

MODERN AUTOMOTIVE CEO

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(J-ib)**

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Table of Contents

MODERN AUTOMOTIVE CEO

CHAPTER ONE:	As A Beginner	1
CHAPTER TWO:	Understanding The Industry	19
CHAPTER THREE:	Automotive Mechanism	78
CHAPTER FOUR:	Building A CEO's Character	104
CHAPTER FIVE:	Ways To Raise Money	141
CHAPTER SIX:	Sales And Marketing	160
CHAPTER SEVEN:	Starting Operation	191
CHAPTER EIGHT:	Business Relationship	227
CHAPTER NINE:	Automobile Sectors	250
CHAPTER TEN	Automotive Manufacturing	303
CHAPTER ELEVEN:	Building A Conglomerate	445
CHAPTER TWELVE:	The Life Of A Successful CEO	458

MY NOTE

The automotive industry is more than just an assembly of parts; it is a complex, pulsating network of innovation, ambition, and human endeavor. It is a testament to humans' relentless drive to move forward, explore the universe, connect, and build. In Africa, this industry stands at a pivotal crossroads, brimming with untapped potential and facing uniquely complex challenges. Navigating this landscape requires not just business acumen but also vision, resilience, and a deep understanding of the forces that dynamically shape mobility.

It is with a profound sense of gratitude that I present this book. First and foremost, I give thanks to Almighty God, the ultimate source of wisdom and strength, whose guidance has been the steady compass on this journey of exploration and writing. This work is also a tribute to the pioneers, the men of grit and vision who laid the foundation of the automotive industry in Africa, especially in Nigeria. Their triumphs and trials have provided the essential context for this book, and their legacy is the foundation upon which the next generation must build.

I wish to express special recognition to two remarkable figures whose lives and work have served as enduring sources of inspiration: Elon Musk and Aliko Dangote. I have drawn immense inspiration from these two towering figures of modern industry, whose influence permeates this book. Elon Musk demonstrated to the world that the automotive industry could be radically reimagined. He challenged every convention, proving that electric vehicles could be desirable, that software is as critical as hardware, and that audacious goals are worth pursuing. From our own soil, Aliko Dangote offers a different, yet equally powerful, blueprint for success. His unparalleled strategic vision, vertical integration, and steadfast focus on scale and impact within the African context have been a profound inspiration. He embodies the fact that with strategic insight, patience, and an unwavering belief in the continent, we can build industrial giants that compete on a global stage. Both Musk and Dangote, in their unique ways, have been my business role models, and their examples have shaped my thinking.

Modern Automotive CEO is not merely an academic analysis; it is

a strategic playbook for leaders ready to steer an automotive enterprise into the future. It is for the CEOs who must balance the realities of today's market with the unsettling tides of electrification, connectivity, technological astuteness, and shifting consumer demands. My hope is that this book serves as a catalyst, a source of comprehension, strategy, and inspiration for the leaders who will drive the next revolution in African mobility. The road ahead is challenging, but as the pioneers before us and the role models beside us have shown, it is a journey filled with immense possibilities.

Welcome to the future seat of the mobility industry.

INTRODUCTION

This book is poised to revolutionize the mobility industry across land vehicles, aviation, AI, space exploration, and maritime. A product of years of intensive research and empirical experience, aimed to build an inter-automotive mind, to invent any human conceivable mobility technology, and to maximize the utilization of automotive products.

After years of participating in revolutionizing the automotive industry, I realized there is a gap in Africa that has stagnated the industry, resulting in minimal evolution and innovation. Everyone is comfortable with the buying and selling routine! To put it differently, automotive entrepreneurs simply want to enrich themselves and retire without a plan for structure and transformation. For this reason, I wrote this book to open the eyes of those in the automotive industry to understand its nitty-gritty, its evolution, and how to create wealth from it while contributing positively to its growth. This book is a precursor of MACEOS, a program designed to build automotive CEOs in all aspects.

MACEOS, which stands for Modern Automotive CEOs, is an initiative by Autohub Africa to develop people in the automotive industry in Africa and around the world. This book serves as a blueprint for achieving success as an automotive CEO, guiding you from the basics to the high point. Read thoughtfully and apply all practical guidelines as you work towards becoming a successful Modern Automotive CEO.

BOOK SUMMARY

A product of years of research and hard work, resulting in what can be described as a “gold mine.” And indeed, it is a “gold mine”! It’s all about how automotive CEOs can grow from the conventional routine to the new age of automotive integrations.

In explaining the expansive scope of the automotive industry, it reveals that maritime, robotic (AI), aviation, automobile, and space exploration fall under a family, termed “Mobility Industry”.

The book covers key topics, including how to get into the business, the scope of the industry, mechanisms, management, marketing, wealth creation, manufacturing, transportation, the future of mobility, ethics/philosophy, and more.

This book serves as a course material conspectus from Autohub Africa’s MACEOS Academy, a digital academy designed to help established and aspiring automotive CEOs embrace the dynamism and trajectory of the mobility industry.

CHAPTER ONE

AS A BEGINNER

This is the beginning of the book, and it explains what a Modern Automotive CEO is all about, what qualifies a person to become an automotive CEO, the best way to enter the industry, and the benefits that Autohub Africa offers to aspiring automotive CEOs through its academy.

The chapter further discusses the necessary preparations for starting out, as well as the need to conduct market analyses, surveys, and career interest. The concluding topic talks about embracing the reality of having accepted to go into the automotive industry and the willingness to give all it requires.

CHAPTER TWO

UNDERSTANDING THE INDUSTRY

Chapter two covers the scope of the industry, market, statistics, and the future of the automotive industry. The discussion includes aviation, land vehicles, maritime, artificial intelligence, and space exploration.

Short and insightful, all aspects of the sectors were discussed summarily, especially space exploration, where interstellar bodies, the universe, and scientific space accomplishments were discussed.

CHAPTER THREE

AUTOMOTIVE MECHANISM

Chapter three explains how a vehicle's engine and transmission work. It also covers other related components, such as suspension, sensors, valves, structure, and electrical system.

The chapter began with a brief history of how automotive mechanisms work, their evolution, and the individuals who have played key roles in making the technology possible.

CHAPTER FOUR

BUILDING A CEO'S CHARACTER

This chapter is pivotal as it opens readers' eyes to what business is all about, how to work professionally in business execution, and the daily lifestyle that accompanies it. Then it proceeds to discuss technical know-how, the necessary skills that an automotive CEO should possess.

It also covered database creation, utilization, managing negative and positive results, self-discovery, health, education, integrity, appearance, words, creativity, managerial qualities, personality, growth, and morals

CHAPTER FIVE

WAYS TO RAISE MONEY

Chapter five first explores what money is and its understanding. Then it proceeds to discuss the systems that accumulate wealth and how wealth can be retained.

It also covers topics such as banking, building an account profile, banks' products and services, repayment, investment advice, international banks, bootstrapping, grants, investors, business plans, and wealth multiplication.

CHAPTER SIX

SALES AND MARKETING

As expected, considering what this book represents, it cannot be concluded without a thorough discussion on sales and marketing. This chapter provides practical guidelines for how an automotive CEO can promote and sell his or her products, especially in today's system.

It began with market research, sales preparation, sales platforms, networking, product cataloging, data cataloging, basic and advanced marketing, absorbing sales bounce, sales commissions, white trading, and other sales and marketing activities.

The chapter wraps up with these three enriching subtopics: Saving money, reinvestment, and business growth.

CHAPTER SEVEN

STARTING OPERATION

This chapter covers the real-world phase of the automotive industry, focusing on practical activities and operational needs. It begins with the need to assess market demand and determine the necessary budget to get started.

The chapter further discusses sensitive topics, including vehicle inspection checklists, diagnostic devices, methods for analyzing vehicle faults, vehicle management, sales strategies, long-term planning, business registration, setting up an office, operational structure, handling official documents, working with affiliates, employee management, handling complaints, and in application to other automotive sectors.

CHAPTER EIGHT

BUSINESS RELATIONSHIP

Chapter eight focuses on business relationships, opening the readers' eyes to how to build connections with the wealthy, partners, executives, board of directors, creditors, business associates, debtors, experienced entrepreneurs, international businessmen, relatives, clients, spiritual businesspeople, corporate organizations, cooperative societies, the government, government agencies, and world organizations.

It also discusses the best ways to understand clients, entrepreneurs, artisans, and advanced networking

CHAPTER NINE

AUTOMOTIVE SECTORS

Chapter nine primarily covers other automotive sectors, aiming to inform automotive CEOs about additional sectors they can also venture into. These sectors include land vehicles, aviation, maritime, robotics, space exploration, and AI. Subsectors are the education of end-users, artisan training, licensing of artisans, vehicle logbook systems, telematics, augmented reality, vehicle security, and carbon capture technology.

Others are solid-state batteries, smart road construction, airless tires, drones, automotive magazines, automotive blogging, vehicle reviews, online automotive services, smart tracking, space recycling, research, smart car-wash, electric vehicles, autonomous vehicles, hybrid vehicles, highway lighting, auto-design, vehicle detailing, automotive academy, hot air balloons, airships, automotive engineering, and transportation.

Some of these sectors were discussed in general terms, while others were examined in detail.

CHAPTER TEN

AUTOMOTIVE MANUFACTURING

This is the core of this book and the most detailed section. It discusses automotive manufacturing in depth, as we can't revolutionize the industry without embracing manufacturing. The chapter covers all sectors of automotive manufacturing, including land vehicles, aircraft, robots, parachutes, maritime, AI, computer, sensors, chips, and components.

It also covers subtopics such as automotive lubricants, fuel, coding, programming languages, steps to coding, regulations, intellectual property protection, space communication technologies, raw materials, production processes, the technology used in modern automotive manufacturing, safety management, automotive manufacturing management, operations, customer relations, certifications, and aircraft sales

CHAPTER ELEVEN

BUILDING A CONGLOMERATE

The goal of a successful CEO is to build a conglomerate. Of course, we can't wrap up this book without discussing how an automotive CEO can build a conglomerate.

This chapter takes a holistic approach to building a conglomerate, covering key topics such as investment, shares, digital currencies, business negotiation, partnerships, government partnerships, company structure, brand management, multinational networking, and the development of a global mega-corporation.

It also discusses other topics, such as winning awards, recognitions, peer groups, identity, and the height of success.

CHAPTER TWELVE

THE LIFE OF A SUCCESSFUL CEO

This is the final chapter of the book. It is more of an allegory; it projects the topics as though in the past, whereas it addresses the present. The chapter discusses the transition stages of an automotive CEO. It covers sensitive topics such as what drew you into the automotive industry, the decisions you made, moments of temptation, seedtime, patience, disappointments, and your contributions to the automotive industry.

It further explores the history of the universe, the history of humanity, beliefs, spirituality, anthropology, the men who shaped the world, great ideas, post-success scenarios, giving back to others, royal dignity, happy death, life after death, and eternity.

CHAPTER ONE

AS A BEGINNER

As in all endeavors, whatever is big today started small in the past. The automotive industry started from sheer human locomotion to the use of horses, camels, carts, to what we have today. This book is for those who have a burning desire for the automotive industry. I don't mean car, aircraft, yacht, or AI enthusiasts! I mean those who want to build a career in the industry and make a difference."Career interest" is essential when choosing a business to venture into. You will agree with me that jumping into a business solely for its monetary gain is unwise. Of course, such a business will be short-lived, resulting in little impact on the industry.

Ultimately, it is far rewarding to pursue a business out of passion than for any other interest. Therefore, you must be convinced of your desire to build a career in the automotive industry before venturing into it. Although a person can go into a business that is transient to her ultimate career. For example, Jeff Bezos has over sixteen thriving companies, yet his ultimate life goal is to build a space company that will enable humanity to become a multi-planetary species and preserve the Earth as a "nature reserve".

Driven by this ambition, he founded Blue Origin, a company that manufactures reusable rockets and aerospace systems. This suggests that Jeff is a CEO in the automotive industry. The point, however, is that Bezos owns other companies while still pursuing his primary goal.

Similarly, Aliko Dangote owns over 18 subsidiaries, including Dangote Vehicle Manufacturing and Transportation Companies,

making him an automotive CEO. Unlike Jeff, whose apex goal is rooted in the automotive industry, Aliko wants to build a more prosperous, self-reliant Africa, focusing on economic development, improved healthcare, and educational opportunities.

Presumably, if Aliko had come from a first-world country, he would have been pursuing an ambition in the space sector. His present ambition, as mentioned above, seems to be about the understanding of the importance of counting one before two. Nevertheless, I envisage that Aliko, in his lifetime, will establish a space exploration company or his successor(s) will.

So, you can have a prime career while still running supplementary businesses. Seemingly, Aliko and Bezos have their respective ultimate goal, and all their business ventures are but meagre steps toward it. The journey to achieving this primary goal hatched everything they have accomplished today. Yet, they remain discontent until this head goal is accomplished.

My point is that you must have an interest in the automotive industry before you can benefit from this program. We are looking for serious-minded individuals who are ready to launch out and contribute to the industry's growth.

Qualification

This book focuses on transforming capable and determined individuals into automotive CEOs. It presents a systematic and practical approach that will establish candidates as CEOs, making them wealthy, innovative, and experienced. This book is for two categories of people: The established and aspiring automotive CEOs. We are taking our coaching from the grassroots to the top. Therefore, all topics in this book apply to these two categories. Although some topics may be directly addressed to aspiring CEOs. Regardless, it is advisable for both categories to absorb all topics and apply the knowledge gained when needed.

This book is not limited to land vehicle entrepreneurs but also encompasses all mobility sectors, including transportation, manufacturing, space exploration, maritime, AI, aviation, and all other automotive-related fields. As the saying goes, "Many are called, but few are chosen," so is the utility of this book. This book is a by-product of years of research and hard work, resulting in what can be

described as a “gold mine.” And indeed, it is a “gold mine”!

We have invested our values and time into this project to ensure that anyone who reads this book attains a life-changing experience. Our goal is to guide you in acquiring the knowledge needed to become a successful automotive CEO and a key player in revolutionizing the industry in the modern age. Those outside the mobility industry can also benefit significantly from this book. They will learn valuable insights that can positively transform their businesses when applied. After all, the mobility industry is permeating nearly all areas of human endeavor.

Basic Requirements

Passion

The power of “will” is invaluable! To succeed in the automotive industry, you must be passionate about it, not solely for monetary gain but to instigate change and leave a legacy.

Passion is what will lead you through the industry; without it, your ambition will be lifeless at the start. As an intending or established automotive CEO, you must have an unwavering interest in the industry. You must be passionate about success. This is definite! It is unlikely you drink water when you are not thirsty. So, it is unlikely that you will become successful without passion.

Many businesses have failed because they lacked deliberate passion. For a business to succeed, there must be a purposeful drive. Because success is the end goal of every endeavor, however, not every endeavor attains success – J-ib.

Passion will motivate you to instinctively carry out your business plans professionally and ensure solid results. Thus, you must develop a strong passion for success before you can fully benefit from this book.

Intelligence

Yes! The automotive industry requires knowledgeable individuals because of its mechanical and algorithmic nature. For instance, Elon Musk is said to have scored an IQ of 155, which makes him extraordinarily intelligent. An IQ score of 130 or higher is considered gifted, while a score of 150-160 or higher is regarded as genius,

comparable to that of Albert Einstein. All automotive engineers and scientists have high IQs and are exceptionally intelligent. You might argue that you are not pursuing engineering or scientific discoveries and that you are only interested in the business side of the industry, so why should you aim for this level of IQ?

Yes, we are on the same path! As a matter of fact, the prime objective of this project is for you to go into businesses in the automotive industry and come out as a wealthy CEO. Notwithstanding, you need to know little or a lot about engineering, coding, and other automotive, scientific, and technical know-how.

Karl Benz was an automotive engineer who became a world-renowned CEO. In contrast, Elon Musk didn't know as much about analogue engineering as Karl; however, his coding experience enabled him to invent or improve electric vehicles. Moreover, this doesn't downplay the fact that he understood mechanical engineering.

Regardless of Karl and Musk's engineering backgrounds, they both understood what it takes to run a successful automotive company. This is why they have prospered so much. Although they can't do everything themselves in the manufacturing plant, they possess the experience and intelligence required to supervise their employees effectively and give directives. You have to understand the basic mechanisms of automotive products and their functionalities. Above all, you must be lucid and well-informed enough to grasp the business aspects of the automotive industry and the skills required to run a company.

Thankfully, this book has covered all these aspects. Thus, you must read curiously and apply what you have learned to the everyday running of your business. Additionally, you must acquire knowledge in other fields of endeavor to stand out brilliantly.

Education

If you hadn't been educated, you might not have understood what MACEOS is all about, and you wouldn't have been able to read these words now. So, congratulations on being educated! Without education, knowledge suffers! Education is crucial because the absence of knowledge limits our scope. The automotive industry, in particular, requires education due to its technical nature. You need to understand automotive mechanisms — such as how an engine

works, how an aircraft launches into space, how the electrical system operates, how software coding works, and how scientific equipment works — and, above all, how to manage a company as a CEO.

As an aspiring automotive CEO, you must be well-educated and have a thirst for knowledge. This will root you and take you to the summit. You must know at least one thing about everything. You must build yourself up such that you can attend a business meeting with Elon Musk, Bernard Arnault, Larry Ellison, Richard Quest, Donald Trump, or any great business person of your fantasy and communicate with him constructively. Knowledge opens doors of opportunities for us, and as a CEO, it must be among your top qualities.

Technology

This is synonymous with education; however, there is a little difference. To be technological is to be scientific. Therefore, to leave a footprint in the automotive industry, you must develop a love for science. This is because there is no field in the automotive industry that is not scientific.

You must understand the basic and fundamental principles that made a particular scientific invention possible. You have to know, for example, how the Internet functions and how science evolved from a Sundial to a Digital Clock. From Abacus to Digital Calculator, Java, C++, Python, Node.js. From a Cart to a Car, a Yacht, an Airplane, and AI. From a Mirror to a Photographic Camera. From molding an Engine Block to an Autonomous Vehicle. From a Magnifying Lens to an X-ray, from Needle to Sewing Machine, from Animal Skin to Textiles, from Suntan to Solar Panels, Quantum dot solar cells... From Encarta to Wikipedia, Google, Deepseek, Grok, Topological Superconductor, and so on. You must be curious to understand how technologies were invented and evolved over time. This will enhance your quest to revolutionize the industry and amass wealth.

Age

Yeah, this is axiomatic! The journey to becoming a successful CEO should begin between the ages of 20 and 70. Younger individuals may not be suitable, and those aged 70 or older may face challenges. You're probably within this age range. Anyway, whether you are

at your prime or advanced in age, what wins is your mindset and determination. With this in place, you can achieve great success at 60 or 21, depending on the situation. Thus, age is a factor, which is all the more reason we should make use of our active years rather than engage in frivolous activities.

Thinker

Managing a company requires creativity and dynamic approaches. Many businesses have been managed adversely due to the CEO's lack of creative thinking. Your creative thinking is tied to how you develop businesses, handle issues, and generate more revenue. As a CEO, you must be discontent with the conventional approach, think outside your routine, and create something from nothing.

Best Way To Start

The benefits of MACEOS are priceless. In other words, they cannot be monetized! We have made provisions for everything you need to become a successful Modern Automobile CEO. I choose to approach this program from a grassroots perspective because I want individuals who haven't been involved in the automotive industry to come in and succeed by applying the teachings in this book.

Before I decided which aspect of the automotive industry should be a beginner's starting point, I had considered the industry's origin and evolution, and "land vehicle" emerged as the primary focus. Credibly, the engineering breakthrough in a land vehicle's engine has birthed every sector of the automotive industry today. For instance, the mechanism used in an aircraft's engine is a by-product of car engines. The same holds true for the engines of rockets, ships, and other mechanical devices, such as generators, grinding machines, and many others.

Therefore, I will base "land vehicle" as a beginner's starting point. This has not necessarily made land vehicles the least; on the contrary, it is because other mobility sectors trace their roots to it. This evolution continues to no end, just as it has been from the beginning. The need for speed and long-distance coverage has led to diverse inventions, and the quest remains the same until we hit the edge of the Universe. The journey started evolutionarily, from a donkey to a cart, and from the regular cart to Robert Valturio's

1472 windmill-powered cart, geared to the wheels. Building on this success, Leonardo da Vinci proposed a self-propelled vehicle in the 15th century. Da Vinci's assertion ignited the passions of scientists, mathematicians, and engineers of his time, who were on a mission to change the status quo. As a result, Jacques de Vaucanson invented a clockwork engine in 1748.

At this point, the invention of the automated machine was steeped in a reality template, and this alignment became clearer when Otto Von Guericke developed an air pump featuring mental pistons, cylinders, and connecting rods in the 17th century. To further embrace reality, Nicolas-Joseph Cugnot created the first self-propelled road vehicle in 1769. Then, in 1863, Belgian inventor Étienne Lenoir successfully built an internal combustion engine. This engineering breakthrough ushered in a new era for the automotive industry, leading to the creation of the gasoline-powered engine by Karl Benz. Consequently, the birth of renowned automotive brands such as Mercedes, Ford, Volkswagen, Toyota, Audi, Chevrolet, and Peugeot ensued. Meanwhile, almost all historians believe Nicolas-Joseph Cugnot's invention was the first actual automobile.

I suppose that at this point, you know how the journey started. Now you can understand that a car running at 240 miles per hour or that space machine thrusting came to be as a result of centuries of hard work from devoted engineers, scientists, and mathematicians.

Empirically, the best way for an aspiring automotive CEO without startup capital to start out is through vehicle sales, as it is something anyone can start without capital. Regardless, there are other sectors in the industry where one can also start out without startup capital, such as driving, vehicle washing, seafaring, piloting, cabin crew, and many others. Although some of these fields require professional training. The overall idea is to start at a convenient stage and then grow it into a conglomerate. This does not change the fact that some people will start big. In fact, some people enter the mobility industry with billions of dollars already in their accounts. For instance, Allen Onyema of Air Peace had already made substantial money in real estate before transitioning into the aviation sector. Similarly, Frank Nneji of ABC Transport began on a large scale through a bank loan. Jeff Bezos founded Blue Origin after making billions of dollars.

In like manner, Kiichiro Toyota was already swimming in

the wealth of his father, Sakichi Toyoda, a prolific inventor and industrialist, before he established Toyota. Elon Musk was already \$1.5 billion rich (after his eBay deal) before he founded SpaceX, and Aliko Dangote was already doing well before he entered the automobile business.

There are so many automotive CEOs who started from a very high position. Data shows that 70% of the world's billionaires have ventured into the automotive industry. In the future, all wealthy people will venture into the automobile business, as well as those who are averagely rich. The mobility industry will be what real estate is today to wealthy entrepreneurs. As a matter of fact, the automotive industry will usurp real estate, rendering it obsolete. Irrespective of this, success in the automotive industry is tied to an individual's interest and determination. Whether you started (are starting) big or small, what drives your success is vision, conception, and dedication. I recommend vehicle sales for those who are starting with nothing because it's a quicker way to raise money, no matter how underground you are. This is why I will focus more on land vehicles than on other sectors.

I started in the automotive industry through transportation. This was even when I was very young, so it crept into me as though it were a destined path. The transport company was UBE Motors. The CEO was a family friend. He offered to let me live with him while I attend secondary education. As a result, I began staying with him, and his transportation company was thriving at that time. So, I was exposed to a lot of things, from drivers to artisans to bank roles in the business, routes to ply in transportation, government licensing, purchasing new vehicles, charging passengers for their goods, vehicle repairs, counting money, debt recovery, and so on.

It was a milky experience for me and the first business-related adventure in my life. Unfortunately, I didn't stay long at the company because the CEO had promised to send me to school. However, after I started working with him, he began to guide me toward serving him as an apprentice, which I declined and worked my way out. This is because I couldn't trade education for anything.

Meanwhile, I won't exaggerate when I extol this great man, Chief John Ekweme, the CEO of United Brothers Enterprises (UBE), but I will state it as it is. I was only 13 years old when I joined you

in your business, and I had the privilege of participating in every activity within the company. Thanks to your generous guidance, I learned almost everything about the business in a short time. I admired everything about you, and you were a role model. You were such a laidback man, meek to a fault! Hardworking and an innate philanthropist! I enjoyed everything under you – my only agitation was the cost of my education. Thank you.

That was my early-life experience in the industry, and it was profoundly formative. Serendipitously, after my education, I got into the entertainment industry, and my then-boss's father, incidentally, was a tycoon in the transportation sector. Along the way, my boss incorporated online ticket booking for passengers into what we were doing, including other tech-related initiatives. This exposed me to the transportation sector and the automotive industry more broadly. After leaving my boss, I started a micro transportation business (airport shuttle), which was short-lived due to poor driver performance. Interestingly, during my time at the airport, I gained exposure to the aviation sector and learned a lot. Meanwhile, this experience remains crude since I haven't ventured into the aviation industry. However, I have begun to facilitate private jet sales and rentals as a middleman.

So, after I left the airport shuttle business, I started buying and selling used vehicles locally. However, my success didn't come mainly from the vehicles I bought and sold, but rather from the vehicles of the affiliate dealers. I would cover (snap a vehicle all around) the affiliate dealers' vehicles, post the images online, and earn a commission when a client buys the vehicle through me. This is why I believe that a beginner with unreserved determination would succeed without start-up capital, because I started that way.

This book covers the A to Z of what you need to be successful in the mobility industry. Whether you're starting as a vehicle dealer or transitioning from other fields within the industry, this book provides all the essential guidelines for success, regardless of the area you choose. Today, we have successful CEOs in the automotive industry who started in humbling circumstances. Notable examples include Karl Benz of Mercedes-Benz, who began as a mechanic, and the most humbled of them is Chief Vincent Obianodo of Young Shall Grow Motors, who started as a vulcanizer and later worked as a bus

conductor, ultimately rising to what he is today.

Similarly, Richard Branson of Virgin Atlantic started as a magazine seller. Godwin Ubaka Okeke of GUO Motors began as a commercial driver, Innocent Chukwuma of IVM, and Cosmas Maduka of Coscharis Motors both started as vehicle part sellers, and so many other wealthy automotive CEOs who started from a low point. Therefore, for those who are starting with nothing or have started with nothing, you will succeed when you start as humbly as your current financial state. If someone like Chief Obianodo could make it this big, you have no excuse whatsoever not to succeed as a vehicle sales agent or whatever field in the industry that you choose to start from.

For those who are starting or have started in vehicle sales, I wouldn't call you "a vehicle dealer" because I can't address you as a dealer when I'm unsure whether you can afford to buy a vehicle in your name. So, the lowest you can start as a Modern Automotive CEO is as an agent dealer, and this hasn't in any way made you lower. Therefore, starting low doesn't make one lower—J-ib. It is the need to ensure that you succeed in the industry, having started from the bottom, that we have written this book to teach you everything you need to know and help you grow exponentially.

Benefits

This concerns our MACEOS project, which aims to develop both aspiring and established Automotive CEOs. Our advanced program for established Automotive CEOs shall take effect in 2026. In the meantime, we are focusing on aspiring Automotive CEOs who indubitably need immediate mentorship. Against this backdrop, here are the steps we can take to empower those aspiring to become successful Modern Automotive CEOs, especially those who want to start as agent dealers. This opportunity is exclusively for individuals in Nigeria and, of course, for those we have admitted into our MACEOS Academy. For those outside Nigeria, read on; we have provided all the guidelines to help you succeed in the industry, no matter where you are. All you need to do is enroll in our digital Academy, and you will lose count of the benefits.

Below are Autohub Africa's incentives for aspiring Automotive CEOs:

- We will teach you everything you need to know to become a successful Modern Automotive CEO.
- We will add you to our automobile groups, where you can connect with dealers across the country.
- We shall provide you with over 10,000 contacts of active dealers in Nigeria.
- We shall give you at least 5,000 contacts of “auto-clients”. These are clients who buy cars, either for themselves or by proxy.
- We shall place those who have no experience in a three-month internship with any of our affiliate dealers.
- With the help of our financial partners, we will grant you a dealership loan to purchase vehicles on your own.
- We will teach you how to import vehicles overseas and buy Nigerian used vehicles.
- We will make it possible for you to join all relevant automotive associations and obtain government certifications.
- We will assist you in profiling and registering your company with CAC.
- We shall promote you as an affiliate dealer and grant you all the accompanying benefits.
- We will provide you with contacts from top individuals in various sectors, such as automobile, aviation, maritime, and more.
- We shall profile your company, among other things.

Preparation

This is the first step towards becoming a Modern Automotive CEO. As you know, “preparation brings courage and courage brings delivery while delivery brings success” – J-ib. To venture into the automotive industry, you must be fully prepared. Opportunely, our MACEOS platform offers a 100% preparation package for you. However, we require individual preparation to help us achieve this goal.

The following are the four basic things you need to start a business in the automotive industry as a beginner:

Time

The first thing required of you in the industry is time. Regardless of the other engagements, you should dedicate at least eight hours a day to this business. In fact, the standard is that you come in full-time and focus your attention on the industry. You may not do well when you have a side hustle while in the industry. It will bring distraction and a superficial approach to business activities. Thus, full-time engagement is the key. Notwithstanding, you can have residual income if it doesn't distract you. In one of the chapters below, I discussed other automotive businesses that you can also go into for residual income.

Smartphone

The second thing you need to start this business is a smartphone and internet access. This is your ultimate tool because your work will be 90% online. However, some fields might require nearly 100% physical activity. Examples include being an automotive artisan, designer, inventor, manufacturer, programmer, or hardware producer. Thus, 90% of online activity pertains to vehicle sales, while other fields with more offline activity have a 10:90 ratio. Meanwhile, owning a smartphone is one thing, but knowing how to utilize it is another. Fortunately, what we teach you here will spark your curiosity and help you make the most of your smartphone's potential.

I know that all we've been discussing may sound too basic to some established and intermediate CEOs. As I said, I'm going grassroots for the sake of intending CEOs. So, read on regardless; you will meet many episodes that apply to your category. As a matter of fact, there are some revelations in this book that you will consider a lifetime treasure.

Before I proceed further, I would like to recognize the industry's sages, from whom I have learned a great deal. My unreserved admiration to Elon Musk, Aliko Dangote, Jeff Bezos, Akio Toyoda, Sergio Marchionne, Carlos Ghosn, Jim Farley, Mark Fields, Mary Barra, Mike Manley, Bernie Ecclestone, Sergey Brin, Larry Page, Ralph Gilles, RJ Scaringe, Rolf Habben Jansen, Captain Rajalingam, Erik Hanell, Søren Skou, Martin Winterkorn, Bernie Ecclestone, Kim Povlsen, Colin Angle, Silas Adekunle, Scott Phoenix, Bill Huang, and Brett Adcock... Adam Bry, David Hanson, Ed Bastian, Scott

Kirby, Campbell Wilson, Michael O’Leary, Benjamin Smith, Badr Mohammed, Allen Onyema, Peter Ingram, Cho Won-tae, Frederick W. Smith, Keith Creel, James M. Foote, Lance M. Fritz, Finn Amund Norbye, Klaus-Michael Kuhne, Rodolphe Saadé, Gianluigi Aponte, Squires, David P. Abney, Oscar Munoz, Xavier Urbain, Dr. Detlef Trefzger, and Scott Davis.

Others are Bjørn Andersen, Reggie Aggarwal, Mike Ettling, Katherine Kostereva, Ulf Persson, Dan Rodrigues, David L Felsenthal, Tooey Courtemanche, Christopher W.Cabr, Adam Elster, Darren Roos, John P. Wiehoff, Rüdiger Grube, Scott Temple, Mario Harik, Mathieu Friedberg, Oscar de Bok, Stefan Paul, Ken Oaks, Brad Bao, Innoson Chukwuma, Eyal Ofer, Stamatis, Tsantanis, Rajalingam Subramaniam, among others.

These outstanding CEOs have been vital to who I am today, particularly in the mobility industry. Their impacts cut across land vehicles, aviation, software, transportation, robotics, and maritime.

I took my time to read about these men, their business philosophies, achievements, and contributions to the global growth of the mobility industry. Meanwhile, I intentionally listed their names so you can learn about them and understand their legacy. You can select a few names that interest you and read about them. Trust me, their pedigree in the industry will ultimately bolster your journey to becoming a successful Modern Automotive CEO.

Internet

The third thing is the Internet. It is unlikely that scientific advancement survives without the internet. The internet is the fuel that drives modern technology. Consequently, you can’t function in your business activities without the internet. Therefore, you must consider the internet a top tool. Imagine a time without internet service on your phone—you’d be grounded! So, prioritize internet access and ensure you have it 24 hours a day because when it’s readily available, possibilities abound! There won’t be any preparation or functionality without the internet. If money moves the world, the internet spins it! – J-ib. Thus, there should be a titled slot for internet subscriptions in your operational budget. This will keep you “on the move”, support your aspirations, and give you the desired results.

Mobility

The fourth and final thing you need to start an operation in the automotive industry is mobility. Your ability to work itinerantly as a beginner in the business is crucial. Therefore, maintaining physical fitness is essential, as the business may require you to travel frequently between locations, especially as a beginner. This is all the more reason you must take care of your health. Exercise regularly, eat farm-fresh food, and drink plenty of water.

Survey

This relates to data collection and other information you need to get started. This data includes statistics and key preparatory details. Below are key areas that you have to survey while starting your automobile business:

Business location

One of the key considerations you must address when starting an automobile business is the location. A good location plays a vital role in accelerating your success in the industry. In fact, your business location determines both your success and failure. Therefore, ensure that you find a suitable location and capitalize on the opportunities it presents. Location in this context is not necessarily a space you can lease for vehicle sampling or an office. No, it is as it concerns the country, state, and city you want to operate from. For instance, to choose a settlement in Festac Town, Lagos, Texas, USA, Kigali, Rwanda, the Central Area, Abuja, and so on.

Expediently, the location of a car lot is essential for those who can afford to lease or rent one. Meanwhile, this is for those who are starting out in vehicle sales. For those starting out from other sectors, consider “car lot” as used above to be what your office is to you. It is not much of an issue if you can't afford a car lot. At most, you can look for an existing one and attach with the people operating therein. Regardless of whether you lease a car lot or get attached to an existing one, your success is tied to your ability to apply what you have been taught in this book. And for those who can neither afford to lease a car lot nor get attached to an existing one, you have nothing to lose if you apply what you read in this book. We have already listed the four key things required to get started. As you can

read, we did not include having a car lot as part of the preparation. No, it is what you can do without, inasmuch as you made the four things required available.

Number of vehicles

Gather statistics to find the number of vehicles in each state in your country, then narrow it down to the local government, and finally, the town. You can do this using Google search. This will give you insight into the automotive industry's activity in each state. Because of the nature of MACEOS, you need a vehicle-dense state. We want you to get fully involved and become a pinnacle in the industry. However, it all depends on the area in the industry where you will end up specializing. For instance, in manufacturing, you can establish it anywhere that is convenient for you. The same thing may apply to other automotive fields; it all depends on necessity.

A good example of what I'm talking about is Innoson Motors. The CEO, Innocent Chukwuma, went to Nnewi, Anambra state, to establish his manufacturing plant regardless of other considerations. He knew that if he could bring the raw materials to the location, other considerations, such as sales and distribution, would not be necessary. The reason is that he can be in Anambra state and still market his product to any state in the country and other countries overseas.

Apart from Innoson, we have several other automotive manufacturing companies located in remote places, yet their products are household names in the city. In the USA, most automotive manufacturers are located outside of automotive hubs such as California, Texas, Florida, and New York. The same applies to Germany, Japan, China, and other countries. So, location isn't necessary. However, for MACEOS, we recommend starting with vehicle sales because it is the most basic and straightforward way to raise funds, allowing you to focus on your primary industry goal, whether you have the resources to rent an office or not. As it concerns Nigerians, we recommend Lagos or Abuja as good locations to start, given the high number of vehicles in these areas.

Number of dealers

This consideration is crucial because the number of dealers in

your chosen location determines the scope of your networking opportunities. It also affects the number of vehicles you can market. All things being equal, this will spur opportunity utility and progression.

Road accessibility

This is very important! You need a good road network to connect smoothly with dealers in your area. It's frustrating when you can't access a particular vehicle, perhaps due to traffic or other factors, especially when you have a client waiting for it. So, find a location that is convenient for you. For instance, I had a good networking opportunity in Abuja, as I could drive anywhere at any time with little to no impediment. Likewise, I was comfortable operating in Festac/Amuwo, Lagos, due to the well-developed road network. Thus, having a location with numerous vehicles, dealers, and a well-developed road network is the best way to start.

Client base

This is crucial, as it will significantly impact your success. Some states buy vehicles from other states in Nigeria. The three dominant places are Lagos, Abuja, and Port Harcourt. Lagos, for instance, accounts for up to 60% of Nigeria's automotive customer base. This is followed by Abuja and then the rest. The more buyers visit your location, the more sales and connections you will make. Regardless, you can still operate from a remote location, close deals, and make connections, as the MACEOS operational system is 90% online. As a matter of fact, I had someone in custody who marketed vehicles online, and he made sales.

So, while being in a high-client-base area is important, you can still work from any location of your choice as long as you can afford the four basic preparation requirements stated above.

Population

For entrepreneurs, analyzing futuristic business statistics is crucial before venturing into a new business. The importance of this futuristic analysis is that it pre-empts you to anticipate the business's probable future outcome. Incidentally, the human population of an area where you want to establish a business is one of the statistics

you should have. The data allows you to forecast your business's future in that area with almost perfect accuracy. And as it concerns the automotive industry, this statistic must be demographic. This information will enable sequence the age categories, guiding you in developing a product. For example, as a MACEOS member starting a business today, you found in your demographic statistics that the 10 to 15-year-olds lead by 30%. This information indicates that demand for vehicles will increase by 30% over the next 5 to 10 years.

Upon discovering this, it will serve as a clue to help you prepare for it. This preparation may involve raising additional funds to buy more vehicles over the next 5 to 10 years, or even building a manufacturing plant for this purpose. This is just a conventional approach; there are other business plans that this statistical information could birth. For example, you can partner with an insurance company to implement a long-term pre-owned vehicle savings program for the parents of the children, so they can save up for their teenage children for the purpose of them owning vehicles by the time they are adults. The insurance company will manage the savings processes, and you will work on making available the number of vehicles that might be needed. You can use schools as a medium to approach the parents of these teens. This is just a typical example; you can use this statistical information in other ways. I believe that with deep thinking and knowledge, you will be able to develop business plans using the gathered population demographic information. There are other things you can think of that may have nothing to do with selling vehicles.

A good example of population utility is China's demonstration of it during its trade war with the United States of America. China believes that, with its current population, it can trade domestically and still succeed. Thus, population utility is essential in any economic engagement. For instance, you can create an automotive cartoon magazine for these teen students. You can establish a driving school academy as part-time schooling, among other options. You will know many other things you can do in the automotive industry by the time you finish reading this book. In summary, determining the population and age demographics of a given location is a good way to inform anticipation.

Embracing Reality

Having understood all that was written above, it's time for you to embrace your present reality and settle into what you've chosen to be: a successful Modern Automotive CEO. At this point, be immersed in introspection. Reflect deeply on your motivations and what you aim to achieve in the industry. Create a plan projection that outlines your mission and vision, your goals, and the timeline for achieving them. Depending on the area from which you want to start, categorize the stages you will go through to achieve your zenith goal. Analyze each stage critically and always think ahead to surpass the norm and bring a change in the industry.

Consider what drives you to excel in your newly chosen business and career. Gather anything that inspires you and harness its impact. Imagine the possibilities in the industry. Visualize an umbrella-like dome shielding the industry while you stand atop it. Picture yourself soaring above the dome, possessing knowledge of everything below as if it were all your accomplishments, filled with sealed experiences. Step out and move around to observe how industry professionals are currently operating in your area. Take note of both their strengths and weaknesses. Hone their strengths and proactively address their shortcomings. Assess their success ratio and incorporate both positive and negative identifications into what motivates you. Be eager to thoroughly understand the industry, particularly its market scope and future potential. Avoid distractions or anything that could challenge your decision to invest in the automotive industry.

Read as many books as you can get your hands on. Read about aviation, maritime, space exploration, AI, transportation, manufacturing, machine components, management, sales and marketing, self-development, and the futuristic aspects of the automotive industry, among others.

Thankfully, these topics are being treated in this book. The more reason you must read all the way through, assimilate its teachings, and apply them in your business. Embrace personal preparation; make your home cozy, eat well, and exercise properly. Be at peace with everyone, and keep your mind clear.

CHAPTER TWO

UNDERSTANDING THE INDUSTRY

This is the foundation of this business, and it's a part you must master very well. You have to master the industry's nature, evolution, scope, future, and market value. After this, you will proceed to understand the various sectors in the industry, including land vehicles, aviation, maritime, artificial intelligence, and space exploration. These sectors are the broods of mathematics, algorithms, and mechanisms. We shall study them in detail as we progress. The automotive industry's departments are enormous and robust. However, regardless of the sector, the following departments are essential and appropriate. They include research, design, development, manufacturing, quality control, marketing, sales, repair, modification, transportation, and corporate services. Every sector in the automotive industry undergoes these departmental processes to complete operations. Meanwhile, there are sub-departmental units that perform unit functions. However, they are for the credit of the principal departments. We shall discuss this in detail as we progress.

I want to start with land vehicles because they are our beginner's starting point. On this note, it is essential that you understand the various departments within the automotive industry and their respective functions. For now, I will spare you the departments and their functions as they might be too encircling for you to understand at this early stage. However, we shall discuss them as we progress. To count one before two, I'm prioritizing what you should know before

progressing to the advanced stage. So, regarding our grassroots agenda and the journey of selling vehicles as a beginner's starting point, understanding vehicle brands, models, year of manufacture, and prices is the first thing you should grasp. Your ability to know vehicle brands, models, years, and prices is the entry permit to starting vehicle sales. This is an area you must study as though you just got admission into a university. This is the central foundation!

The most crucial thing in a business is the knowledge of its products. You have to know the products in the industry you are in, and, in the automotive industry, knowledge of vehicle brands, models, years, and prices is essential. This will put you in the driver's seat, and there won't be a limit to where you can go.

The best way to know about a vehicle's specifications is through automotive classified websites. Examples of automotive classified websites include Corpat, Autohub Africa, Cars.com, Autotrader, Carguru.com, Carvana, Jiji, Autocheck, Copart, Capital Auto Auction, ADESA, AutoBidMaster, eBay Motors, ACV Auctions, A Better Bid, and so on. Visit these websites and study them very well. You will see vehicle catalogs and learn a lot from them. Another way to achieve this is to look at any vehicle around you and study its specifications. Like my son at 5, he would point at any vehicle that passed by - demanding to know the model, year, specifications, and current price. Such early interest and curiosity enabled him to understand assorted brands of vehicles today. There are many other ways, like searching randomly online, watching vehicle reviews, and so on. You can also achieve this from automotive WhatsApp groups, all depending on your quest. You have to keep memorizing vehicle information, especially the model and year. This will guide you to sink into the business and build your confidence when talking to a client about a particular vehicle. Like I said earlier, all of this is as it concerns a beginner. As we move forward, we shall see other broader aspects you must know about.

Understanding The Market

The importance of knowing the automotive industry's market scope cannot be overstated. It provides opportunities and enables

forecasting. I lack the nomenclature for land, sea, and air vehicles. In other words, what would the union of land vehicles, maritime, and aviation be named? Or what could we call the ternion of a car, an aircraft, and a boat? Well, after extensive research, I realized that they all fall under the automotive industry. For instance, we already have cars with features of being a car, an aircraft, and a boat, all at once. Examples are Maverick, Splash, and Halo Interceptor. Oh my... I love Halo! Halo Interceptor is a breathtaking masterpiece by British concept designer Philip Pauley. What makes Halo unique is that it features both aircraft and helicopter capabilities. We have hybrid vehicles that combine features of flying cars and airplanes, which can also sail on water. Examples include Terrafugia, Aeromobil, and Kitty Hawk for flying cars, while for amphibious vehicles, we have the famous Russian Orlyonok, Amphicar, YachtStang, and others.

So, airplanes, cars, ships, and anything that is an auto-locomotive fall under the category of an automobile. This also includes drones, robots, AI, and other advanced algorithms that have attained automation. AI and space exploration are part of the automotive industry because an autonomous vehicle, for example, is an AI technology. As a matter of fact, 70% of high-tech robots currently in existence are manufactured by automotive manufacturing companies. For example, ASIMO is made by Honda, Optimus by Tesla, T-HR3 by Toyota, and HH7 by Hyundai, among others. So, AI is part of the automotive industry. Space exploration, on the other hand, is the automotive industry's destination pinnacle. In other words, the evolution of the automotive industry will be in space. Vehicles will all be flying, including spaceships, rockets, and all kinds of machines. And, of course, these vehicles are products of the automotive industry.

The truth is that space exploration won't be possible without vehicles and AI. For example, the Webb telescope is a combination of mechanisms and algorithms, making it both an AI and a space vehicle. Indubitably, space exploration relies on the automotive industry because it cannot be achieved without automotive products. In fact, I envisage an era in which humans live in space, hovering in their respective spacecraft. In this era, just as humans currently live

in buildings on Earth, so shall they live in machines in space, and the automotive industry will make this possible.

The automotive industry fosters the future of mankind, as its products are the force that propels both the present and the future. So, the automotive industry is anything that can autonomously move from one place to another, or that can aid such movement. Creatures like donkeys, horses, and even humans can be classified as automobiles. This is because they are self-propelled, and anything self-propelled is of the automobile. In fact, automotive products are by-products of the above creatures. For example, donkeys and horses have played key roles in the evolution of transportation. Similarly, humans have played a role. In ancient times, people walked miles from one place to another, either for economic reasons or for other necessities. Humans used to carry loads on their heads or shoulders from one location to another. These ancient mobilization necessities gave birth to the modern automotive industry. Apparently, the automotive industry is very vast and touches almost everything. What makes it interesting is the fact that it's highly futuristic. It's the only industry with the potential to outlive humans.

The proposed transhumanism, exoskeleton, and AI intelligence explosion are all under the automotive industry. Thus, the automotive industry is the future of the world, and its influence is in everything. To me, anything operating in an automated system is automotive, whether mobile or stationary. For instance, a computer device has a continuous sequence of electrical pulses that synchronizes the operations of all its components, carrying information, preventing conflicts, and ensuring seamless coordination. These electrical pulses are generated via a micro mobility. Thus, there is always a moving force in every mechanism, whether such a machine is stationary or mobile. Regarding the automotive industry's market scope, I will discuss aviation, maritime, AI, and space exploration. Then, I will be detailed with "land vehicle" because it's our aspiring automotive CEOs' starting point. On account of this, below is a summary of the automotive industry's scope:

Land Vehicle

The scope of the automotive industry is broad, but I will break it into pieces. First, determine the number of vehicle brands globally, then narrow it down to your country and, of course, your town. Knowing the number of vehicle brands that operate globally and in your country is very important. As a matter of fact, it is advisable that you know the ones that are yet to operate in your country. You have to understand the brand name, the country where it is manufactured, the founder, the year it was founded, and its global ranking. This information will guide you through. The following are the statistics you should know to determine the scope of land vehicles, both local and international.

Step one

Determine the number of land vehicle brands worldwide:

The table below provides an overview of land vehicle brands worldwide. Kindly study the brands and assimilate the information therein.

Brand	Country	Founder	Year Founded	G.R
Acura	Japan	Kiichiro Toyoda	28/08/1937	39
Alfa Romeo	Italy	Nicola Romeo	24/06/1910	73
Alpine	France	Jean Redele	22/06/1955	93
Ashok Leyland	India	Raghunandan Saran	07/09/1948	78
Aston Martin	U.K	Lionel Martin & Robert Bamford	15/01/1913	70
Audi	Germany	August Horch	16/07/1909	10
Bajaj	India	Jamnalal Bajaj	1940	48
BAIC	China	Chinese Government	1958	87
BMW	Germany	Karl Rapp, C. Castiglioni & Franz Popp.	07/03/1916	5
Bentley	U.K	Water Owen Bentley	18/01/1919	27
Bugatti	France	Ettore Bugatti	1909	30
Buick	USA	David Buick	1899	28
BYD	China	Wang Chuanfu	2003	9
Cadillac	USA	William Murphy, Lemuel Bowen, & Henry M.L	22/08/1902	25
Changan	China	Li Hongzhang	1862	62
Chevrolet	USA	Louis/Arthur Chevrolet, William C. Durant.	03/11/1911	14
Chrysler	USA	Walter Chrysler	06/06/1925	29
Citroen	France	Andre Citroen	03/1919	67
Dacia	Romania	Nicolae Ceausescu	09/1966	69
Daewoo	South Korea	Kim Woo-choong	22/03/1967	82
DAF	Netherlands	Hubert Van Doorne	1928	74
Daihatsu	Japan	Saneyasu, Yoshiaki, Tsurumi, Masashi & Zenjiro.	01/03/1907	86
Dodge	USA	Horace & John Dodge	14/12/1900	47
Dongfeng	China	Chinese Government	1862	59
FAWDE	China	Chinese Government	1943	68
Ferrari	Italy	Enzo Ferrari	13/09/1939	8
Fiat	Italy	Giovanni Agnelli	1899	50
FISKER	USA	Henrik Fisker	08/2007	55
Ford	USA	Henry Ford	16/06/1903	12
Foton	China	BAIC Group	28/08/96	56
GAC	China	Chinese Government	1955	66
Geely	China	Li Shufu	06/11/1986	22
GMC	USA	William Durant	1911	20

Great Wall	China	Wei Jianjun	1984	38
Hero	India	Brijmohan Lall Munjal	19/01/1984	52
Honda	Japan	Soichiro Honda & Takeo Fujisawa	24/09/1948	7
Hyundai	South Korea	Chung Ju-yung	29/12/1967	6
Infiniti	Japan	Bill Bruce	08/11/1989	58
IVM	Nigeria	Innocent Chukwuma	2007	85
Isuzu	Japan	Yoshisuke Aikawa	30/03/1934	32
Iveco	Italy	Fiat Group	01/01/1975	64
JAC	China	Xiang Xingchu	20/05/1964	75
Jaguar	U.K	William Lyons & William Walmsley	04/09/1922	51
Jeep	USA	American Military & Willys Overland	1943	23
Kenworth	USA	Harry Kent & Edgar Worthington	1923	65
Kia	South Korea	Kim Cheol-ho	09/06/1944	16
Kiira	Uganda	Ugandan Government	2014	99
Lada	Russia	Russian24 Government	1973	94
Lamborghini	Italy	Ferrucci Lamborghini	1963	24
Land Rover	U.K	British Leyland	1948	18
Lexus	Japan	Eiji Toyoda	1989	13
LI AUTO	China	Li Xiang	2015	43
Lincoln	USA	Henry Leland & Wilfred Leland	08/1917	41
LUCID	USA	Bernard, Sam & Sheaupyng	2007	96
MACK	USA	John & Augustus Mack	26/07/1900	54
Mahindra	India	Jagdish & KailashChandra & Ludwig Sander	02/10/1945	91
MAN	Germany	Indian Government	1893	53
Maruti	India	Alfieri, Bindo, Carlo, Ettore &	24/02/1981	40
Maserati	Italy	Ernesto Maserati	11/1914	60
Mazda	Japan	Jujiro Matsuda	30/01/1920	35
McLaren	U.K	Bruce McLaren	02/12/1985	84
Mercedes-Benz	Germany	Karl Benz	01/1886	2
MINI	U.K	British Motor Corporation	1959	57
Mitsubishi	Japan	Yataro Iwasaki	1870	17
NIO	China	William Li & Li Hong Qin	2014	42
Nissan	Japan	Yoshisuke Aikawa	26/12/1933	21
Opel	Germany	Adam Opel	1862	63
Haval	China	Wei Jianjun(GWM)	2013	76
Oshkosh	USA	William & Bernhard	1917	80
PACCAR	USA	William Pigott	1905	88
Peterbilt	USA	Theodore Alfred Peterman	1939	92

Peugeot	France	Armand Peugeot	1889	37
Polestar	Sweden	Flash Engineering	1996	44
Porsche	Germany	Ferdinand Porsche	1931	31
Qinling	China	Joint Venture	05/1985	97
RAM	USA	Dodge Motors	2010	36
Renault	France	Louis, Marcel & Fernand Renault.	24/12/1898	34
Rivian	USA	Robert Scaringe	06/2009	81
Roewe	China	SAIC Motors	2006	89
Rolls-Royce	U.K	Henry Royce & Charles Rolls	15/03/1906	19
Royal Enfield	England	Albert Eadie & Bob Walker Smith	1893	79
Scania	Sweden	Philip Wersen	1911	33
Seat	Spain	Instituto Nacional de Industria	09/05/1950	90
Seres	China	Xinghai Zhang	2016	83
Skoda	Czech R.	Vaclav Laurin & Vaclav Klement	1895	45
Sinotruk	China	Sinotruk Group	31/01/2007	71
Subaru	Japan	Fuji Heavy Industries Ltd	15/07/1953	49
Suzuki	Japan	Michio Suzuki	10/1909	26
TATA	India	Jehangir Ratanji Tata	1945	61
Tesla	USA	Elon, Eberhard, Straubel, Marc & Wright.	01/07/2003	4
Toyota	Japan	Kiichiro Toyoda	28/08/1937	1
TVS	India	T.V. Sundaram Iyengar	1978	98
Vauxhall	U.K	Alexander Wilson	1857	95
Volkswagen	Germany	German Labour Front	1937	3
Volvo	Sweden	Assar Gabrielsson & Gustav Larson	1927	15
Wuling	China	SAIC, GM & Wuling (SGMW)	18/11/2002	72
Xiaomi	China	Lei Jun	09/2021	11
Yamaha	Japan	Genichi Kawakami	01/07/1955	46
Yulon	Taiwan	Ching-Ling Yen	10/09/1953	100
Yutong	China	Zhengzhou Bus Repair Factory	1963	77

The above information is helpful. Although it may not include all the vehicle brands currently operating in your country, it has surely helped you understand the top vehicle brands available globally. Note that the global ranking above is dynamic. The MACEOS program is a global adventure. It is not limited to Nigeria or Africa. It is international! Of course, in recognition of human deficiencies, reliance on machines is evolutionarily universal, and this is with certainty as long as mankind thinks universally. Thus, thinking

globally is the first step to dreaming big in the automotive industry. Believe that you can have a business affiliation with Elon Musk of SpaceX, Ola Källenius of Mercedes-Benz, Rene Obermann of Airbus, Marc Raibert of Boston Dynamics, Thomas Schafer of Volkswagen, Victoria Backhaus Jerling of AAAM, Innoson Chukwuma of Innoson Vehicle Motors, and other distinguished automotive CEOs.

Believe that your company will create a machine that can touch the universe's edge or circle the universe in synchronicity and perfection. Better still, believe that your company will contribute to the invention of a machine that can achieve the above. Believe that you can partner with top automotive organizations like NASA, OICA, IAA, AAAI, IFR, RIA, IMO, ICAO, and so on. Believe that these organizations would someday send proposals to your company, demanding your service, just as NASA has done with SpaceX, Blue Origin, United Launch Alliance, Axiom Space, Astrobotic Technology, Virgin Galactic, Firefly Aerospace, and others. So, believe that you can operate remotely from anywhere and grow to have a global presence. These conceptions will effortlessly guide and lead you to achieve everything you desire.

Step 2

Determine the number of automotive manufacturing and assembling companies in your country:

This is very important because it serves as a ground through which you will understand the length and breadth of the industry. This also serves as a determinant of the growth of the automotive industry in your location. Besides gathering this information to determine the size of the automotive industry in your location, it also serves as marketing research. This is because you can approach these companies tomorrow and build a business relationship with them. Many automotive brands have offices in Nigeria; in fact, almost all major brands have offices in Nigeria. We have the likes of Toyota, Nissan, Honda, Mercedes, Hyundai, Kia, Ford, TATA, GAC, Peugeot, Changan, Volkswagen, BMW, Land Rover, GMC, and so on. Although some of these brands are franchised.

This brings me to express my gratitude to our modeled predecessors who were able to secure franchises from these global

brands. My profound gratitude to Cosmas Maduka of Coscharis Motors, William Anumudu of Globe Motors, Chief Michael Ade-Ojo of Elizade Nigeria, Late Olanrewaju Shittu of Lanre Shittu Motors, Sunil Vasawani of Stallion Motors, and others that I can't list here. We are proud of you all, and it is in the spirit of your contributions to the automotive industry that we are building on. The following is the list of automotive manufacturing and assembling companies in Nigeria. You can research that of your country if you are not in Nigeria.

SN	COMPANY NAME	FACTORY ADDRESS	PRODUCTS	BRAND
1	Hyundai Motors Nig. Ltd.	Km 17, Badagry highway, Ojo, Lagos.	Cars & SUVs	Hyundai
2	Honda Automobile West Africa Ltd.	Km 6 Ota Idiroko expressway, Ogun state.	Cars & SUVs	Honda
3	Elizade Nigeria Ltd.	Segun Irefin Street, Ikotun Egbe, Lagos.	Commercial & Passenger vehicles.	JAC
4	PAN Nigeria Ltd.	PAN drive Kakuri Industrial Estate, Kaduna.	Cars	Peugeot
5	Leyland Motors	Km 8, Iwo Road, Ibadan.	Buses & Trucks	Leyland
6	Innoson Vehicle Manufacturing Ltd.	95 Owerri road, Umudim, Nnewi, Anambra.	Pick-up, Buses, SUVs, Cars & Tricycles.	IVM
7	Dana Motors Ltd	Dana house, 116 Apapa-Oshodi expressway, Isolo, Lagos.	Cars, SUVs & Trucks	KIA
8	Dangote Sinotruck West Africa Ltd.	Plot 3 Oba Akran Avenue, Ikeja, Lagos.	Trucks	Sinotruck
9	Koncept Autocentre Nigeria	Plot 122-132 Afprint Premises, Oshodi-Apapa expressway, Isolo, Lagos.	Cars, Pick-up & SUVs.	Isuzu
10	Iron Product Industries Ltd.	78 Onilewura street off Segun Irefin street, Ikotun Egbe, Lagos.	Light, Medium & Heavy Trucks.	Tata, Foton & Actron.
11	Nigeria Sino Trucks Ltd.	78 Onilewura street off Segun Irefin street, Ikotun Egbe, Lagos.	Trucks	Sinotruck
12	SCOA Nigeria Ltd.	157 Apapa-Oshodi expressway, Isolo, Lagos.	Trucks & Buses	MAN
13	Coscharis Motor Assembly Ltd.	CG-Eko, at the old Eko engineering building, beside the Lagos Tax office, off Oba Akinjobi road, Ikeja, Lagos.	SUVs, Cars & Pick-up.	Ford
14	Perfection Motors Co. Ltd.	No. 3 Ladipo Oluwale avenue, Ikeja industrial estate, Lagos.	Trucks	FAW
15	Aston Motor Ltd.	Plot 4 Block E, Amuwo Odofin-Badagry expressway,	Trucks	Aston & Dayun

		Orile, Lagos.		
16	Stallion Motors Ltd.	Km 17, Badagry highway, Ojo, Lagos.	Cars, Mini-Buses & SUVs	Nissan, Volkswagen Infiniti & Datsun
17	Zahav Automobile Nigeria Ltd.	14/16 Segun Irefin Street, Ikotun.	Car, Van, Buses, SUVs & Pick-ups.	JINBEI, Foton, BIAC & Changan.
18	Proforce Ltd	1 Akaka roadOde Remo, Lagos-Ibadan expressway (after Ogire trailer park), Ogun.	Armoured SUVs, Patrol boat & Militarized Van.	Proforce
19	Tranguinea Ltd/ Leventis	Off Oyo Road Moniya, Ibadan, near Bascon Nigeria Ltd.	Truck & Buses	Foton & Eichel
20	De-Damak Nigeria Ltd.	Plot A Olubadan estate, off new Ife road, Ibadan.	Trucks & Buses	T-King & BAW
21	Transit Support Services Ltd.	Plot 6 Emene Industrial layout, Emene, Enugu state.	Trucks	Shacman
22	VON Automobile Nigeria Ltd.	Km 17 Badagry highway, Ojo, Lagos.	Pick-up, Buses & Trucks.	Ashok Leyland
23	National Trucks Manufacturing Ltd. (NTM).	Km 11 Zaria Road, Kano state.	Trucks, Pick-up, Buses & Tractors.	Sino, Foton, GWM, DF & Kinglong.
24	Kewalram Nigeria Ltd.	Plot 122-132 Afprint Premises Oshodi-Apapa expressway, Isolo, Lagos.	SUVs, Buses, Pick-up & Trucks.	Foton & JMC

You can research more about this; we may have additional information beyond what I listed above. You can also research global automotive manufacturing companies and their respective brands and market scope.

Step 3

Determine the number of global automotive dealers in your country:

These are indigenous automobile dealers that have a global business presence. This category of people goes to other countries, establishes

themselves there, and at the same time, establishes in their home country. For instance, in Texas, USA, there are Nigerian automobile dealers who have established themselves there and still have a presence in Nigeria. Apart from Texas, there are other Nigerian dealers in other states in the USA, among whom I admire the most. His name is Faith Mba, and he is the CEO of Faith's Toyota-Ford in Vermont. Mr. Mba was the first Nigerian to acquire Toyota and Ford Dealerships in the USA. To learn more about this great Nigerian representing our global presence, visit www.faithsauto.com.

We also have other Nigerians who have established automotive presence in other countries like Canada, the United Kingdom, Dubai (UAE), Germany, etc., and still have a presence in Nigeria. People like Benson Ofoma of Sensorsa Group in Canada, Ikenna Ordor of Starr Luxury Cars in the United Kingdom, Ahmed Amwell of Luxury Supercars in Dubai, Oluwatobi Ajayi of Nord Automobiles, who is in partnership with an automotive company in Germany, and many others. I also want to thank all the automotive dealers in the diaspora for their contributions so far to the growth of the automotive industry in Nigeria and Africa. Back to the point, having the data of these dealers who are automotive CEOs in the diaspora and yet have influence in the automotive industry in Nigeria, is very important because it guides you in determining the scope of the industry. Secondly, they are your business prospects because you can reach out to them and network with them.

Step 4

Determine the number of government-licensed automotive dealers in Nigeria (or your country of base):

This is still another way you can determine the scope of the market. Licensed dealers are more assured when it comes to data gathering. This is because registered dealers are more established than floor dealers. You can get the number of licensed dealers from the state government of your location.

Step 5

The number of floor-automotive dealers in Nigeria (or your country of base):

This comprises all dealers in the open market, both experienced and inexperienced, licensed and unlicensed. Meanwhile, the disadvantage of dealing with unlicensed dealers is that some can withdraw from the business at any given time, unlike the licensed ones, whose involvement is considered a long-term project. Regardless, the infusion of this category of dealers into the industry brings about varieties. As a matter of fact, it is the floor dealers we need more in MACEOS because they are the ones we want to groom and guide on how to operate in the industry. Incidentally, what we have discussed so far in this book is for them. They are the category that we are building from the grassroots.

Step 6**Determine the number of vehicles in use in Nigeria (or your country of base):**

This still gives you a window to determine the market scope of the automotive industry. In fact, knowing the number of vehicles in operation in your country will provide you with all the data you need, and this will guide you in forecasting your business outcome in the industry. As of the third quarter of 2025, more than twelve million vehicles are in operation in Nigeria (this is my estimate based on personal research). Using this data, you can determine the percentage of vehicles that are up for sale daily. Similarly, you can determine the percentage of daily mechanical repair customers—the ones who require car-wash service, the ones who need an insurance policy, the ones who require painting or mechanical attention, etc. This will give you options in your business choice with probable outcomes.

Step 7**Determine the number of vehicles that are being imported into the country annually:**

This is also the data you should have, as it will also guide you to determine the scope of the market. Make an effort to determine the number of vehicles brought into the country annually. Break it down

to quarterly, monthly, weekly, and daily. Although this statistic is not fixed, however, you can average it to guide your determination. We have, on average, over 80,000 vehicles (both new and used) that have been imported into the country annually for the past decade. When we break this down, we will have 7,000 vehicles a month, 1,700 a week, and 238 daily. In the future, we may likely have less margin following the constant increment of duty by the Federal Government and the high dollar rate to the Naira. Moreover, I envisage a renaissance for brand-new vehicle manufacturing in this country and other African countries. When this is actualized, the importation of used vehicles from overseas will be drastically reduced. Apparently, this campaign has begun as we are already experiencing brand-new domestic vehicles in the country. Vehicles like Nord, Greely, GAC, JAC, Innoson, Foton, Sinotruk, Shangan, and Peugeot, as well as tricycles like TVS, Dana, Promotex, Scoa, and the Enviable of Obi Cubana. I envision a future where all vehicles used in Nigeria are domestically manufactured.

Step 8

Determine the average number of road-off vehicles in the country: Yes! This is important because it allows you to determine the number of vehicles in circulation. Unfortunately, the National Bureau of Statistics (NBS) has not fixed this. As a matter of fact, the Federal Government no longer determines or implements the road-off-vehicles as it used to be. Today, individual vehicle owners willingly submit vehicles that can't be used again for destruction. Thus, the total number of road-off-vehicles, including those from individuals and accident vehicles beyond repair, equals the number of road-off-vehicles in the country.

Anyway, the fact remains that if you are able to determine road-off-vehicles per annum, it will guide you in determining the number of vehicles that are in use in the country. From personal research, as of the third quarter of 2025, we have, on average, 7,220 road-off vehicles per annum, 600 in a month, 150 in a week, and 21 vehicles daily. You can carry out research on this independently for accuracy. In all, let it guide you in determining the market scope of the industry.

Step 9

Determine the average number of vehicles purchased daily:

In every business, the rate of turnover is always a key determinant in forecasting the future outcome of the business. Regrettably, sales statistics are difficult to determine because of our lack of a central automobile data collection unit. I have tried to determine the average daily automobile sales, and I discovered that a major source is the number of vehicles registered with the government each day. However, this method can't provide reliable results. The reason is that some vehicles are re-registered as if they were new, often by mischievously altering the chassis, such as tweaking a 3 to an 8. Due to these discrepancies, achieving accuracy becomes impossible. From private in-depth research to determine the number of vehicles sold daily in Nigeria, I will conclude that we have, on average, 58,880 vehicles sold per annum, 4,906 a month, 1,226 a week, and 175 daily. This excludes swapped vehicles.

Step 10

Determine the ratio of vehicles to the country's population:

This is also necessary because it will guide you in forecasting future sales. You will achieve this by dividing the number of vehicles currently in use in the country by the population. The population of Nigeria as of the third quarter of 2025 is above 237 million. To determine the ratio of the vehicles in the country to the population, you would have to divide the total number of vehicles in use in the country by the population. As of the third quarter of 2025, there are more than 12,000,000 vehicles in circulation in Nigeria. So, if we are to determine the ratio of the vehicles in the country to the population, we would have 12,000,000 divided by 237,000,000, which would give us 0.05. This is regrettably poor! This is nothing compared to countries like Monaco, the USA, New Zealand, Canada, Finland, etc., which have almost one vehicle per person. This ratio is extremely low, which implies that the country needs more vehicles. And, if you can determine the population demography, you can forecast the yearly demand graph of vehicles by the population, even over five decades.

As of the third quarter of 2025, there are approximately 1.661

billion vehicles worldwide (heavy-duty vehicles exclusive), and the global human population has just reached 8.25 billion, resulting in a vehicle-to-person ratio of 0.2. This is not bad, but soon the world could have one vehicle per person. This data should help guide your projection of the future of the automotive industry.

Step 11

Determine the purchase ratio to the population:

You can determine this annually, monthly, weekly, or daily. It depends on what works best for you. Regardless of which option you choose, you will still achieve the same result if you perform your calculations correctly. Here, I will determine the yearly purchase ratio to the population, and I will achieve this by dividing the annual vehicles purchased by the population. Thus, 58,880 divided by 237 million, which gives us 0.0002. Apparently, this ratio is unbelievably low! This is the reason we are stepping in to make a change. We shall partner with the Government to adopt programs that will enable low-income earners to own vehicles. For the global ratio, there is a record sales projection of 89.6 million worldwide vehicle sales in 2025, which would give us a 0.01 ratio to the population. This is grossly fair; however, we shall have a better margin in the future. Meanwhile, the 89 million sales in 2024 are 3.5 million less than the worldwide number of vehicles manufactured in 2024. This implies that millions of vehicles are lying in the factories unsold. This is also a wake-up call to adopt a means to empower the population that cannot afford to buy vehicles to buy one or more.

Step 12

Sales turnover in your city:

This is important as it concerns your immediate location. For instance, if you are in Lagos, divide the annual sales by monthly, weekly, and then daily. This will give you the average daily sales of vehicles in Lagos. You can get your figure from the Lagos state vehicle registration database. Well, I just chose to classify “vehicle” as a sector in the automotive industry, but in a real sense, all sectors in the automotive industry are vehicular. So, the scope of “vehicle” is as enormous as

all the sectors in the automotive industry. Therefore, whatever we discuss subsequently applies to “vehicle”. Meanwhile, “land vehicles” are vehicles that can operate only on the Earth’s surface. More so, “automotive” and “automobile” are relatively the same. The difference is that “automotive” is broader because it touches other sectors. Regardless, it’s a derivative (adjective) of the “automobile”. Thus, I can use automotive and automobile interchangeably here. Don’t get confused about them, I literally mean the same thing.

Aviation

As of the second quarter of 2025, there were about 28,578 commercial aircraft, 58,400 military aircraft, and approximately 26,000 private jets worldwide. There are also about 67,663 aerial routes connecting more than 10,000 airports worldwide. The global aviation industry is indeed vast and a bit advanced. However, I will focus more on aspects concerning Africa, especially Nigeria, rather than the worldwide perspective. You can relate everything you read here to your country, regardless. You can always find any statistical information you need about this topic online. The market scope of Nigerian aviation (commercial, military, and private) is vast, though still developing. The Nigerian aviation industry has experienced significant growth, with the number of registered aircraft rising to 439 (the figure fluctuates due to various factors) and the number of airports increasing to 32. Additionally, there are airstrips and airfields constructed primarily by the Nigerian Air Force and multinational oil companies. Nigeria’s Air Force has over 179 air platforms, comprising 117 aircraft, 55 helicopters, and seven unmanned aerial vehicles used for fighters, logistics, special-mission, and general support. The number of private jets in Nigeria is undetermined due to international and domestic registration discrepancies. Meanwhile, Nigeria has quite a handful of jets.

Nigeria Airlines recorded 15.68 million passengers who traveled through the nation’s airports in 2024, which is less than the 15.89 million recorded in 2023 and 16.17 million recorded in 2022, respectively. However, there is a forecast of 17 million airline passengers in 2025. If we were to break down 17 million airline passengers per day, we would have a staggering 46,575 passengers a day. Wow! Nigeria’s aviation market is undoubtedly large and

bustling. Unsurprisingly, the sector scored 70% at the International Civil Aviation Organization (ICAO) and Universal Safety Oversight Audit Program Continuous Monitoring Approach (USOAP-CMA). According to the International Air Transport Association (IATA), the global forecast for airline passengers in 2025 is 9.9 billion, which is an increase of 4.8% from 2024. That is a colossal 29 million passengers daily worldwide. This proves that the aviation market is globally large, and this is just the floor stage, as both land and sea transportation shall be usurped by air transport in the future. Who knows, we might record as high as one billion global airline passengers daily in the future. This reveals to you how large and futuristic the aviation market is, both domestic and global. Although the market is always considered to be for the elites and the Government, the reverse is the case. The truth is that our success and aspirations stem from our desires. If you are so desired and determined to own an airline company, you can achieve it with success.

Thankfully, the Government has provided basic facilities for airline operations and licensed manpower. The Nigerian aviation market is large, and it's experiencing speedy growth. As of 2025, it boasts 2133 licensed Pilots, 1659 Aircraft Maintenance Engineers, 371 Air Traffic Controllers, 2343 Cabin Crew, 588 Dispatchers, 430 Air Traffic Safety Electronic Personnel, and 105 Aeronautical Station Operators. To further boost its routes and space in the global sphere, Nigeria holds Bilateral Air Services Agreements with over 78 countries, all targeted at meeting the aviation needs of the estimated 228 million population. Nigeria has a large domestic market for air travel, with 33% of her population traveling by air, making the sector profitable.

The aviation history in Nigeria dates back to November 1, 1925, when the first aircraft landed in Kano, involving three De Havilland DH 9A aircraft belonging to the Royal Air Force. However, it was not until 1946 that Nigerian Airways, known as West African Airways Corporation (WAAC), was born. The aviation sector was a government endeavor, not until decades later that the privatization spree began, which saw the privatization of several government-owned parastatals. This privatization initiative led to the establishment of new airlines, such as Virgin Nigeria, Arik Air, and Dana Air. Years later, the implementation of deregulation and liberalization policies

gave birth to Air Nigeria, Chanchangi Airlines, and IRS Airlines. Beyond its efficiency in transportation, civil aviation is a highly lucrative business. It is estimated to have a global value exceeding \$1 trillion in 2025, with market size projected to grow by 9.2% in 2026.

The International Air Transport Association (IATA) chief, Willie Walsh, projected that global aviation profit would hit \$36.6 billion by the end of 2025, with a 22.7% net profit margin from record revenues of \$1.7 trillion. He further says that, on average, an airline will retain a net profit of \$5.45 for every passenger carried. Now, statistically, I stated earlier that the forecast for airline passengers in Nigeria in 2025 is 50,595 passengers a day against 46,575 in 2024. Thus, if we are to carry out calculations using the IATA projection of a net profit of \$5.45 per passenger carried, we would have 50,595 multiplied by 5.45, which gives us a daily net profit of approximately \$275,742. Awesome! This amount is huge! This is what Nigerian airlines are expected to make on a daily basis. And if I want to go micro about this analysis, just to open your eyes on the need to invest in the aviation sector, I would out of 439 registered aircraft, have 150 commercial aircraft, and out of 150, 110 airlines operate daily. We would have \$275,742 divided by 110 aircraft, which is \$2,506 net profit per aircraft, by \$5.45 per passenger. Aside from passenger aircraft, the Nigerian Air Freight market size is estimated at \$3.8 billion in 2025 and is expected to reach \$5.64 billion per annum by 2029 and \$6 billion in 2030, respectively.

On the government side, FAAN and NCAA revenue are expected to exceed N400 billion and N100 billion, respectively, in 2025, having performed in 2024 with a record-breaking 82.5% revenue increase. There is a forecast of N700 billion and N220 billion by 2030. These are mouth-watering aviation sector revenues for the Government.

Investing in the aviation sector is undoubtedly a good deal because of its large market scope. There is no end to its future as air transport lies at the heart of global business and tourism. Meanwhile, the aviation sector is also an umbrella for space exploration. For instance, the Meteorological Agency provides meteorological services to the aviation industry, including weather forecasting, observations, and data analysis. These services are crucial for safe and efficient air operations. Similarly, the Airspace Management Agency manages air traffic control and navigation services in Nigerian airspace. The agency provides communication, navigation, and surveillance services to

ensure safe and efficient air traffic operations. These services cannot be achieved without satellites, and this is where space exploration comes in. Space exploration is part of aviation because it also requires transportation. For example, it was announced in 2016 that Nigeria could send an astronaut to space by 2030. Regardless of the debate on whether this is feasible, we need air transportation to achieve this. Thus, space exploration is part of the industry.

The aviation sector requires satellites in space to operate effectively. Nigeria has launched six satellites so far. However, NigeriaSat-1, NigComSat-1, and EduSat-1 are no longer in orbit - they were replaced with NigComSat-1R (a communications satellite), NigeriaSat-2, and NigeriaSat-X, which are Earth observation satellites. Nigeria plans to use NigeriaSat-3 and NigeriaSAR-n1 to replace the two Earth observation satellites, NigeriaSat-2 and NigeriaSat-X, which have outlived their design lives. Additionally, the need to replace the communication satellite NigComSat-1R is imminent owing to its only two-year lifespan, as it was built to last for fifteen years in 2011. Over the past few decades, Africa has witnessed a significant increase in investments in space exploration, ranging from satellites to ground facilities like astronomical observatories, ground stations for remote sensing and communications, and rocket launch capabilities.

South Africa, Egypt, Algeria, and Nigeria are the continent's space frontiers. Undoubtedly, we are still in the space dark age because of overreliance on the Government. It's high time individuals stepped into space exploration in Africa. The Nigerian Government, for example, kept making forecasts that it barely achieved: When Robert Boroffice was the Coordinating Director for Science at the National Agency for Science and Engineering Infrastructure, he announced at a public lecture on space technology development that Nigeria could build indigenous satellites in the country without foreign assistance by 2018. Today, we haven't achieved this feat. He also said that Nigeria will take advantage of its geographic location to launch an Indigenous-developed space launcher into a near-equatorial orbit from a national spaceport by 2025–2028. Today, there are no signs to indicate that this is achievable. The Nigerian Government planned to train astronauts by 2015 and launch them into orbit by 2030. Today, none of these projects is imminent. In fact, our Government doesn't even consider space exploration important. For example, former

Director of NASRDA, S. O. Mohammed, once said, “We are not part of the race for the moon; we’re not part of the race for Mars.” This indicates that some government officials are not interested in space-related adventures. So, the hope of colonizing space is now placed on individuals.

Citizens of third-world countries have recognized the market potential of the aviation sector, and many have stepped in, regardless of the Government’s interests. America is a good example. In fact, NASA now collaborates with some private companies like SpaceX on one space project after another, which is why they are achieving tremendous results today. China, Japan, and Russia are also following this trend. If Africa does not join this trend, she will be left behind, and space will be divided among space-adventurous nations. For example, China’s far side lunar probe Chang’e-6 (South Pole-Aitken basin) raised global eyebrows as many speculated it was for mining of the moon’s dark-side resources. Well, the fact is that, regardless of global space regulations, economically, those who have previously surveyed interstellar bodies have a significant advantage. Aside from the economic importance, the scientific importance is as important as the former. We all celebrate the insights that the Webb Telescope is giving us into deep space, forgetting that it was an effort initiated by the American Government and some concerned individuals. Yet, these people are unsatisfied; they want to keep inventing and exploring space. And a whole continent is sleeping, and if at all, progresses at a snail’s pace. Over here, we don’t even have a functional government-owned airline. There was a glimmer of hope that Nigeria Air, Nigeria’s national air carrier, would be launched in 2023. Regrettably, with a lot of skepticism around partnership, ownership, and shares in the company, a court order halted the establishment of the anticipated Nigeria Air. Unfortunately, to date, the Nigerian Government sees no need to revamp it.

I brought up these examples to further explain why individuals should invest in the aviation sector in Africa, especially in Nigeria. Apart from the financial gain, it brings development, civilization, and overall rapid evolution of the human race. Let’s copy from individuals like Allen Onyema, Jacky Hathiramani, Captain Edward Boyo, Prof. Obiora Okonkwo, and others. We should also learn from individuals like Elon Musk, Jeff Bezos, William E. Boeing, and others. Imagine

Elon and Bezos work unstoppably for the space shuttle to Mars, other interstellar bodies, and general space exploration – the result will be explosive! Their dreams are the height of human conception and aspiration! Similarly, many private companies manufacture military aircraft, warships, and artillery, such as Lockheed Martins in the USA, Safran in France, FADEA Official in Argentina, Nedaero in the Netherlands, Avio Aero in Italy, and so on. These companies allow their governments to spend on military vehicles domestically rather than overseas.

Maritime

As of the third quarter of 2025, there are approximately 79,000 vessels (ships) globally. This includes container ships, bulk carriers, tankers, and others. There are approximately 12,000 yachts, 150 million boats, and 600 submarines worldwide.

There are thousands of indeterminate sea routes globally, both for recreational sailing paths and commercial shipping. However, there are crucial global shipping routes that are pivotal for international trade, such as the Strait of Malacca, the Suez Canal, the Panama Canal, the St. Lawrence Seaway, and the English Channel or Dover Strait. The maritime sector is huge and vast; it's one of the biggest and oldest transportation sectors globally. Incidentally, Nigeria is deeply involved in marine transportation, thanks to her location and large economy.

Located on the coastline corridors of the Gulf of Guinea and the Bight of Benin, Nigeria is blessed with a natural maritime endowment base comprising a coastline of over 850 kilometers, an exclusive economic zone of over 200 nautical miles, and a vast inland waterways resource estimated at nearly 4,000 kilometers, capable of supporting a vibrant intra-regional trade. With Nigeria's total annual freight cost estimated to be between \$5 billion and \$6 billion, maritime transport is undeniably of great economic importance. Nigeria's first Indigenous shipping line, the "Nigerian Line," was established by Patrick Osoba as a joint venture with a Finnish firm, Nordstrom and Company. Today, following consistent channel dredging, buoy installation, and improved security at the port channels, the number of ship calls has grown to 188,000 units as of May 2025, a significant increase from the previous 157,000.

The Lekki Deep Seaport, which doubles as Nigeria's first fully automated port at take-off, processed 6,076 TEUs (twenty-foot equivalent unit) of transshipment cargo, having a meteoric rise in numbers from a total of 80,244 TEUs in 2022 to 118,046 TEUs. It has been forecasted to exceed 160,000 TEUs by the end of 2025. This is an enormous progress! The resultant effect of the Lekki Deep Seaport was a quantum leap in the number of Nigerian export-laden containers rose from 156,790 in 2022 to 226,456 TEUs in 2023. Today, about 4,000 ships visit Lagos ports alone each year, and about an annual number of 72,000 seafarers in Nigeria. This is commendable as the global seafarers are around 1.5 million. Nigeria is the largest ship-owning country in Africa. In terms of the world fleet, it is number 33, with 291 vessels totaling 7.94 million tons of dead weight. Nigeria is indubitably a large seafaring nation with vast revenue opportunities. For instance, the Nigeria Port Authority remitted N501 billion to the Federal Government in 2023, N400 billion in 2024, and projected N1.28 trillion in 2025.

Similarly, Nigeria's indigenous shipowners are doing well. However, the Nigerian crude oil trade terms deprive them of a lot of revenue, as FOB terms incapacitate them from participating in the affreightment of the nation's crude oil. Nigeria sells its crude oil on FOB (Free On Board), meaning the buyer nominates the ships carrying the crude. This is unlike the CIF (Cost, Insurance, and Freight) trade term, which means that Nigeria transports the crude by herself while the buyer pays the insurance company involved.

Nigerian shipowners have been canvassing for the Government to adopt CIF trade terms instead of FOB over these trade terms. We are losing trillions of Naira to foreign shippers, which is very adverse to our economy. Nigeria is the only OPEC country that sells its crude oil under the FOB trade term. Countries like Saudi Arabia, Angola, and Iraq carry their oil on Government-Owned vessels. Data shows that Nigeria loses more than two trillion Naira to foreign shippers yearly, giving out more than 150 million tons of cargo, including oil products worth more than seven hundred billion Naira. On account of this, the Shipowners Association of Nigeria is pressing on the Federal Government to adopt CIF trade terms, which would allow them to transport crude oil overseas with their vessels. The Nigerian Government, on the other hand, said that no Indigenous shipowners

have supertankers of about 300,000 tons, which are global trading ships. As a result, she cannot risk her bilateral oil trade agreement to please indigenous shipowners.

As of 2023, out of the 4,355 registered vessels, 347 were fishing vessels, 1071 cabotage vessels, 600 tanker vessels, and other special vessels. Meanwhile, according to the Federal Government, the 600 tanker vessels are not supertankers. As a result, they cannot lift crude oil. Against this assertion, shipowners are vehement in their opinion that if the Government adopts CIF trade terms, they will be able to lift the crude oil instead of frittering away values that would have accrued to the country's economy. Meanwhile, this is still an open proposal before the country's legislature. Thankfully, Dangote Refinery has stepped in, and everybody hopes it will change the norm for the benefit of all. Determining the market scope of the marine sector in Nigeria is a bit difficult because it's more of an international affair than a national one. However, it's quite expansive and wealthy. As such, no investor who goes into the maritime business in Nigeria will lose as much as the person understands what he is doing. Apparently, there are vacuums in the industry. For this reason, we need passionate individuals to step in and improve the industry. We need dedicated men who can bring change to any of the departments in the maritime sector, as listed below.

The Nigerian maritime industry comprises all enterprises from designing a ship, boat, yacht, or vessel component construction to manufacturing, acquiring, operating, supplying, repairing, and maintaining vessels and component parts, managing and operating shipping lines, stevedoring and customs brokerage services, shipyards, dry docks, marine railways, marine repair shops, shipping, freight forwarding services, and other similar enterprises. The maritime market scope in Nigeria embraces all the maritime-related business activities within the country's maritime environment. They are offshore economic activities, such as fishing, salvage, towage, and underwater resources, and onshore economic activities, such as port activities, maritime transport, ship construction, repairs, and maintenance activities. You can choose to invest in any of the above fields in maritime and bring a change there. There are so many opportunities available for indigenous shippers, but it will be bogus when the federal Government adopts CIF trade terms. Of

course, zealous investors can break the bank to acquire the 300,000-ton supertankers of global trading standards. Conversely, the Government can fund individuals to acquire it. With this, we can operate comparatively with the world's leading flags by tonnage and number of vessels, such as Liberia, Panama, the Marshall Islands, and the rest. Dangote has already laid a successful foundation for us to achieve this.

Apart from the commercial aspect of the maritime market in Nigeria, the naval sector is also a huge branch. This is also important because when there is even specialization in the industry, those that specialize in manufacturing can domestically manufacture vessels for the Nigerian Navy, thereby eliminating reliance on foreign suppliers. For instance, the Nigerian Navy has over 75 warships, including two frigates: Thunder and Aradu. It is the fifth strongest Navy in Africa, falling behind South Africa, Egypt, Algeria, and Morocco. The Nigerian Navy has various vessels, such as frigates, offshore patrol vessels, minesweepers, fast patrol boats, patrol cutters, and inshore patrol crafts. These are still opportunities in the industry that you can invest in and bring about change. Of course, if we have indigenous manufacturers of these warships, the Nigerian Government will certainly patronize them. Still, the objective of MACEOS is to take what is for us, change the industry to compete with third-world countries, and build our dear nation.

We have other fields, such as boat and yacht transportation. As of today, Nigeria has more than 740 boats scattered across the nation. Similarly, we have yachts, although quite a few when compared with over 10,000 yachts afloat globally. Regardless, presently, the number of boats and yachts in the country is commendable. Yachts and boats are other maritime branches that are investment-worthy. I look forward to an era in which Africans can indigenously build yachts, boats, and ships of any luxury. I look forward to when we can independently execute all maritime transportation activities. I look forward to a moment when enthusiastic Nigerians will go into the maritime industry and revolutionize it. However, this time is imminent!

Artificial Intelligence

The first time I had commendation for the creativity and evolution of the human race was the day I watched Hanson Robotics' humanoid

robot, Sophia, being interviewed. Sophia could answer any question constructively with an expression of emotions. I was so proud of this achievement, and it spurred my interest in AI. Since then, I have been from one research project to another. Mechanical reasoning started with philosophers and mathematicians in antiquity. The study of logic gave birth to Alan Turing's theory of computation, which suggested that by shuffling symbols as simple as "0" and "1", a machine could simulate any conceivable form of mathematical reasoning. This, alongside the concurrent discoveries in cybernetics, information theory, and neurobiology, led researchers to consider the possibility of building an "electronic brain." This evolutionarily founded a workshop at Dartmouth College in 1956 for Artificial Intelligence (AI) research. This research led to deep learning, which was successful due to improvements in hardware, graphics, processing units, cloud computing, and access to large amounts of data, including curated datasets such as ImageNet. Deep learning brought an enormous increase in global interest and funding in AI, and as a result, AI became the most futuristic industry in the world. How does this marvel that is on the verge of changing the history of existence start? Well, the earliest algorithm is traced to the Babylonian Sumerian clay tablet, which was used to compute the time and place of significant astronomical events.

Charles Babbage and C. A Lovelace are credited with the first creation of an algorithm intended for processing on a computer and an analytical engine, considered to be the first device with a real Turing-complete computer instead of just a calculator. These two souls are said to be history's first programmers. Meanwhile, Alan Turing was the first person to conduct prominent research in the field that he called machine intelligence.

This metamorphosed into several classifications of algorithms, such as search, sorting, computational geometry, merge, numerical, graph, medical, combinatorial, machine learning, cryptography, data compression algorithms, and parsing techniques. These algorithm classifications, in turn, gave birth to advanced Bots like Google, Siri, Alexa, Waymo, ChatGPT, Gemini, AI Art, Meta, Deep Blue, MuZero, and so on. I addressed these AI-powered algorithms, "Bots," because once an application becomes practical and familiar enough, it cannot be called AI anymore. Today, algorithm evolution has

grown to machine learning, which implies that machines can learn independently, just as humans do. Isn't this revolutionarily amazing? Mathematics and algorithms have changed the human race forever! With this, we can achieve whatever we can conceive.

We can modify AI and mechanisms and achieve incredible possibilities. We can evolve to invent a technology that will be equivalent to or faster than light. Of course, the proposition of quantum mechanics and entanglement is an answer on the threshold. Quantum mechanics is believed to transcend time, space, and, consequently, the speed of light. It ensures the consistency of the universe across all its spatio-temporal extension, containing the "mechanisms" by which events, even when separated by arbitrarily large distances in space or in time, are guaranteed to maintain consistency. Thus, quantum mechanics is a huge prospect. On the other hand, Quantum entanglement is a phenomenon by which two particles interact regardless of their distance. I believe that one day, the human race will discover a way to bend the rules of space and time so that quantum entanglement can be applied to machine mechanisms and information transmission. Anything nonlocal can give rise to something strange. Einstein referred to it as "spooky action at a distance." So, let's paint this picture for a yes case; by this phenomenon, we can invent a technology that can interact with any interstellar object regardless of distance. For instance, the elements that make up the Sun's core can interact with this technology on Earth, allowing us to learn everything about the stars. Imagine if this technology could interact and x-ray unknown phenomena such as dark matter, dark energy, black holes, and the mystery behind the expanding universe. This would be mind-blowing!

Recently, Microsoft announced its discovery of another state matter outside liquid, solid, and gas, called Majorana1. This is a groundbreaking quantum chip that uses a new class of materials called topoconductors to create more reliable and scalable qubits. A chip designed to be the foundation for a future quantum supercomputer that could achieve a million-qubit scale, enabling quantum systems to surpass classical supercomputers in solving real-world problems. Similarly, Google's Willow chip is a significant step forward in quantum computing due to its improved error correction and performance. Willow utilizes 105 physical qubits and incorporates

technologies that reduce errors as more qubits are added, paving the way for larger, more reliable quantum computers. This breakthrough is crucial because error correction has been a major hurdle in the development of practical quantum computing.

Well, with or without quantum mechanics or an entanglement perspective, I envision that humanity will invent a technology that will be equal to the speed of light or even faster. Empirically, it has been observed that anything with mass, information, or energy cannot travel at the speed of light. Based on this observation, I'm convinced that the human race has the propensity to beat this odd to achieve the speed of light. Light is made up of photons, an elementary particle with a mass equal to zero. Thus, the massless nature of light and the oscillation of the electric and magnetic fields, being perpendicular to each other, make it an electromagnetic wave, just like the radio wave. Being an electromagnetic wave, light doesn't need any medium to propagate and can travel in a vacuum. These things may be deep or unfamiliar, but I have to go this far for you to be able to conceive what awaits mankind to achieve through Artificial Intelligence. The invention of a vessel that can travel at the speed of light appears to be the most challenging adventure for science after the "elementary particle."

Well, the human race will not only achieve the speed of light but will be able to mine the Sun and stars. This is how powerful I have conceived humans and their capabilities! Imagine the temperature density of the Sun, yet mankind will be able to devise a means to mine stars, regardless of probable encumbrances. As a matter of fact, I'm optimistic the human race will be able to outpace the expanding universe. As a result, she will be able to travel around the cosmological oval of the universe. At this point, we will be able to colonize the universe almost to infinity, thanks to the power of AI.

Back to our discussion, machine learning has different classifications, and it is necessary because it makes machine automation and evolution possible. So, I will go into detail about machine learning because it's a game-changer. I chose to go into detail on this topic because AI is still new to many, unlike other sectors. Of course, before you can understand an industry's market scope, you must first understand the industry. This is why I'm going into detail about AI. I want you to not only know its market scope but also understand AI

and its potential. We have different types of machine learning, such as supervised, unsupervised, semi-supervised, reinforcement, active, deep, ensemble, online, and batch learning. Each type of machine learning has its strengths and applications, and the choice of a given type depends on the specific problem and dataset. Among these learning types, I love modern deep learning, which has techniques for word embedding, representing words typically as vectors, encoding their meaning, and transformers. Deep learning architecture uses an attention mechanism, a generative pre-trained transformer (“GPT”), and other real-world applications.

Deep learning has trained machines as such that they become perceptive. This machine can deduce aspects of the world using input from sensors such as cameras, microphones, wireless signals, and active lidar, sonar, radar, and tactile sensors, like image classification, speech, facial, and object recognition. A good example of this machine is Kismet, which has the ability to recognize and stimulate emotions. Today, advanced machine learning has led to neural networks: Interconnections of groups of nodes that replicate a neural network in the human brain. Through this achievement, machines can express emotions and might attain self-awareness in the future. As a matter of fact, scientists believe that humans can be digitally immortalized through mind-uploading. Artificial intelligence is the industry of every industry because all the fields of human endeavor need it. From education to agriculture, medicine, science, astronomy, and automobiles, all the fields of endeavor. This will open your eyes to how expansive our industry is. AI applies to everything!

As it concerns space exploration, AI is used to analyze the increasing amounts of available data and applications, mainly for classification, regression, clustering, forecasting, generation, discovery, and the development of new scientific insights. For example, it is used to discover exoplanets, forecast solar activity, and distinguish between signals and instrumental effects in gravitational wave astronomy. It could also be used for activities in space, such as space exploration, including analyzing data from space missions, making real-time science decisions about spacecraft, avoiding space debris, and conducting more autonomous operations. The global artificial intelligence market was estimated to be USD 244.22 billion in mid-2025 and is projected to grow to over USD 1.5 trillion by 2030.

The AI market is vast as it covers many industries, such as automotive, healthcare, retail, finance, manufacturing, and domestic use.

Artificial Intelligence has proven to be a remarkable revolutionary component of the digital age. Tech giants like Amazon.com, Google, Apple, Facebook, Microsoft, Nvidia, Baidu, Xiaomi, SoftBank, NTT, Yandex, etc., are investing significantly in research and development of AI, increasing the artificial intelligence market cap as a result. The AI market in Nigeria is expected to reach \$450 million by 2026 and a staggering \$ 1 billion by 2030. Recognizing AI's transformative potential, the Nigerian Government has launched initiatives like the National AI Strategy 2020-2030 and the National Centre for AI and Robotics (NCAIR). This framework fosters research, development, and adoption through policy frameworks, funding, and talent development programs.

Nigeria has brilliant souls who have left a blueprint in this sector. The likes of Emmanuel Gabriel of OBTranslate, an AI algorithm capable of translating 2,000 African languages, Olugbenga Agboola of Flutterwave, Mitchell Elegbe of Interswitch, Shola Akinlade and Ezra Olubi of Paystack, Razaq Ahmed of CowryWise, Inioluwa Raji of Machine-learning company Clarifai, and Google's Ethical AI team. Ndubuisi Ekekwe is credited with developing microchips used in minimally invasive surgical robots. He was also part of the team that created the XL sensor for iPhone and iPad, Yunusa Jibrin of Vision Transformer, an AI tool used to detect terrorists' hideouts, and Silas Adekunle of Awarri, an Artificial Intelligence (AI) research lab startup. Alongside his partner, Eniola Edun, Awarri was born out of the need to democratize access to AI and robotics technology across the continent and so many others. Undoubtedly, Nigeria has woken up to embrace the opportunities that Artificial Intelligence presents. Today, we have Government and privately owned tech companies that are all targeted at AI utility. Examples are the Nigeria Artificial Intelligence Research Scheme (NAIRS), the National Centre for Artificial Intelligence and Robotics (NCAIR), the National Artificial Intelligence, Data Scientists Network, Deeper Insight, Stepwise, Avkalan.ai, Kemonia, etc.

The AI market in Nigeria is undoubtedly still in its infancy. However, the prospect is high because of its importance and influence. Against this backdrop, we rely more on the global AI

market because the first-world countries, for example, have gone way ahead of us. As such, we only pirate what is already done by them. So, understanding the global market is as important as that of the domestic market. The global projection of the AI market in 2025 is above \$244 billion and above \$900 billion by 2030, with the USA having the largest share. Personally, my global projection for AI in 2030 will be above \$2 trillion. The reason is that AI will become a pivotal tool in every industry by 2030, and the need and demand will be extremely high. The AI market is structured into six markets based on the technology applied. Each has three aspects: market size by the industry's manufacturing companies, market size by available AI products, and market size by demand.

Google, OpenAI, IBM, Microsoft, Anthropic, and Nvidia are key players in the AI industry. So are robotic companies like Agility Robotics, Apptronik, Figure, Unitree, Carbon, Boston Dynamics, LIMX Dynamics, 1X Technology, Tesla, and others. So are software companies like Oracle, SAP, Adobe, Procore, Cvent, Alteryx, IFS, and so on. These companies work tirelessly for innovations every day. AI products have already permeated the world, including software, hardware, and biohybrids. There are AI software applications that have transformed every aspect of life, from system software such as operating systems, firmware, device drivers, utilities, and programming language translators to application software like word processors, databases, spreadsheets, web browsers, and more. The robotics industry is the ultimate hope for humans to explore space and achieve incredible scientific breakthroughs on Earth. Today, we have robots that can express emotions, recognize objects, speech, and environments, learn independently, operate autonomously, develop themselves, and perform many other incredible feats. As a matter of fact, on the 27 of April, 2024, China unveiled a self-developed humanoid robot, "Tiangong", with a processing power of 550 trillion operations per second and a physical running speed of 6 kilometers per hour, falling behind Unitree H1 of Unitree robotics who holds the world record for running at a speed of 3.3 meters per a second, that is above 11 kilometers per hour. As of November 2025, Tiangong is 50% smarter after numerous upgrades. Apart from its running speed, Unitree H1 can backflip using M107 joint motors. This is an advanced version of Boston Dynamics, which also backflips using hydraulics.

We have other intelligent robots with incredible capabilities, such as Atlas, Optimus Gen 2, Asimo, Pepper, Sophia, NAO, Nadine, JIA JIA, AMECA, CL1, Digit, and so on. You can search for these amazing robotics and swim in their awesome capabilities.

The global demand for AI is overwhelming. As a real fact, you will agree that every family on Earth wants to have one artificial intelligence to another, including you reading this book. In fact, every individual wants artificial intelligence. We do not only want one specific AI but different AI for different fields. We need an AI for the house chores; we need an AI as a house doctor, receptionist, driver, content creator, photographer, office staff... almost everything! Therefore, the demand for AI products is unlimited and enormous. As I said, AI is needed in almost all fields of endeavor. AI will be humanity's drive and focus in terms of physical evolution and discoveries. As of September 2025, there are above 8.93 million software applications in circulation worldwide, excluding PC software. The Google Play Store has 2.85 million, Apple's App Store has 1.99 million, Amazon's App Store has 597,362, and other App stores make up the remaining 4.91 million. As of 2024, there were 28.7 million software developers worldwide, and the number is expected to exceed 45 million by 2030. This is apparent as a greater number of schoolchildren today are being taught one programming language after another.

Smartphone users worldwide, on average, have 40 Apps installed on their phones, and they access, on average, 10 Apps daily. In 2024, 218 billion Apps were downloaded worldwide. With an 8.2 billion-person world population as of the second quarter of 2025, each person on Earth downloads 26 Apps in a year.

The global revenue for software applications is expected to reach \$613 billion in 2025. With a compound annual growth rate of 8.48%. It has been projected to reach a whopping \$1 trillion by 2030. This is regardless of the fact that 80% of the software is available on top software sites like Softpedia, Ninite, SofTepo, SourceForge, CNET, FileHippo, etc., and is offered for free. For instance, over 30 million open-source software projects are hosted on the GitHub platform. Google Play has 96.9% free Apps, and only 3.1% paid Apps. Similarly, the Apple App Store has 94.2% free apps and only 5.8%, and the same margin applies to other App stores. Yet we have such annual revenue from software applications. This software is downloaded worldwide

every second. As of the second quarter of 2025, there were 348 billion App downloads worldwide. TikTok is the most downloaded App with 5 billion downloads, followed by Instagram with 3.8 billion, WhatsApp with 3.2 billion, Facebook with 3 billion, and CapCut with 1.4 billion. Other popular apps include Temu, ChatGPT, Spotify, Snapchat, Threads, Telegram, Shein, DeepSeek, Grok, and Roblox.

The world has embraced the digital age with dexterity and high expectations. Modern technology has become part of us and, in one way or another, controls our decisions and performances. Computers now passively control our thinking and reasoning, which is why humans are now considered cyborgs. For example, people worldwide spend more than 4 billion hours on mobile apps yearly. A smartphone user averagely opening an App on her device every hour, which is 12 hours daily and 360 hours monthly, excluding the night hours. WhatsApp, Music, and shopping Apps are the most engaged mobile Apps. WhatsApp is said to be opened every three minutes on average. Meanwhile, a survey shows that 25% of Apps downloaded worldwide are only accessed once after downloading. For instance, iOS Apps have a retention rate of 25.6% after one day and 43% after 30 days. On the other hand, Android Apps are 22.6% after one day and 2.6% after 30 days. Regardless, the demand for software is soaring daily. In fact, I envisage a world where everything about man will be soft copies, and we will see our world through a device. At this point, we will be entirely a blend of artificial and biological intelligence—a phenomenon I termed “Cyborg Race.” This brings me to the demand for robots. There are over 4.3 million industrial robots worldwide, with Asia accounting for 70%, Europe 17%, the Americas 10%, and others 3%. It has been forecasted that there will be more than 20 million robots worldwide by 2030. As of 2023 and 2024, the global robot-to-human ratio in the manufacturing industry is 1 to 71. And 14% of workers worldwide have lost their jobs to robots, with 141 robots for every 10,000 manufacturing employees.

The global average robot density is 173 robots per 10,000 employees, more than South Korea, which is the global leader in robot density, with 1,212 robots per 10,000 employees. That's one robot for every eight human employees. Singapore came second with 780 Robots per 10,000 employees, followed by Germany with 465, Japan with 437, China with 432, Sweden with 383, Hong Kong

with 363, Switzerland with 346, Taiwan with 342, and the USA with 335 robots per 10,000 employees. Around 5 in 20 workers have lost their jobs to robots. This is amazing and has opened our eyes to what AI will become. Who knows, all the jobs might be replaced by automation, and this will duplicate human intelligence by a factor of 3. Collaborative robots, or “Cobots,” are the world’s fastest-growing segment of the robotics industry. Cobots work alongside humans, functioning as extra sets of hands or feet to complete manufacturing tasks.

Similarly, professional service robots (robots that perform non-manufacturing jobs) are also in high demand. They are needed in medical establishments, logistics, homes, offices, etcetera.

The robotic industry is growing at a breakneck pace, and with AI, machine learning, and cloud technology, the room for innovation is indubitably limitless. Different innovations and thrive are being launched every minute. For instance, Toyota recently unveiled £8 billion “Robot City,” nicknamed the city of the future, where humans would be subject to mass robotic experimentation. The city is envisioned as a “living laboratory” where Toyota plans to pilot its cutting-edge renewable energy and autonomous vehicle technologies, known as “e-palettes.” World ceremonies about robots!

The following is the summary of the AI market:

- The Computer Vision market covers applications that enable computers to interpret and understand digital images and video data.
- The Machine Learning market covers the use of algorithms to enable computer systems to learn from data.
- The Natural Language Processing market covers applications that enable computers to understand, interpret, and generate human language.
- The Artificial Intelligence Robotics market covers the combination of AI, machine learning, and engineering to create intelligent machines that can perform tasks autonomously.
- The Autonomous and sensor Technology market covers machines and systems that operate independently and respond to environmental changes using sensors, AI, and machine learning.
- The Generative AI market covers artificial intelligence that involves creating models capable of generating new content, such as images,

videos, and text, which are indistinguishable from human-generated content.

Artificial Intelligence is the most promising market worldwide. The drivers will be on top of a horse because it's the determinant and propeller of the future.

Space Exploration

You become lazy analyzing what is above whenever you look at the sky. You recoil in limitation, giving up on your ability to discern what lies above. Well, you are not alone; everyone feels the same way. For this reason, humanity is working hard to invent machines that can take them into the depths of space and show them everything within. It is in the pursuit of this adventure that space exploration was born. Since the dawn of space exploration, tremendous discoveries have been made, from Sputnik 1 in 1957 to the Webb telescope of today. Space exploration appears to be the frontier of human evolution, and its pursuit is unparalleled, with reports of significant developments emerging from around the globe each week. Every minute, numerous activities take place, all focused on advancing space exploration, from testing a new rocket system to launching innovative satellites or analyzing how a robotic exploration mission will safely land on Mars.

The space exploration market is enormous, although it is still in its infancy, given its futuristic projections. As of the third quarter of 2025, the global market value for space exploration is \$512 billion, with projections estimating it will be worth \$1.8 trillion by 2035. This figure encompasses robotics, machines, AI, software, satellites, launchers, research, and human services. As of today, November 25, 2025, the number of human-made machines orbiting Earth exceeds 140 million. These machines travel through space with adventurous curiosity. The Voyager 1 spacecraft, launched in 1977, is the farthest human-made object in space, having journeyed over 14 billion miles away. Well, this projection seems quite low from my perspective. I believe that the value of space exploration will exceed \$10 trillion by the year 2040. I arrived at this projection because space exploration entails high costs and represents a crucial transition for the future. For instance, NASA's Artemis project to land humans on the Moon is estimated to cost around \$86 billion from fiscal years 2012 through 2025. Nonetheless, whatever we spend on exploring space is worth it

compared to the insights we gain in understanding our universe. We have accomplished a great deal so far through space exploration.

From discovering that Ceres is the largest asteroid in our solar system, with a diameter of about 940 kilometers, to identifying over 2,600 exoplanets by Kepler since its launch in 2009, to knowing that the distance between the Earth and the Moon is approximately 384,400 kilometers, to providing the European Space Agency's Gaia mission with the resources to create the most detailed 3D map of the Milky Way galaxy, which includes over a billion stars, to name just a few. These discoveries are just the tip of the iceberg, as many exciting projects for space exploration are on the horizon. For example, NASA hopes to land humans on Mars by 2030. Rocket Lab and MIT plan to launch the "Venus Life Finder" by 2025 on a mission to search for organic molecules on Venus. Similarly, NASA's DAVINCI is expected to be launched by 2029 to explore Venus' atmosphere and geological features. This might come simultaneously with VERITAS, whose job would be to map Venus' topography. There are countless ongoing space exploration projects, and they will continue until humanity no longer exists. We want to know everything in space. We want to determine the number of galaxies in deep space, the number of blackholes, the number of stars, the number of planets, moons, and asteroids, and what dark matter and dark energy are.

We want to understand what causes the expansion of the universe, whether it is endless, has an edge, or is oval. We want to explore the fundamental particle, the origin of creation, how gravity works, wormholes, and the possibility of a multiverse. We seek to understand what is faster than light and the Great Attractor. We desire to learn about the beginning and the ending. Above all, we wish to travel and reside on other planets, whether within or beyond our local galaxy.

We seek to understand the mysterious aspects of existence that remain undefined in our time. Therefore, the pursuit of space exploration is as boundless as the desire to comprehend the entirety of the universe. For this reason, I prioritize space exploration above all other endeavors. It is the most forward-thinking! All automotive products, including AI and aviation, are secondary to space exploration.

The spacecraft mission has been a tussle game in the world of technology and invention. In a cosmic spin of innovation and

exploration, man's compulsive curiosity has propelled him to astounding feats in the vast expanse of space, from the intrepid steps on the Moon with Apollo 11 to the Voyager spacecraft journeying into the unrevealed depths of interstellar space. Mankind tenaciously speeds through the cosmos, unraveling the enigma of neighboring planets, stars, and galaxies with rovers and probes. Each mission represents the human race's collective ingenuity and the persistent pursuit of knowledge. With a spacecraft orbiting distant asteroids, surveying the atmospheres of alien worlds, and peering into the depths of the universe with cutting-edge telescopes, we are propelled onto the brink of even greater discoveries, fueled by the limitless human Spirit that knows no bounds. The world's spacecraft missions have been outstanding, and we have progressed further than expected. Nevertheless, we are still in our local evolution, clouded by ignorance of what lies above. Below are humanity's achievements in the quest to understand what is above so far.

Human Space Probe

Voyager 1

The Voyager 1 spacecraft was launched in 1977 and is the farthest man-made object from Earth. As of November 2025, Voyager 1 has traveled over 25 billion kilometers from Earth, equivalent to 167.34 astronomical units, and is moving at a speed of 17 kilometers per second. Apollo 11, the first crewed mission to land on the Moon, successfully touched down on July 20, 1969. The success of this milestone brought hope and joy to the pioneering nations of space exploration.

Similarly, her twin sister, Voyager 2, launched in the same year, is the only spacecraft that has visited Uranus and Neptune. After making striking discoveries like the active volcanoes on Jupiter's moon, Io, and the complexity of Saturn's rings, the mission was subsequently extended. Voyager 2 went on to explore Uranus and Neptune, paving the way for a visit to those outer planets.

Opportunity/Spirit

Opportunity, also known as MER-1, is a robotic rover that was launched for Mars exploration on July 7th, 2003, just three weeks

after its twin, Spirit, also known as MER-A, landed on Mars.

Opportunity was in operation on Mars until 2018, making it unique and spectacular because it outlived the projected duration. Sophisticatedly built, the careful operation of Opportunity on Mars allowed it to operate for 5,111 space sols, which is 57 times its predestined lifespan, exceeding the initial plan by 14 years, 47 days Earth time. NASA last contacted Opportunity on June 10th, 2018. By that time, it had set a record by traveling over 45 kilometers on the surface of Mars. Opportunity achieved remarkable results by analyzing a variety of rocks and soils that contain clues to past water activity on Mars. The samples they looked for included those with mineral deposits formed through water-related processes such as precipitation, evaporation, sedimentary cementation, and hydrothermal activity.

Opportunity and Spirit rovers were part of the Mars long-term Exploration Rover program. The Mars Exploration Program had four main goals: to determine whether life exists on Mars, to find out if recoverable water may be present, to study its climate and geology, and to prepare for a potential human mission to Mars. To travel across the Martian surface and conduct periodic geologic analyses to determine if water existed on Mars and what minerals are present, and finally, to corroborate data collected by the Mars Reconnaissance Orbiter (MRO). Both rovers were designed for a lifespan of 90 sols (92 Earth days), but each lasted significantly longer than expected. Spirit's mission extended 20 times beyond its planned duration, ending on May 25th, 2011, after it became stuck in soft sand and exhausted its power reserves trying to free itself. Opportunity, on the other hand, lasted 57 times longer than its initial 90-sol goal.

Today, Curiosity and Perseverance have taken over, and they are making incredible discoveries. Recently, it was reported that Perseverance provided evidence of the presence of water on Mars, including organic compounds and a chemical energy source, all on one rock located in the Jezero Crater. In many ways, this has increased the expectation of finding microbial life that once existed on Mars. We are crossing our fingers for more discoveries from these rovers. Meanwhile, the first spacecraft to land on Mars was Viking 1, which NASA launched on July 20th, 1976. We have other probes sent to Mars, such as Tianwen-1, a Chinese probe consisting of an orbiter

and a rover, Zhurong, the Mangalyaan of India, InSight from NASA, Hope from the UAE, and others.

Hubble Space Telescope

The Hubble Space Telescope has made over 1.4 million observations since its launch in 1990. Although space telescopes were launched into space before Hubble, Hubble gained international recognition because of its vast components, sophistication, and versatility. Hubble is the only telescope designed by astronauts to be maintained in space. Five Space Shuttle missions have repaired, upgraded, and replaced systems on the telescope, including all five of the main instruments. In April 2020, Hubble completed 30 years of operation, and it is predicted to last between 2030 and 2040. Hubble has helped resolve some long-standing problems in astronomy while raising new questions. Many of these discoveries have prompted the need for new theories to explain them. Meanwhile, we celebrate all the discoveries so far, as they have provided us with in-depth knowledge about the age and expansion of the universe, extending visible wavelength images, black holes, solar system discoveries, supernova reappearance, and the mass and size of the Milky Way.

Hubble made other mouth-watering discoveries like the proto-planetary disks in the Orion Nebula, evidence of extrasolar planets around Sun-like stars, the optical counterparts of the still-mysterious gamma-ray bursts, galaxies approximately 10 billion light-years away believed to have stopped forming stars, significant results for understanding the formation of elliptical galaxies, the parental star, and many other discoveries. James Webb's telescope is furthering this expedition, and we hope to discover more. Of course, there are other space telescopes apart from Hubble and Webb, such as Proton 1 to 4, SAS-B, Cos-B, Granat, Gamma, CGRO, LEGRI, INTEGRAL, SVON, AGILE, IKAROS, and others. These telescopes have made remarkable achievements in space exploration, and some of them are still making discoveries.

Rosetta

Rosetta, an ESA spacecraft, made history by successfully landing a probe on a comet named 67P/Churyumov-Gerasimenko on August 6th, 2014. It is the first mission in human history to rendezvous with

a comet. The mission aimed to land an unprecedented probe on a comet and, of course, search for evidence of life. The mission ended on September 30th, 2016.

Juno

The Juno spacecraft, launched in 2011, is currently studying Jupiter's atmosphere and magnetosphere. Built by Lockheed Martin, Juno is NASA's space probe with the mission to measure Jupiter's composition, gravitational field, magnetic field, and polar magnetosphere. It also searches for clues on how the planet was formed, including whether it has a rocky core, the amount of water in the deep atmosphere, mass distribution, and its deep winds, which can reach speeds up to 620 kilometers per hour.

Atlantis

Atlantis, the workhorse of space, made thirty-three missions to space between 1985 and 2011. It was the fourth shuttle built and the last to travel into space. It performed well in twenty-five years of service, transporting thirty-three missions, including secret missions for the U.S. military, ferrying astronauts to and from space stations, and launching several probes. Atlantis gained a reputation as the unsung workhorse of the shuttle fleet because it sent so many satellites into space. It also had the distinction of flying the final shuttle mission before it was retired in 2011.

Parker

Launched in 2018, the Parker Solar Probe is another spacecraft mission with spectacular features and unique expectations. Parker will get closer to the Sun than any previous spacecraft, approaching within 4 million miles. Parker is a NASA space probe launched to make observations on the outer corona of the Sun. It is the first spacecraft to get closer to the Sun. Parker got closer this year, 2025, approaching the center of the Sun within 6.1 million kilometers. It traveled at a speed of 690,000 kilometers per hour, which is 0.064% the speed of light. Parker is the fastest object ever built by man. How interesting would it be if Parker gave us more information about the Sun that we never knew about? Secondly, Parker's ability to achieve 0.064% of the speed of light is a testament that man will one day

invent a technology that reaches the speed of light or even faster.

New Horizon

Pluto's spy, the New Horizons spacecraft, completed a flyby of Pluto in 2015, providing comprehensive images and data of the distant dwarf planet. New Horizons is an interplanetary space probe launched as part of NASA's New Frontiers program with a team led by Alan Stern. The spacecraft was launched in 2006 with the primary mission to perform a flyby study of the Pluto system in 2015. A secondary mission was to fly by and study one or more other Kuiper belt objects in the decade to follow, which became a mission to 486,958 Arrokoth. New Horizons is the fifth space probe to achieve the escape velocity needed to leave the solar system.

Huygens

The Huygens probe, part of the Cassini-Huygens mission, successfully landed on Titan, Saturn's Moon, on January 14th, 2005, near the Adiri region. Huygens was a combination of the Cassini and Huygens spacecraft, which was launched from Earth on October 15th, 1997, and separated from the Cassini orbiter on December 25th, 2004. Huygens's landing is the only successful landing on a moon other than that of Earth. Huygens was designed to gather data from Pluto's Moon. This data includes geographical formation, atmosphere, water, and, of course, evidence of life.

Dragon 1

Dragon 1 is the first private spacecraft to shuttle to the International Space Station (ISS). Built and launched by American SpaceX. It is also the first commercially built and operated spacecraft to be recovered successfully from orbit. Dragon 1 is the first variant. Between 2010 and 2020, it flew twenty-three cargo missions to the ISS before it was retired. An improved version, Dragon 2, was introduced in 2019, and it has both crewed and cargo versions. The first uncrewed flight test, Demo-1, occurred in March 2019, followed by the crewed flight test, Demo-2, in May 2020. Since those tests, the Crew Dragon has become one of the main spacecraft ferrying crew to and from the ISS, while the Cargo Dragon continues to transport cargo under the CRS program.

Expectantly, SpaceX has also developed versions of these probes: Red Dragon, poised for Mars exploration, and Dragon XL, designed for Gateway Logistics Services to the Lunar Gateway.

Pioneer 10/11

The Pioneer 10 and 11 spacecraft were the first to explore the outer solar system, providing valuable data on Jupiter and Saturn. Both spacecraft were identically designed.

Pioneer 10 was launched on March 2nd, 1972, whereas Pioneer 11 was launched on April 6th, 1973. The two spacecraft crossed the asteroid belt and visited Jupiter. Pioneer 11 went further and visited Saturn while exiting the solar system. Precisely built with the trajectory ability to veer the asteroid belt, Pioneer 10 and 11 were equipped with onboard instruments to study the asteroid belt, the environment around Jupiter, the solar wind, cosmic rays, and, of course, the capacity for the reach of the solar system and heliosphere. These special instruments are the Helium Vector Magnetometer (HVM), the Quadrispherical Plasma Analyzer, the Charged Particle Instrument (CPI), the Cosmic Ray Telescope (CRT), and the Geiger Tube.

Telescope (GTT), Trapped Radiation Detector (TRD), Meteoroid Detectors, Asteroid/Meteoroid Detector (AMD), Ultraviolet Photometer, Imaging Photopolarimeter (IPP), Infrared Radiometer, and Triaxial Fluxgate Magnetometer. If progress is maintained, Pioneer 10 and its sister craft, Pioneer 11, will join the two Voyager spacecraft and the New Horizons spacecraft, leaving the Solar System to wander further into the interstellar medium. Voyager 2 overtook Pioneer 10 on July 18th, 2023, making Pioneer 10 the third farthest spacecraft from the Sun after Voyager 1 and 2. As of June 2025, the probe is estimated to be a staggering 21 billion kilometers from the Earth and 20.9 billion kilometers from the Sun. Sunlight takes 18.9 hours to reach Pioneer 10, against 8 minutes for the Earth. Pioneer 10 is currently traveling in the direction of the constellation Taurus. One unique thing I love about the Pioneer 10 and 11 probes is the gold-anodized aluminum plaque onboard the two spacecraft. It was adopted in case intelligent lifeforms from another planetary system find either spacecraft. The plaques feature a nude sketched image of a human male and female, along with sundry symbols designed to give

information about the spacecraft's origin.

OSIRIS-REx

The OSIRIS-REx mission was designed to collect samples from asteroid Bennu and return them to Earth for detailed analysis. It is the first U.S. mission to collect a sample from an asteroid.

On September 24th, 2023, it returned to Earth to drop off a container filled with material from asteroid Bennu. After dropping the sample through Earth's atmosphere, the spacecraft was renamed OSIRIS-APEX and was again sent on a new mission to explore asteroid Apophis by 2029. We have other spacecraft that returned extraterrestrial material samples to the Earth. The likes of Apollo 11, which was the first human-made machine to return material from space to the Earth in 1969. Other Apollo missions did the same, like Apollo 12,14,15,16, and 17, respectively. We also have Soviet mission projects that achieved the same feat, like the Luna 16 of 1970, and other missions like Luna 20 and 24.

China CNSA Chang'e 5 and 6 returned to lunar soil on December 16th, 2020, and June 25th, 2024, respectively. Others are the Genesis mission, which returned a solar wind sample, the Stardust mission, which returned a comet sample, and JAXA's Hayabusa and 2, which returned asteroid debris. These samples have allowed scientists to study more about the composition and formation of matter, the characteristics of interstellar atmospheres, and, of course, signs of the existence of life outside the Earth. Among these samples is a meteorite that is believed to have come from Mars.

I want to recognize China for its first successful mission to the Moon, the Chang'e 4 mission, which landed on the far side of the Moon. After the success of the Apollo missions and Soviet Luna missions, moon exploration became the dream of many countries. Today, 11 space agencies have successfully sent spacecraft to the Moon, including landers, orbiters, impactors, and flybys. The countries are the United States of America, the Soviet Union, Japan, China, India, Israel, Italy, Luxembourg, South Korea, the United Arab Emirates, and the European Space Agency.

XMM-Newton

The XMM-Newton space observatory is the flagship of European

X-ray astronomy. It was built by the European Space Agency mission and launched on December 10th, 1999. It is the most powerful X-ray telescope ever placed in orbit and observes the ‘hot’ X-ray universe, including objects like neutron stars, black holes, and active galaxies. We have other X-ray telescopes that have made remarkable achievements, such as SAS-A, Ariel V, Aryabhala, SAS-C, CORSA, HEAO 1 and 2, Astro-B, ROSAT, Alexis, RXTE, ABRIXAS, HETE 2, NuSTAR, Mikhailo Lomonosov, NICER, HXMT, XRISM, XPoSat, SVOM, and a few others.

Insight Lander

Insight Lander is a space probe that I can’t leave behind because of its unprecedented features. On December 19th, 2018, it was the first spacecraft to place a seismometer robotically onto the surface of another planet. A seismometer is a copper-colored instrument that responds to ground deformation and shaking caused by natural disasters such as quakes, volcanic eruptions, and explosions. It is usually combined with a timing device and a recording device to form a seismograph and measures seismic waves caused by marsquakes, meteorite strikes, and other phenomena. Observing how these waves travel through Mars’ interior will allow scientists to study how the planet’s crust, mantle, and core are layered. It will also divulge more about how all rocky bodies are formed, including Earth and its Moon. There are other spacecraft that have visited Mars that I can’t discuss here. The likes of Mars 3 of 1971, Viking 1 and Viking 2 of 1976, Mars Pathfinder and its Sojourner rover of 1997, Phoenix lander of 2008, Tianwen-1 lander of 2021, and Ingenuity helicopter of 2021

BepiColombo

A joint mission between ESA and the Japan Aerospace Exploration Agency (JAXA), the BepiColombo mission is based on two scientific spacecraft and one transfer module (the Mercury Planetary Orbiter (MPO) to map the planet, the Mercury Magnetospheric Orbiter (MMO) to investigate its magnetosphere, and the Mercury Transfer Module (MTM)) used during the cruise phase to deliver the two spacecraft to Mercury. BepiColombo is designed to study and understand the composition of geophysics, the atmosphere, and the

history of Mercury's magnetosphere. It will also help explore planets in the inner Solar System, giving us a deeper insight into Mercury and its characteristics. Compared to other planets, Mercury is difficult to explore. The speed required to reach it is relatively high, and its proximity to the Sun makes it difficult to maneuver a spacecraft into a stable orbit around it. For this reason, we have very few Mercury spacecraft missions. Messenger was the first man-made object to orbit Mercury, followed by Mariner 10 and BepiColombo.

The future of space exploration will be engrossing, as we will probably witness and know everything about the universe. The limit to what we shall achieve from space exploration is inconceivable using Telescopic, robotic, and human spaceflight.

Investment in space exploration has dramatically shifted since the space race of the 20th century. Space exploration of the late 20th century was driven by competition between the Soviet Union and the United States to achieve the first spaceflight. Now, the private sector and national governments are also investing in space exploration. Aside from the exploration of space, today, we are motivated by having an alternative to protecting human life from catastrophic events on Earth. As a result, man is leveraging on migrating to other planets should there be a natural disaster on Earth that is beyond our control. Man can also move to space for economic reasons, like mining natural resources for both space and Earth development.

Leveraging these resources, man could move industrial machines to space to lower emissions on Earth and ultimately lead to finding cleaner energy sources. Therefore, the prime aim of colonizing space is to explore, save the human race, advance technologically, and solve economic challenges.

Interestingly, many private companies have stepped into the space race, working to make space travel more efficient and cost-friendly. They all hope to colonize space and send as many humans as possible to planets and moons. Among these private companies, SpaceX is at the forefront, having been able to launch a reusable rocket, Falcon. Other private space companies are Orbital, Blue Origin, Boeing, Sierra Space, and others.

For space research, space exploration unraveled so many things that were in the dark centuries ago. The distinctive attributes of space drool astronauts to conduct research that could not otherwise be done

on Earth alone. Also, looking at the Earth from space has enabled scientists to gain more insight into the Earth's natural environment. Presently, NASA's research on the International Space Station includes biomedical, material science, technology advancement, and methods to enable further space exploration. According to experts, microgravity enables astronauts to execute medical research that is impossible to discern on Earth.

For example, NASA is researching new treatment options for complex diseases, such as Duchenne muscular dystrophy, which require the use of a microgravity environment to keep the microparticles in the treatment solution stable. NASA has also reported research investment in microbial vaccine development and drug microencapsulation for targeted and more efficient treatment delivery.

StarChip

Breakthrough Starshot is a research and engineering project by Breakthrough Initiatives to develop a proof-of-concept fleet of light sail spacecraft named StarChip capable of traveling to the Alpha Centauri star system, which is 4.37 light-years away. It was founded in 2016 by Yuri Milner, Stephen Hawking, and Mark Zuckerberg.

Conclusion

This is how far humans have gone in space exploration. I believe the above highlights will open your eyes to the market and scope of space exploration. As we progress, we shall touch on a few related topics. Before I proceed, I would like to list some notable companies that manufacture spacecraft and space machines. They are: ABL Space Systems, Agnikul Cosmos, ARCA Space, Australian Space Research Institute, Astra Space, Bellatrix Aerospace, Blue Origin, BluShift, Borneo SubOrbital, Canadian Arrow, CubeCab, Firely Aerospace, Galactic Energy, Generation Orbit, Others are InterOrbital System, Mishael Aerospace, OneSpace, OrbitX, Relativity Space, Rocket Crafters, Skyroot Aerospace, Skyrora, Success Rocket, Vector Launch, Virgin Orbit, Moon Express, and so on.

Celestial Bodies

Celestial bodies are natural objects found in space, each playing a role

in the vast structure of the universe. Below are major celestial bodies and their characteristics:

Nebula

A nebula is a vast cloud of gas and dust in space, often called the “nurseries of stars.” They play a crucial role in the life cycle of the universe, as new stars and planetary systems form within them when gravity pulls gas and dust together. Some nebulae also form from the remnants of dying stars, like supernova explosions or the outer layers shed by red giants. A Nebula comes in various types, including Emission nebulae, which glow brightly from ionized gases (an example is the Orion Nebula), and Reflection nebulae, which shine by reflecting the light of nearby stars. Others are Dark nebulae, dense clouds that block starlight behind them, and Planetary nebulae, which are shells of gas expelled by dying stars. With their stunning colors and shapes, nebulae are both beautiful cosmic formations and key sites of creation and transformation in the universe.

Meteorite

A meteorite is a rock that originated in outer space and has fallen to the surface of a planet or Moon. When the original object enters the atmosphere, various factors, such as friction, pressure, and chemical interactions with atmospheric gases, cause it to heat up and radiate energy. It then becomes a meteor and forms a fireball, also known as a shooting star; astronomers call the brightest examples “bolides.” Once it settles on the larger body’s surface, the meteorite becomes a meteor. Meteorites vary significantly in size. For geologists, a bolide is a meteorite large enough to create an impact crater.

Meteorites that are recovered after being observed as they transit the atmosphere and impact the Earth are called meteorite falls. All others are known as meteorite finds. Meteorites have traditionally been divided into three broad categories: Stony meteorites, which are rocks, mainly composed of silicate minerals; iron meteorites, which are largely composed of ferronickel; and stony-iron meteorites, which contain large amounts of both metallic and rocky material.

Modern classification schemes divide meteorites into groups according to their structure, chemical and isotopic composition, and mineralogy. “Meteorites” less than 1mm in diameter are classified as

micrometeorites. However, micrometeorites differ from meteorites in that they typically melt completely in the atmosphere and fall to Earth as quenched droplets. Extraterrestrial meteorites have been found on the Moon, in the United States of America, Antarctica, Australia, the Sahara, Northwest Africa, the Arabian Peninsula, and elsewhere. There are over 30,000 meteorite collections on Earth.

Asteroid

An asteroid is a minor planet that is neither a true planet nor an identified comet that orbits within the inner Solar System. They are rocky, metallic, or icy bodies with no atmosphere, classified as C-type (carbonaceous), M-type (metallic), or S-type (silicaceous). The size and shape of asteroids vary significantly, ranging from small rubble piles under a kilometer across and larger than meteoroids to Ceres, a dwarf planet almost 1000 km in diameter. A body is classified as a comet, not an asteroid, if it shows a coma (tail) when warmed by solar radiation, although recent observations suggest a continuum between these types of bodies.

Of the roughly one million known asteroids, the most significant number are located between the orbits of Mars and Jupiter, approximately 2 to 4 astronomical units from the Sun, in a region known as the central asteroid belt. The total mass of all the asteroids combined is only 3% that of Earth's Moon. Most main-belt asteroids have slightly elliptical stable orbits, revolving in the same direction as the Earth, and taking three to six years to complete a full circuit of the Sun.

Asteroids have historically been observed from Earth. The first close-up observation of an asteroid was made by the Galileo spacecraft. Subsequently, NASA and JAXA launched several dedicated missions to asteroids, with plans for other missions in progress. NASA's NEAR Shoemaker studied Eros, and Dawn observed Vesta and Ceres. JAXA's missions Hayabusa and Hayabusa2 studied and returned samples of Itokawa and Ryugu, respectively.

OSIRIS-REx studied Bennu, collecting a sample in 2020, which was delivered back to Earth in 2023. NASA's Lucy, launched in 2021, is tasked with studying ten different asteroids, two from the central belt and eight Jupiter trojans. Psyche, launched in October 2023, aims to examine the metallic asteroid Psyche. Near-Earth asteroids can

threaten all life on the planet, as in the impact that may have inflicted the Cretaceous–Paleogene extinction. As an experiment to meet this danger, in September 2022, the Double Asteroid Redirection Test spacecraft successfully altered the orbit of a non-threatening asteroid moon, Dimorphos. The three most important groups of near-Earth asteroids are the Apollos, Amors, and Atens.

Comet

Comets are defined as icy bodies of frozen gases, rocks, and dust that formed when the solar system formed about 4.6 billion years ago. Comets orbit the Sun in highly elliptical orbits that can take hundreds of thousands of years to complete. As a comet approaches the Sun, it heats up very quickly, causing solid ice to turn directly into gas via a process called sublimation, according to the Lunar and Planetary Institute. The gas contains water vapor, carbon monoxide, carbon dioxide, and other trace substances and is eventually swept into the distinctive comet tail. According to NASA, scientists sometimes call comets dirty snowballs or snowy dirtballs, depending on whether they contain more ice material or rocky debris.

Occasionally, a comet streaks through the inner solar system; some do so regularly, some only once every few centuries. Many people have never seen a comet, but those who have won't easily forget the celestial show. As of October 2025, there are about 5,200 known comets.

Moon

Scientifically, the Moon is believed to have formed from the debris of the Earth in the early solar system formation. It is the Earth's only natural satellite. Apart from the Earth and other planetary moons, there are records of more than 470 moons orbiting smaller bodies, such as asteroids, dwarf planets, and Kuiper Belt Objects (KBOs) beyond the orbit of Neptune. These moons are called small-body satellites. Scientists are very good at spotting moons orbiting distant giant planets. Many small moons have been found, although the International Astronomical Union, which governs the official names of planets and moons, will no longer name small moons unless they are of significant scientific interest. Thousands of moons are yet to be discovered in our solar system, and trillions are likely in deep space.

Dwarf Planet

Dwarf planets are planets that are smaller than average planets. Presently, the number of dwarf planets in our solar system is unknown. However, estimates have run as high as 200 in the Kuiper belt and over 10,000 in the region beyond. Examples of dwarf planets are Ceres, which is in the inner solar system, and four in the trans-Neptunian region: Pluto, Eris, Haumea, and Makemake, among many others. Meanwhile, only Pluto and Ceres have been confirmed to be in hydrostatic equilibrium, judging from the results of the New Horizons and Dawn missions.

Exoplanet

An exoplanet, also known as an extrasolar planet, is a planet outside the solar system. As of the third quarter of 2025, there are approximately 6,028 confirmed exoplanets worldwide in 4,286 planetary systems, with 961 systems having more than one planet. Today, the James Webb Telescope provides us with greater insight into space and is expected to discover more exoplanets. This will enhance our understanding of their composition, environmental conditions, and potential for life. It is believed that most stars in our galaxy have at least one exoplanet. Exoplanets are central to the search

Planet

Popularly believed to be a star's debris, a planet is a large, rounded, astronomical body that orbits a star. Our solar system has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Pluto, which was considered a planet earlier, has been relegated to dwarf planet status. Planets are peculiar to humanity because the Sun is our home, and other planets that don't orbit the Sun are our neighbors. Meanwhile, the most widely accepted theory of planet formation is the nebular hypothesis, which suggests that an interstellar cloud collapses from a nebula to form a young protostar surrounded by a protoplanetary disk. As a result, planets grow in this disk through a gradual buildup of materials driven by gravity, a process known as accretion.

Earth

Our home and village, the Earth, is the third planet from the Sun and

the only astronomical body known to harbor life. This is made possible because the Earth is an ocean world, sustaining liquid surface water, the only kind in the solar system. The Earth's ocean covers 70.8% of its surface, and the remaining 29.2% is land, most of which is in the form of continental landmasses within its land hemisphere. A higher percentage of the Earth's land is humid and covered by vegetation, while large sheets of ice at Earth's polar deserts retain more water than Earth's groundwater, lakes, rivers, and atmospheric water combined. The Earth's crust comprises slowly moving tectonic plates, which act to produce mountain ranges, volcanoes, and earthquakes. The Earth has a liquid outer core that generates a magnetosphere capable of deflecting most of the destructive solar winds and cosmic radiation. The Earth is a fantastic planet. Like other planets, it orbits the Sun.

The Earth's core is divided into two main layers: the inner and outer core. The outer core is composed of liquid iron-nickel with lighter elements, is 2,260 km thick, and has a temperature of 4,000–5,000°C. On the other hand, the inner core is composed of a solid iron-nickel alloy with traces of lighter elements like sulfur, oxygen, and silicon. It is about 1,220 km in radius, about 70% the size of the Moon. The inner core has a temperature of 5,400–6,000°C, similar to the Sun's surface, and over 3.5 million times atmospheric pressure. The core remains one of Earth's least accessible yet most critical regions, influencing geology, climate, and life itself. Its core layer is similar to that of the Sun, stars, and other celestial bodies.

Star

A star is a luminous spheroid of plasma held together by self-gravity. Well, the idea of a star being held by "self-gravity" may likely be due to the limitations of human conception and discovery. The reason is that there could be an invisible or undetectable fabric that holds the stars. An example of this unknown energy is dark energy. The nearest star to Earth is the Sun. Many other stars are visible to the naked eye at night. Of course, the inconceivable distance of these stars from the Earth makes them appear as a dot of light. Some prominent stars that are closely positioned have been categorized into constellations and asterisms. Stars are different in size and brightness. The following are stars that are known to be very big in size: Stephenson 2-18 (2,150 solar radii), UY Scuti ($1,708 \pm 192$ solar Radii), V766 Centauri Aa

($1,492 \pm 540$ solar radii), KY Cygni ($1,420 \pm 284$ solar radii), AH Scorpii ($1,411 \pm 124$ solar radii), VV Cephei (1,329.62 solar radii), and so on.

The following are the brightest stars in space: Sirius (Alpha Canis Majoris), Arcturus (Alpha Bootis), Vega (Alpha Lyrae), Capella (Alpha Aurigae), Rigel (Beta Orionis), and more.

It has been estimated that there are about a septillion stars in the observable universe. Above 4,000 stars in the Milky Way can be seen with the naked eye. Stars are giant balls of hot gas made up of hydrogen, helium, and small amounts of other elements. The largest stars include Stephenson 2-18, WOH G64, RSGC1-F01, UY Scuti, VY Canis Majoris, and others. Some stars are incredibly massive. For instance, Stephenson 2-18 is estimated to have a radius about 2,150 times that of the Sun, while the Sun's radius is 109 times that of Earth. You can understand how large these stars can be. This is just as of 2025. We hope to discover more stars in the future, and some of them might be larger than Stephenson 2-18. This is why we must work harder and smarter to build more sophisticated space telescopes than those we have today. James Webb is performing excellently, but we need something much more advanced for advanced discoveries.

Galaxy

A galaxy is a system of stars and interstellar matter that makes up the universe. Galaxies are believed to have been formed soon after the universe began. They exist in clusters, some of which are grouped into larger clusters that measure hundreds of millions of light-years in diameter. Galaxies differ in shape, with variations arising from how the systems were formed and evolved. They vary in structure and characteristics; some are in the ongoing formation of baby stars, made up of glowing gas, clouds of dust, and molecular complexes. Others, in contrast, are dormant, having long ago stopped forming new stars. We have yet to determine the exact number of galaxies in the universe. Estimates have risen from thousands to millions, then to billions, and now to trillions. This number multiplies as space telescope technology improves. Meanwhile, it remains a mystery to the scientific community and humanity at large to convincingly ascertain how the space cloud that forms stars and breaks down into all matter was created.

Supercluster galaxy

A supercluster is a vast cosmic structure composed of multiple galaxy clusters, stretching hundreds of millions of light-years across. Typical superclusters span between 100 million and 500 million light-years, containing tens of thousands of galaxies. Our own Laniakea Supercluster includes the Milky Way Galaxy, the Virgo Cluster, and many others, spanning roughly 520 million light-years. Superclusters are part of the cosmic web — a vast network of filaments made of dark matter, gas, and galaxies, separated by enormous voids. Studying superclusters helps astronomers understand the large-scale structure of the universe, galaxy formation, and the effects of dark matter and dark energy on cosmic expansion.

Blackhole

A black hole is a region of spacetime where gravity is so strong that nothing—not even light or other electromagnetic waves—has enough energy to escape it. Black holes of stellar mass form when massive stars collapse at the end of their life cycles. Once a black hole forms, it can grow by absorbing mass from its surroundings. Supermassive black holes, which contain millions of solar masses, may form by absorbing other stars and merging with additional black holes or through the direct collapse of gas clouds. There is a consensus that supermassive black holes exist in the centers of most galaxies.

Einstein's theory of general relativity predicts that a sufficiently compact mass can deform spacetime to form a black hole. Detecting black holes is difficult, and NASA suggests that there could be 10 million to a billion stellar black holes in the Milky Way alone. However, black holes remain a mystery to humans.

Wormhole

A wormhole is a viable solution to the equations describing Einstein's theory of general relativity. It connects two distant points in space and time via a tunnel. Wormholes, as far as we know, are only hypothetical. They are legitimate solutions to general relativity, but scientists have never figured out a way to maintain a stable wormhole in the real universe. Hypothetically, Albert Einstein and Nathan Rosen discovered wormhole solutions in 1935, which is why wormholes are sometimes called "Einstein-Rosen bridges." Similarly,

Einstein and Rosen started the mathematical theory of a black hole, which consists of a singularity (a point of infinite density) and an event horizon (a region surrounding that singularity beyond which nothing can escape).

In accordance with the physics of the universe, Einstein and Rosen found that they could extend their theory to include the polar opposite of black holes, which is white holes. These theoretical white holes also contain a singularity, but they operate in inverse relation to a blackhole: No object can enter the event horizon of a white hole and be retained. Such material will be ejected immediately.

According to the European Southern Observatory, a single photon, or particle of light, passing through the wormhole tunnel would introduce so much energy to the system that the tunnel would snap apart, destroying the wormhole. The key ingredient for stabilizing wormholes is exotic matter, a form of matter with a negative mass. In summation, a wormhole is a scientific fiction because no space object has been pictured as a structure attributable to the wormhole. It is a mathematical theory that relies on the characteristics of the universe.

Dark matter

Dark matter is an exploratory form of matter that does not interact with light or the electromagnetic field. It is propelled by gravitational effects, which cannot be explained by general relativity unless more discoveries are made in the future. As galaxies form and evolve, more clues about the substance of dark matter might unravel. Dark matter is not known to interact with ordinary baryon matter, and its radiation, except through gravity, is difficult to detect in the laboratory. The most prevailing explanation is that dark matter is some worthless undiscovered subatomic particle, such as axons. Another theory is that dark matter is composed of primordial blackholes. Inadvertently, dark matter is classified as “cold”, “warm”, or “hot” according to its velocity. Meanwhile, present models have supported a cold dark matter scenario in which structures emerge by the gradual accumulation of particles. Dark matter remains a mystery to man, and more discoveries are being made.

Dark energy

Dark energy is an unknown force that indescribably influences

the universe. According to physical astronomy, dark energy is the invisible force that propels the universe's expansion. Dark energy is the dominant component of the universe, accounting for 68% of the observable universe, while dark matter accounts for 26% and 5% for other components, such as neutrinos and photons. The first observational evidence for dark energy's existence came from measurements of supernovae. Before this observation, scientists had thought that the gravitational attraction of matter and energy in the universe would cause the universe's expansion to slow over time. On the contrary, since the discovery of the "accelerating expansion," several independent lines of evidence have been discovered that support the existence of dark energy.

Dark energy's definite nature is yet to be determined, making it a mystery. However, several definitions abound. The two prime propositions are the cosmological constant, which represents a continual energy density filling space, and the scalar fields, dynamic quantities with energy densities that vary over time and space, such as quintessence or moduli. Scalar fields vary, while a cosmological constant remains constant across time and space. Dark energy is still a foreign phenomenon to the scientific community. We know little or nothing about it, as its characteristics are yet to be determined. With time, we shall unravel dark energy, which might help us understand more about the universe.

Expanding universe

Years ago, the Hubble telescope gave us a hint that the universe is expanding. According to science, billions of years after the universe began, its expansion started to speed up, being propelled by an unknown phenomenon called dark energy. This expansion increases the distance between the gravitationally unbound parts of the observable universe and the gravity-bound observable universe. Meanwhile, the expansion of the universe is inherent. In other words, it does not expand "into" anything, nor does it exist "outside" space. This characteristic makes the universe more mysterious, and man is challenged to unravel all therein. Hypothetically, cosmic expansion is a key feature of the Big Bang. According to inflation theory, during the inflationary epoch, after the Big Bang, the universe suddenly expanded, and its volume increased exponentially. Thus, the universe's

expansion is inherent and self-operational, and this scientifically made the expansion of matter possible after the Bang.

The expansion of the universe is another puzzle that the universe offers us. It challenges us to think as fast as the speed at which the universe expands. The question is, is the universe expanding in a straight path like traveling from the USA to Brazil, or is the expansion like an ocean that travels expansively and still returns in synchronicity? Well, the answer to this question lies in our ignorance and curiosity. This is one more reason it is a mystery, and to make it even more mysterious, the expanding universe is faster than light.

Great Attractor

The great attractor is a mysterious gravitational anomaly in intergalactic space, located roughly 150 to 250 million light-years away from the Milky Way in the direction of the constellations Centaurus and Norma. It exerts a gravitational pull so strong that it influences the motion of galaxies, including our own, across a vast region of space. The great attractor is a region of immense mass, possibly equivalent to the mass of tens of thousands of galaxies. Its strong gravitational pull causes galaxies in the region to accelerate towards it at an incredible speed.

It was first detected in the 1970s and 1980s through studies of galaxy motions. Astronomers noticed that galaxies, including the Milky Way, were moving toward a specific point in space at about 600 km/s (1.3 million mph), beyond what could be explained by the expansion of the universe.

The Great Attractor lies behind the Milky Way's galactic plane, an area crowded with stars, gas, and dust, making it difficult to observe in visible light. This region is called the "Zone of Avoidance." Infrared and radio telescopes like 2MASS and Parkes Observatory have helped peer through this obscuration. The mass of the great attractor is estimated to be 10^{16} solar masses, about 10,000 times the size of the Milky Way. The great attractor is not a single massive object; it's a gravitational focal point caused by the combined mass of galaxies, dark matter, and galaxy clusters in the region. Meanwhile, there is a larger motion flow! One is the Shapley Attractor, and another is a massive supercluster beyond the Great Attractor that pulls galaxies even faster.

Studying these attractors helps scientists understand the universe's large-scale structure and galaxy flows. It also demonstrates the role of dark matter in shaping cosmic movements and shows how galaxy superclusters influence the local group dynamics. Modern telescopes like the Square Kilometre Array and JWST may provide more precise observations in the near future. This will further define the mass distribution and exact nature of this region.

The edge of the Universe

The observable universe extends about 46.5 billion light-years in every direction from Earth. This "edge" marks the cosmic horizon, the farthest light that has had time to reach us since the Big Bang, about 13.8 billion years ago. Beyond this horizon, the universe continues, but its light hasn't reached us yet, meaning we can't observe or measure it. The universe itself has no true edge; it's thought to be either infinite or curved back on itself, like the surface of a sphere with no center or boundary. As space expands faster than light beyond a certain point, distant regions are moving away from us so quickly that their light will never reach us, even in the far future.

In short, the "edge" of the universe isn't a border — it's the limit of what we can see and know.

Space Mysteries

Space remains a mystery to man because there are so many unanswered questions. Questions like what dark energy is made of, why the universe is expanding and to what end, if the theory of the Big Bang is true, what happened before the Big Bang, how the black hole formed, and what is behind it. Other questions are how galaxies are formed, interstellar gas, the full characteristics of dark matter, fundamental particles, the cosmic web, what is beyond the observable and unobservable universe, energy, gravity, radiation, and so many more.

Mankind is on an unending quest to unravel these mysteries. Consequently, it has become its evolutionary compass. Space exploration is our zenith aspiration, and it will shape our evolution. The automotive industry bears the weight of achieving these milestones. I took my time to go this far in space exploration because I want to sink you into it, being that it is an unfamiliar sector to many.

As you can understand, space exploration is relatively engaging and vast. The scope is extensive, and the market is comprehensive. Above all, it is the most futuristic and humanity's apex aspiration.

The Summary Of Chapter Two

The automotive scope today extends far beyond traditional road vehicles. It has evolved into a broad mobility ecosystem that connects land transportation, aviation technologies, maritime engineering, artificial intelligence, and even emerging space exploration platforms. Land vehicles remain the foundation, transitioning from mechanical engines to electric drivetrains, autonomous systems, connected sensors, and intelligent mobility networks. Their evolution reflects the global shift toward cleaner energy, digital control, and high-efficiency movement.

In aviation, automotive principles merge with aerospace engineering to create advanced propulsion systems, lighter materials, unmanned aerial vehicles, and electric vertical-takeoff aircraft, reshaping urban air mobility. Meanwhile, maritime mobility leverages large-scale propulsion, hydrodynamic design, AI-assisted navigation, and environmentally friendly fuels to support global trade and offshore operations.

Artificial intelligence ties the entire scope together, powering autonomous decision-making, fleet management, predictive diagnostics, simulation models, and smart mobility infrastructure. AI enables real-time communication between vehicles, ships, aircraft, and robotic systems, creating a unified, intelligent mobility network. The reach of the automotive world now extends into space exploration, where advanced robotics, autonomous rovers, propulsion technologies, and lightweight materials drive missions on the Moon, Mars, and deep space. Lessons from automotive engineering increasingly influence spacecraft design, energy storage, and off-planet vehicle mobility. Futuristic mobility will be defined by fully autonomous systems, quantum-enhanced navigation, electric and hydrogen propulsion, intermodal AI coordination, self-healing materials, and seamless integration between land, sea, air, and space vehicles. The automotive scope is evolving into a global and eventually interplanetary mobility ecosystem driven by intelligence, sustainability, and advanced engineering.

CHAPTER THREE

AUTOMOTIVE MECHANISM

As a CEO, the number one rule that you must understand is the fact that you are alone in everything you do. You are alone in your success and failure. For this reason, you must master the act of independence; you must know that you determine the race. You must know that neither your breakthrough nor your downfall is transferable to anyone. To master the act of independence, you must first determine your ability and potential. This will give you confidence in your dispositions. Being independent necessitates taking other people's advice, opinions, and contributions only as secondary. The essence of being independent is taking responsibility for the outcome of your business. Therefore, avoid being misled by wrong advisers or unplanned circumstances. Don't give in to pressure. Master your path and travel after it. Avoid group talks, gatherings, and parties. Welcome everyone, and don't commit to anyone.

This topic is very important, and I want you to take it seriously. Before I move on, how would you feel when your client calls you to tell you of a particular issue with a vehicle that he or she bought from you, and you don't know anything about what the person is saying? Of course, you will feel disappointed, and not only that, you will lose your client's regard as one who is in the industry. Now, let me open your eyes to something: in any field of endeavor, your clients subconsciously or inadvertently believe you have absolute knowledge of it. Thus, as a vehicle seller or a service provider in any of the automotive sectors, every prospective client believes that you understand everything about automotive products. For this reason, they are always free to ask you any questions. I can't count the number of times that clients have called me to report that their

vehicle has developed one issue after another. I always provide a palliative solution by educating them on the problem and giving them a probable solution. You must do everything in your power to understand the mechanism of at least a car. Of course, similar technology catalyzes other automobile vehicles, such as aircraft, trains, ships, etc.

The introduction of electrical technology has made understanding automotive mechanisms more difficult. Nevertheless, it's expected of an automotive CEO to have at least a basic understanding of vehicle mechanisms. Understanding the mechanism of a car is an institution on its own, but I will make an abstract summary of it. Car mechanisms are encompassing, as it has been estimated that some cars have as many as thirty thousand components. This will open your eyes to the need to soften your brain and learn as much as you can. The good aspect is that the more you learn about the vehicle's mechanism, the more you want to know. This will happen so that you understand the intelligence behind it and travel in synchronicity. It will happen in a way that, at a point, you will develop the inclination to invent one in your name.

For instance, I have studied automotive mechanisms so thoroughly that I have begun to think of a new species of mechanism that is transcendental and feasible. As a matter of fact, I have aeronautical engineering theory, where a small component of symmetric parts operates electrically for combustion and acceleration. This atomic symmetry, in synergy with electricity, can inherently correct component malfunctions by healing and re-healing itself. In other words, it's a robotic machine that can naturally repair itself and attain infinite longevity. This is a shape-shifting technique that allows the device to assume any form. What turned out to be a shock to me was NASA's recent announcement that they had envisioned a shape-shifting technology in nature, which is akin to my theory. Although mine is for speed and space exploration. My ultimate goal in the mobility industry is to invent or contribute to the invention of a vessel that is equal to or faster than the speed of light.

I had a revelation in which a human brought the technology of "Ezekiel's Wheel" into reality. It was after this revelation that I changed the logo of Autohub Africa to what it is today. The four ring colors signify the four Ezekiel's Wheels: "Wheels within wheels,"

with each wheel intersecting the others at right angles. Although the Scripture didn't state the speed at which Ezekiel's Wheel travels, what caught my attention is the fact that it can travel in any direction at any time. This means that it navigates the four cardinal directions instantaneously, without having to turn or reverse. It can take any direction in a 360-degree circle. This means that the vessel has no front, back, or sides... Any direction is automated! This is a marvel of divine technology. A spiritual technology that I believe could be brought to reality in the physical realm. However, it's a technology that demands that man give up all impurities and stay whole for divine insight.

Today, no technology can travel in all directions instantaneously. Notwithstanding, it's very possible if we are so determined, also with time and evolution. It will be a marvel of engineering! And I'm optimistic humans can achieve this. Even if it's not in our generation, I know the generations to come will. In fact, James Bruton has built what he calls an omnidirectional bike with wheels made of large plastic circus balls that can drift and rotate in all directions (360 degrees). Thanks to the two giant rotating wheels, the bike can balance on its own—a drift bike! The electrical and mechanical engineer uses five O-Drive brushless motors to move the bike's omnidirectional wheels around. They also have small rollers around their circumference to make this action possible. This is a landmark breakthrough, as it has opened the scientific world's eyes to the possibility of inventing omnidirectional machines. Imagine having space machines travel in all directions. It would be revolutionary! NASA is currently funding a flying amphibious robot that mutates into different devices. Dubbed "Shape-shifter," this technology comprises smaller unit systems that collectively morph into robotic balls, flight arrays, and torpedo-like swimmers.

This proposal envisions the machine globetrotting from Titan's rugged cliffs to its deep seafloors. This same technology would be applied to other non-amphibious robots and even aircraft. In like manner, NASA is at it again with another self-healing robotic wear called "Smart-Suit". This kit is designed specifically for human missions to Mars. Apart from the safety technology in this spacesuit, it is embedded with soft robotics, stretchable self-healing skin, and integrated sensors that can collect and display data to the wearer.

These technologies might become a household routine in the future, and if this is the case, aircraft crashes will be a thing of history. Similarly, traveling to space would have no limitation, as the machine would always heal itself of any fault regardless of the distance it has covered.

The only impediment to this technology will be a collision with a hash interstellar body like the sun and stars. Heedlessly, I believe that humans would be able to create a radar technology that will deter interstellar collision, no matter the speed at which the vessel is traveling. I have also developed a mechanical module that allows an aircraft to flap its wings like a bird, regardless of whether the aircraft engine is on or off. In other words, with this technology, if an aircraft malfunctions in the air, it will manually flap its wings and land successfully. These theories are feasible; unfortunately, I lack the mathematical equation to present them. Meanwhile, I cannot necessarily build this technology myself, but I can sell the theories to automotive engineers, who would then develop them into a reality.

So, you have to keep learning the mechanism until you are able to invent one. You might be imagining how possible this could be when you haven't had a course on automotive engineering. Well, a good example is when you are new to an area, and someone familiar with the roads takes you around. By the time the person explains more than ten routes, you might be preoccupied, wondering how he was able to navigate those routes. Everything will be strange to you. The truth is that by the time you spend a month or more in the same area, you will know about those routes, and they will be easy for you to navigate. You might even know more undiscovered ones; it all depends on your level of curiosity.

Similarly, when you open your mind with a burning desire to know how a vehicle functions, you will learn everything, starting from the engine to the radio antenna. Gradually, if you're consistent, other advanced technologies will be familiar to you, so you will even start thinking about how to modify what is in existence. In this pattern, I was able to build myself to this stage, from studying how a bicycle works to how a cart works to how a vehicle's engine, transmission, electrical system, how an aircraft engine works, how it stands the wind and propels, and how a jet, drone, ship, AI automation, and others work with incredible speed. So, with steady

knowledge of these things, the components and functions will be very familiar to you, and your understanding will be at a tip. The first step to understanding a vehicle's mechanism is to understand the components that make up the engine and gear, and how they function interactively.

Engine

The basic components to understand very well in an engine are the crankshafts, pistons, rods, valves, cylinder, camshaft, etc. To understand a vehicle's mechanism, we have to start with the engine. And in the engine, the piston is the prime mover and powerhouse. A piston is fixed in the crankshaft, and when it travels to the end of its range, whether up or down, it's called a stroke. A car engine uses a four-stroke cycle. It works like this: First, there is the intake; the piston descends, sucking in the air-fuel mixture into the cylinder through the intake port with both intake valves open. Second is the compression; with all valves closed, the piston travels back up, compressing the fuel and air mixture for more powerful combustion.

Third is the power stroke; an electrical spark ignites the compressed fuel and air mixture, and the resulting combustion forces the piston to the bottom of the cylinder again. And a connecting rod transfers this power to the crankshaft. And the fourth is the exhaust; as the piston comes back up, it pushes the spent combusted mixture through the opening exhaust into the exhaust port, connecting multiple pistons. For a smooth power delivery, pistons take turns firing. The firing order for a four-cylinder engine, for example, is 1324. Camshaft: The specially shaped cams push the spring-loaded valves open in turn. Cam gears and the timing belt/chain link everything to the crankshaft, causing them all to spin together. The crankshaft translates piston power out of the engine, having a counterweight to balance against the pistons for a perfect, smooth revolution.

RPM stands for revolutions per minute, which is the number of times a crankshaft rotates in a minute. The engine block houses the crankshaft and the cylinders, and the cylinder head holds the valves, ports, cams, etc. The geared flywheel sits on one side of the crankshaft for connection to the transmission; it is also where the starter connects to the system.

The four-cylinder engine is arranged in a single row. There are

many other configurations, such as the six, eight, and twelve-cylinder engines, where half of the cylinders on each side form a V shape. We have other engine types, like the Straight engine, Flat engine, Radial engine, U engine, H engine, W engine, X engine, and so on. In aircraft, we have Reciprocating engines, Radial engines, rotary engines, Wankel engines, Electric motors, Turbojet engines, Turbine engines, Rocket engines, Inline engines, and jet engines, among others. We have steam engines, internal combustion engines, gas turbine engines, electric motors, Stirling, and so on in the maritime industry.

In drones, we have Batteries, Combustion engines, Hydrogen fuel cells, Solar power, Drone Tethers, Laser power beaming, and so on. AI is much more complex because it involves algorithms. It is computer-based; the input and output are achieved through systematic coding. AI works with hardware, software, and, introductoryly, wetware. These processes of ware are made up of various components, including materials, coding, and electrical pulsation synapses. AI is built using programming languages such as C++, R, Lisp, Python, JavaScript, C#, Smalltalk, Mojo, Haskell, Wolfram, and others. We also have specialized languages like Planner, AIML, POP-11, Prolog, and STRIPS. We have weak and strong AI. Examples of weak AI include Siri, Alexa, ChatGPT, Gemini, DeepSeek, Grok, and other smart assistants. Other examples are self-driving cars, Google search, Conversational bots, Email spam filters, Netflix's recommendations, Reactive machines, and limited memory.

Examples of strong AI are rule-based reasoning systems, self-awareness, artificial general intelligence, artificial superintelligence, transcendent, cosmic, and God-like. Thus, the evolution of the mobility industry is from land, sea, air, and cloud (AI). These are our projections for now, not sidelining what could emerge from quantum mechanics and computing, which are believed to operate on a different dimension compared to classical computing.

Classical computing differs from quantum computing, which uses qubits instead of bits.

Qubits can exist in a superposition of states, 0 and 1, simultaneously, enabling quantum computers to explore multiple possibilities at once. Quantum computers can potentially solve specific problems much faster than classical computers, especially those with high

computational complexity.

Let's return to the main topic, which is the vehicle engine mechanism. Despite the designs and capacities of any of the engines listed above (cars, aircraft, ships, and drones), the basic parts and mechanisms are the same. Now, let's look at other systems that support this combustion process. The first is the air intake system. Air passes through the air filter and enters the intake manifold, where it mixes with fuel before being sucked into the individual cylinders through the intake ports. Number two is the fuel system. A fuel pump carries fuel from the tank through a tin pipe to the fuel filter and then to the engine, where the fuel injectors emit a precisely timed gas spray into the intake ports. Number three is the cooling system. The engine gets very hot during operation and requires cooling. Through the cylinder head, the coolant system around the cylinders carries a special liquid called anti-freeze to keep the temperature within a safe operating range. It is called anti-freeze because it won't freeze in icy weather. After cooling hot engine parts, the coolant circulates through the radiator. The radiator has a network of small tubes and fins, which enables perfect cooling. The coolant passes through these channels as the radiator fan pulls in air, which then flows through the tubes and fins, cooling the hot liquid for recirculation.

The water pump keeps the coolant system flowing and properly pressurized. The thermostat regulates coolant temperature by either routing coolant back through the engine or to the radiator for further cooling.

Number four is the electrical system. The spark plug delivers the electrical spark that ignites the fuel-air mixture for combustion. The metal call is insulated from the outer casing made of porcelain. The spark jumps between the conductive surfaces. The coil pack, on the other hand, delivers electrical current to the spark plugs as directed by the engine control module (ECM). The ECM is a computer that directs many core engine functions, such as spark timing, valve open and close timing, air-to-fuel ratio, etcetera.

The alternator functions as a power generator, converting the engine's mechanical energy into electricity to charge the battery and power other electrical systems while the engine is running. The battery provides power to the starter, which starts the engine.

Number five is the lubricating system. Motor oil is used to

lubricate, clean, prevent corrosion, improve sealing, and cool the engine by carrying heat away from moving parts. Rings around the top of the piston head keep oil out of the combustion process while allowing the cylinder to be lubricated. The oil galleries are channels connecting the engine block and cylinder head, carrying oil to various engine parts. Oil flows to the engine and returns to the oil pan for recirculation. The oil pump keeps the oil properly pressurized and flowing. Oil rests in the oil pan when not in circulation. The oil filter keeps the oil clean from contaminants.

Number six is the exhaust. The exhaust manifold collects gases from multiple cylinders into one pipe. The exhaust flows through the catalytic converter, which captures toxic chemicals, and then goes out through a muffler that reduces exhaust noise.

The basic systems through which a vehicle's engine functions are discussed above. Now, we will have an abstract discussion of how a vehicle's transmission works.

Gear

A vehicle's transmission is complex, but I will explain it as easily as possible. I prefer to talk about automatic transmission over manual because the former is contemporary. The automatic transmission is a "man-made" miracle because of its brilliance, power, and ease of drive. It works based on the planetary gear set. To understand this process, let's look at the basic parts of the planetary gear set. The basic planetary gear set includes the sun gear, planet gear, gear carrier, and gear rings. Planetary gear sets have two inputs and one output. In an automatic transmission, the output rotation is drawn from the planet carrier. The two inputs are connected to the ring and the sun gears. An automatic transmission has many functional parts. It uses a combination of fluid, mechanical, and electrical engineering to provide a ride from slow rolling to superhighway cruising.

So, let's overhaul the power flow of an automatic transmission. Before then, I want you to understand the names of the systems: The engine sends power to the torque converter's pump. The pump sends power to the torque converter's turbine via transmission fluid. The turbine sends the transmission fluid back to the pump via the stator. On the other hand, the stator multiplies the power of the transmission fluid, allowing the pump to send more power back

to the turbine. A vortex power rotation is created inside the torque converter at this stage.

The turbine is connected to a central shaft that connects to the transmission. As the turbine spins, the shaft rotates, sending power to the first planetary gear set of the transmission. Depending on which multiple disc clutch or brake band is engaged in the transmission, the power from the torque converter will either cause the sun gear, the planetary carrier, or the ring gear of the planetary gear system to move or stay stationary; all depends on which parts of the planetary gear system are moving or determine the gear ratio. Whatever planetary gear arrangement a given transmission has (whether the sun gear is acting as input, the planetary carrier acting as output, or the ring gear is stationary determines the amount of power the transmission sends to the rest of the drive train.

Automatic transmission is amazing and compactly complex. It is technically more complex than I have explained; however, that was the abstract mechanism. Sensors and valves regulate and modify the function of the transmission, but I won't discuss them here. I will list them when we discuss sensors in a vehicle. The function of an automatic transmission is easier to understand visually. I recommend watching videos online. At least now you have a summary of what goes on under the hood while you cruise on a freeway.

Electrical System

The electrical system is the lifeline of every modern vehicle. It powers, controls, and connects all essential components. It operates on direct current (DC) supplied by the battery, while the alternator recharges the battery and supplies electricity when the engine is running.

The system works through a network of wires, fuses, relays, and control units that channel electricity to different parts of the car. Whenever the ignition key is turned on, the battery sends power to the starter motor, cranking the engine. Once the engine runs, the alternator takes over, generating current for lighting, sensors, dashboard electronics, and other accessories.

Automotive wiring varies by purpose; primary wires handle general circuits like lights and signals, battery cables carry high current to the starter and grounding points, fusible links act as built-in safety fuses, and shielded or heat-resistant wires protect sensitive

circuits and high-temperature areas. Each wire type ensures stable current flow and safety under different conditions.

In electric vehicles (EVs), the electrical system replaces the fuel engine entirely. A battery pack stores energy, a motor converts that electricity into motion, and an inverter controls power delivery. EVs also feature a battery management system to monitor temperature, charging, and regenerative braking, which recovers energy when slowing down. Overall, the car's electrical system, whether in a traditional or electric vehicle, serves as the central network that channels energy, enables control, and powers the intelligent functions that define modern mobility.

Suspensions

A vehicle's suspension system is the setup of springs, shock absorbers, and linkages that connect the wheels to the car's body. Its main job is to absorb shocks, maintain stability, and ensure a smooth ride by keeping the tires in firm contact with the road.

Here is how it functions: when a vehicle drives over bumps or uneven surfaces, the springs compress and expand to cushion the impact, while shock absorbers (dampers) control the motion of the springs, preventing excessive bouncing. The control arms and linkages guide wheel movement, keeping the tires properly aligned and stable during cornering or braking.

There are two major types: independent suspension, where each wheel moves separately for better comfort and handling, and dependent suspension, where wheels on the same axle move together, offering strength and load support. Overall, the suspension system ensures a balance between comfort, control, and safety, allowing vehicles to handle smoothly across varying road conditions.

Here are the main parts that make up a vehicle's suspension system:

Springs: Absorb shocks from road bumps and support the vehicle's weight. Examples are coil springs, leaf springs, and torsion bars.

Shock Absorbers: Control spring movement and reduce bouncing for a smoother ride.

Struts: Combine a shock absorber and a spring into one unit, commonly used in front suspensions.

Control Arms: Connect the wheel hub to the vehicle's frame, allowing controlled up-and-down wheel movement.

Ball Joints: This is a pivot points that enable steering and suspension movement simultaneously.

Stabilizer (Anti-roll) Bar: Reduces body roll when turning or cornering.

Bushings: Rubber or polyurethane cushions that reduce friction and absorb vibration between suspension components.

Steering Knuckle: Connects the suspension and steering systems, holding the wheel hub in place.

Beam: Supports the vehicle's weight and helps align the wheels in dependent suspensions.

Linkages and Rods: Connect various parts of the suspension to ensure proper geometry and motion control.

Together, these components work to keep the vehicle stable, comfortable, and safe under all driving conditions.

Body

The body of a car is the main structural frame that gives the vehicle its shape, strength, and safety. It houses all major components such as the engine, suspension, electrical systems, and interior fittings, while also influencing aerodynamics, comfort, and design.

Types of Car Bodies

Sedan: Four-door passenger car with a separate trunk.

Hatchback: Compact car with a rear door that opens upward.

SUV (Sport Utility Vehicle): Larger, with higher ground clearance and off-road capability.

Coupe: Two-door sporty vehicle.

Convertible: A Car with a retractable or removable roof.

Pickup, Truck, and Van: Designed for cargo and utility purposes.

Materials

Car bodies are made from materials chosen for their balance of strength, weight, and cost. The following are a vehicle's body common materials:

Steel: The most common material, offering durability and crash resistance.

Aluminum: Lightweight and corrosion-resistant, used in modern

and performance vehicles to improve fuel efficiency.

Carbon Fiber and Composites: Extremely light and strong, used in high-end sports and electric vehicles.

Plastics and Fiberglass: Used for panels, bumpers, and trim due to their flexibility and low weight.

Welding and coupling

Body parts are joined through a combination of welding, riveting, and adhesive bonding. Below are the types of welding and processes.

Spot Welding: The most common method in steel car bodies, using electric current to fuse metal sheets at specific points.

MIG/TIG Welding: Applied in thicker sections or aluminum structures for strong, continuous joints.

Adhesive Bonding: Used alongside welding to reduce vibration and enhance structural rigidity.

Bolting and Riveting: Common in modular or composite assemblies. Once welded and coupled, the body undergoes painting, sealing, and finishing before mechanical and interior components are installed, creating the final structure known as the body-in-white (BIW).

In essence, the car body blends engineering precision with design aesthetics, ensuring safety, efficiency, and visual appeal.

Sensor

A sensor is a device that detects physical properties or environmental changes and converts them into signals that can be measured or recorded. These signals are often electrical, but they can also be mechanical, optical, or chemical outputs. Sensors are used in a wide range of applications.

How Sensors Work

As a mechanic eager for a successful career in your workshop, you must understand how automotive sensors operate. As their name indicates, they function like sensory organs, sending crucial information to the engine. They detect changes in stimuli, which act as triggers that activate them and start the information relay process. A good example is the car's pressure sensor. The pressure sensor sends a voltage signal based on the pressure it detects. If the pressure exceeds a certain limit, the information is transmitted to the engine's central processor via a wire connection or modern wireless methods.

The engine will then notify you with an alarm or a dashboard light turning on. Notifying you of any fault requires your attention and helps ensure quick car maintenance.

The other vehicle sensors work in the same way, with some, such as temperature sensors, affecting change as they operate. When they detect a significant rise or lowering of the vehicle's temperature, they send the info to the processor, which carries a parallel command to correct the issue. The air conditioner can be turned on or off, and the air inlets will open or close to control the temperature to the desired levels.

Type Of Sensors

Any serious car and auto-engineering enthusiast has, at some point in their life, asked the question, "How many sensors are in a car?" To answer this, here is a list of sensors that a vehicle's system may include.

Coolant temperature sensor

The coolant temperature sensor, also called the engine coolant temperature sensor (ECTS), begins the car's sensor list by measuring the temperature of the coolant or antifreeze in the cooling system. This component works with a car's electrical control unit to show how much heat is produced by the engine. The sensor's data is sent to the control unit, and if the temperature isn't at the right level, the unit will make adjustments to fix the issue. Some adjustments involve modifying the fuel injection rate, ignition timing, and toggling the electrical fan on and off.

Intake air temperature sensor

The intake air temperature sensor is an essential vehicle component. It helps determine and monitor the temperature of the air entering the engine, assisting the engine control unit in making accurate measurements when balancing the air-fuel mixture. Cold air is usually denser than hot air, and it requires more fuel to keep the fuel mixture balanced for the vehicle's optimal performance. The sensor is typically mounted on the intake manifold, with its tip exposed to detect the temperature of the incoming air. It sends this data to the engine computer to adjust fuel injection and maintain the proper

air-fuel ratio.

Mass airflow sensor

The mass airflow sensor is another air sensor installed in the vehicle. It measures the amount of air entering the engine. The sensor also tracks pressure and temperature, the two variables that the engine control unit monitors for fuel injection. There are two types of mass airflow sensors: The hot wire and the vane meter. Both include an intake air temperature sensor, and they are primarily used in cars made after 1996. The mass airflow sensor works accurately when combined with an oxygen sensor, which is another sensor we will review.

Manifold absolute pressure sensor

The manifold absolute pressure (MAP) sensor is a standard component in internal combustion engines that provides information about engine vacuum pressure. This data is sent to the engine control unit and helps calculate air density. These calculations give a clear understanding of the mass airflow sensor. In fact, the manifold absolute pressure sensor functions similarly to the mass airflow sensor—the result indicates the air mass flow rate. The calculated rate helps the control unit achieve an optimal fuel injection ratio, which balances the air-fuel mixture.

Oxygen sensor

Oxygen sensors, invented by Gunter Baumann, have been a staple in the industrial world for nearly fifty years. They are used to measure the amount of oxygen in liquids or gases.

The oxygen sensor is located in the emission system and monitors the emissions. The result is excellent performance and controlled gas emissions. This is helpful now that several lobby groups are advocating for reduced automobile pollution.

These sensors became widespread in auto engineering after the 1980s. Most cars now have at least one oxygen sensor, and newer models can have up to four for better efficiency.

Knock sensor

Knocking is a common engine problem in internal combustion

engines. It occurs when the air/fuel mixture burns improperly, causing knocking sounds when you start the ignition. These sensors are found in diesel engines but are also common in gasoline-powered vehicles.

The knock sensors detect vibrations caused by 'knock' from incomplete combustion. They send these vibration signals to the engine's processor, which then corrects the issues to maintain efficient burning of the air and fuel mixture.

Crankshaft sensor

The crankshaft sensor, also known as a crank sensor, is an electric component in diesel and petrol engines. It monitors the crankshaft's position and rotating speed, making it an important part of the vehicle. The engine management unit uses sensor data to control various engine parameters, such as fuel injection and ignition timing. It also collaborates with the camshaft sensor to enhance the car's efficiency.

Camshaft sensor

As previously explained, the camshaft sensor, also known as the camshaft position sensor, works together with the crankshaft sensor to determine the precise position of the crankshaft. Electrical signals from both sensors are sent to the engine management system and help regulate various parameters to ensure a smooth ride. If the camshaft's position or rotation rate deviates from normal, the sensor will send signals to the central processor. The processor will typically relay these messages to the dashboard to alert you of the issue. The camshaft and crankshaft sensors are crucial for maintenance because they prevent additional stress on a poorly aligned crankshaft. White smoke from the engine may signal an issue with either the camshaft or crankshaft sensor.

Fuel temperature sensor

A significant part of a car's motion depends on fuel injection, which should always function optimally. Several sensors, including the fuel temperature sensor, are dedicated to managing fuel injection in internal combustion engines. The fuel temperature sensor detects the fuel's temperature, as its name indicates. The primary focus is on

fuel density since HOT fuel is less dense than cold fuel. The variation in density impacts the amount of fuel injected. This sensor helps control fuel intake, which then manages emissions and fuel use.

Fuel tank pressure sensor

Another sensor that monitors fuel is the fuel tank pressure sensor. It is part of the fuel tank assembly and is mounted on the top or sides of the tank. It plays a vital role in the evaporative emission control system, which prevents vapors from escaping the gas tank into the atmosphere. The sensor monitors the pressure in the fuel tank, helping to detect leaks. If there is a leak, the pressure will change, and the sensor will send signals to the engine's main control unit. This causes the check engine light to turn on, prompting you to perform the necessary checks to identify the problem.

Voltage Sensor

The voltage sensor is another common sensor used in vehicles. This component controls the car's speed, especially during idling. It helps increase or decrease speed and ensures the variable changes as needed.

Nox sensor

Nox sensors are necessary for controlling emissions and conserving the environment. They are high-temperature electric devices that help detect the many forms of nitrogen oxides.

Much research is still underway to develop Nox sensors that can help reduce nitrogen oxides emissions into the environment. These compounds have numerous harmful effects, such as smog, acid rain, and health problems. The sensors measure the levels of compounds passing through the exhaust fumes. If the readings are high, the management system will start processes to lower these gases.

Exhaust temperature sensor

The exhaust temperature sensor works with both petrol and diesel engines and serves a different function. The technology behind exhaust sensors is among the most advanced in emissions control, and most modern cars include these components. This sensor protects the vehicle's components in gasoline engines, such as the

turbocharger and catalytic converter. If the sensor detects high temperatures in these parts, it sends an electrical signal to the engine control unit to reduce heat, mainly by lowering pressure. In diesel engines, the exhaust temperature sensor monitors the heat of the diesel particulate filter. This helps determine whether the conditions are ideal for the filter's self-cleaning.

Boost pressure sensor

These engine components are primarily found in turbocharged cars. They provide data on air pressure and air/fuel ratios, which are essential for controlling engine performance and enhancing the overall performance of the vehicle. They also manage the boost level in the intake chamber of supercharged engines or those equipped with a turbocharger. This component measures the absolute pressure and air density before the throttle valve and transmits the signals to the control system. Using these signals, the control unit can adjust the fuel amount for optimal combustion of the air/fuel mixture.

Throttle position sensor

The throttle position sensor is typically mounted on the throttle body. It monitors how far the throttle blade opens, which depends on how far you press the accelerator pedal. The throttle's position influences the amount of air entering the engine's manifold, and it functions similarly to a valve. The sensor checks the throttle's position and the speed of its opening and closing. Like any sensor, it sends voltages to the engine's computer system, determining the fuel injection rate to balance the air-to-fuel ratio.

Vehicle speed sensor

Another of the many types of sensors used in automobiles is the vehicle speed sensor. It measures wheel speed, focusing on transaxle output, and sends the message to the vehicle's engine computer. With the information on the wheels' speed, the control unit regulates parameters related to vehicle speed. The variables include ignition timing, air intake, and the air-to-fuel ratio, among others.

Water in the fuel sensor

One problem you may encounter with your car is contaminated

fuel. There are several contaminants, and the common one is water. Your vehicle cannot run on water as fuel, and you may notice telltale signs such as poor acceleration, ignition problems, and knocking. The water in the fuel sensor (WiF) detects the presence of water in the fuel tank. The sensor detects the tank's water levels through the electrical conductivity difference between petrol or diesel and water. If there is excess water, the sensor transmits the data to the ECU and then to the dashboard, which is noticeable by the check light on the dashboard.

Tire pressure sensor

Tire pressure is essential for a smooth and safe ride. When tire pressure decreases, it affects your vehicle's performance, and in extreme conditions, it may lead to an accident. To help monitor this variable affecting the tires, we have the tire pressure sensors positioned in the pocket created by the wheel and tire. They measure the tire's air pressure and circulate the values via low-frequency radio. The signals are sent to either the ECU or the dashboard, where the readings are in pounds per square inch (psi).

Torque sensor

The torque sensor, or the torque transducer, measures and records dynamic torque. Measuring dynamic torque is difficult, and this sensor overcomes the challenges by using a magnetic domain to condition the rotating shaft. The domain's magnetic properties vary depending on the torque; non-contact sensors can measure this variable. These are magneto-elastic sensors, and they are standard in race cars, typical automobiles, and aircraft. As an automobile CEO, mechanic, or owner, you need to know that there are two types of sensors: rotary and reaction. They measure dynamic and static torque, respectively.

Transmission fluid temperature sensor

Transmission fluid is a crucial element in an automobile's transmission system. It helps with braking and steering, and also lubricates parts of this system. Transmission fluid has a high boiling point, and when exposed to excess heat, it may lead to the transmission system's failure. Failure can result in poor steering and braking, slow response, and,

at times, a burning odor. The transmission fluid temperature sensor comes to your aid in detecting the heat of the transmission fluid. It transmits the collected data to the dashboard, compelling you to act to correct the problem.

Oil level sensor

Oil is a must-have utility for your car to move perfectly. It helps in lubrication, and you need to check its levels regularly. The oil level sensor is ideal for keeping tabs on your vehicle's oil level. The sensor applies the properties of magnetism, where a magnetized sealant moves up and down the tube of the oil chamber. A magnetic reed turns off a switch when there is a change in oil levels. Consequently, the switch will complete a circuit, leading to notification of the fault on your dashboard.

Fuel level sensor

The fuel-level sensor measures the amount of fuel in the tank at any given time. It also reports on fuel refills, drainage, and the remaining volume. Fuel level sensors are widely used in fleet management, and you can connect them to a GPS. This allows you to monitor fuel consumption and refills, helping you detect any fuel theft.

Airbag sensor

Airbags are vital safety components in vehicles. During a crash, they deploy to cushion passengers and help prevent injuries. The airbag sensor is a crucial part of airbag technology; it functions as an accelerometer that detects the car's deceleration. It gathers this information and transmits it to the airbag control module, which deploys the airbag during an impact.

Brake fluid pressure sensor

The brake fluid pressure sensor is part of the automobile's braking system and helps detect the braking fluid's pressure. The braking fluid operates ideally at certain pressure levels, and a slight deviation may affect its performance. A deviation in pressure indicates a problem in the system, such as poor-quality brake fluid or leaks. The sensor has a port that measures the pressure, and when it drops, it sends the message as an electric voltage to your dashboard.

ABS sensor

The ABS sensor is also known as the wheel speed sensor. It records the wheels' speed and sends the information to the ECU. The wheels may vary in speed, and the sensor notes any difference from normal. The sensor resembles a toothed ring with a coil-over and a magnet to capture and transmit the signal to the engine control unit. The message sent to the control unit helps prevent the brakes from locking on the wheels during motion.

Car parking sensor

Parking sensors help with parking by detecting obstacles and notifying the driver of their presence. The sensors use ultrasonic systems or electromagnetic properties to alert you of obstacles, especially in reverse parking. The sensor shoots out pulses, and a control system measures their return intensity to approximate the distance from the obstacles. If the sensor is too proximal, a sensor alarm goes off faster as a warning. Electromagnetic parking sensors activate when approaching a barrier, causing their alarm to sound. If you stop, the sounds decrease in intensity.

Conclusion

The above describes various types of car sensors that you need to know about as an aspiring automobile CEO, vehicle owner, or vehicle professional engineer. They are vital systems in a vehicle that alert you to any system anomalies that might require attention. You can install as many as you want as long as you understand their relevance to your vehicle's efficiency. With a simple mechanic's tool set, you can install the systems without assistance. Make sure they are working properly so you don't miss warning signs that could damage your car. You should understand these sensors and their functions, as this will greatly assist you when you're buying a vehicle.

Valve

Gases enter and exit the combustion chamber through passages in the cylinder head known as ports, which are regulated by valves. There are two sets of valves—one for controlling the intake and the other for the exhaust. When open, valves must allow minimal obstruction to gas flow and provide a gas-tight seal when closed. During the

intake stroke, the intake valve opens to admit a mixture of air and fuel. Then the valve closes, allowing the mixture to be compressed and ignited. During the exhaust stroke, the exhaust valve opens to allow the piston's upward movement to push out the burnt gases.

Valves are operated by a camshaft, which opens each valve—either directly or via a linkage—at the appropriate time. The valves must be synchronized with the piston to open and close correctly during the piston's stroke. A timing belt (called a cambelt in British English) or timing chain connects the crankshaft and the camshaft, ensuring they stay synchronized.

Valve Assembly

The valve assembly is a crucial part of an engine's cylinder head that controls the flow of air-fuel mixture into the cylinders and the exhaust gases out of them. It ensures proper timing, compression, and engine performance. A typical valve assembly includes intake and exhaust valves, valve springs, retainers, keepers, valve guides, and seats. The intake valve opens to let the air-fuel mixture enter the combustion chamber, while the exhaust valve opens to release burnt gases after combustion.

The camshaft operates the valves through lifters, pushrods, and rocker arms (in overhead valve engines) or directly (in overhead cam engines). Valve springs return the valves to their closed position after each cycle, maintaining a tight seal for compression. In summary, the valve assembly regulates airflow, combustion, and exhaust, making it essential for efficient engine operation, power output, and fuel economy.

Valve Design

Early engines experimented with different valve designs, but for about a hundred years, all car engines have used the same design: The poppet valve. Each valve sits in a circular hole formed in the roof of the combustion chamber. When closed, a tight seal will form between the valve and the surface it presses against, known as the valve seat. The valve spring keeps the valve closed by pushing against a disc, called the retainer, which is secured to the valve stem.

The pressure pushing exhaust gases out is stronger than the vacuum pulling in air and fuel. It's easier to push gases with pressure

than to suck them in with a vacuum. You can try this yourself by breathing through a drinking straw; it takes longer to fill your lungs than to empty them. This shows that exhaust gases flow more easily, which is why the intake valves are larger, giving more space for the intake flow.

Types Of Valve

Heat flow valve

The valve itself has a circular head attached to a long stem. The stem fits into the valve guide and makes sure the valve can only move up and down, not side to side. The valve is made up of two parts that are welded together. The head is usually crafted from stainless steel, while the stem is constructed from high-carbon steel. Valves are primarily used in high-performance engines and are made from hardened steel or more exotic materials like titanium. When the valve is closed, it contacts the surface around the perimeter of the valve port. This surface, where the valve sits, is called the valve seat. The seat is typically smooth because it provides a sealing surface, and maximum contact between the valve and seat allows the cylinder head to absorb heat from the valve. With a cast-iron head, the valve seat is machined directly into the head. In contrast, for softer aluminum heads, which can't withstand the corrosion from exhaust gases, the valve seat is made from stronger metal and pressed into the head.

Both intake and exhaust valves become hot during operation. This heat must be dissipated, mainly conducted across the face of the valve, through the valve seat, and into the cylinder head, where flowing coolant carries it away. Heat also travels up the stem and through the valve guides into the head. Some performance valve stems are filled with sodium, which melts and sloshes inside the stem to enhance heat transfer. Exhaust valves have a shorter lifespan than intake valves. They are exposed to higher temperatures because hot exhaust gases flow around and behind them. Since they operate in close contact with hot, corrosive exhaust gases, they are made from highly durable, heat- and corrosion-resistant materials.

Valve guides

The valves pass through a bore in the port, which is lined with a precisely machined tube called a valve guide. The valve guide fits snugly around the valve stem to prevent side-to-side movement or wiggling. This tight fit keeps the valve face perfectly aligned with the valve seat. This tight clearance prevents oil from leaking into the port and also helps stop pressurized gases from being forced past the valve stem into the cylinder head. Valve guides are further sealed with a valve stem seal, an O-ring that seals against the valve stem, preventing excess oil and gases from passing through the valve guide into the port. Some oil is desirable in the valve guide to prevent wear and ensure smooth operation.

Valve spring

Each valve is held closed by a valve spring. The spring not only keeps the valve closed but also maintains contact between the valve assembly and the camshaft or rocker arm when the valve is open. The valve train must exert force against the spring's tension to open the valve. The strength of the valve spring is very important. If the spring is too strong, we waste power opening and closing valves, which increases wear on the valve-train. But if the spring is too weak, it will fail to close the valve quickly enough at high speeds. The valve will be out of contact with the camshaft, causing a condition known as valve float, which we want to always avoid.

The valve spring surrounds the valve stem and pushes upward on a circular plate called a valve retainer, which is locked around the valve stem.

Two valve keepers (valve cotters, collets, or locks) secure the retainer to the stem. The tapered valve keepers fit into grooves on the valve stem, preventing the retainer from sliding upward.

Valve lifters

Valve followers, also called valve lifters or tappets, are cylindrical spacers that sit between the top of the valve stem and the cam lobe or rocker arm. I will discuss them in detail under the camshaft.

Valve/Camshaft

The function of the valves is closely connected to that of the camshaft,

and they work together, with the camshaft controlling the opening and closing of the valves. I mentioned I would discuss Valve Lifters later, but I recommend checking out online articles on camshafts and valve lifters for a complete overview of the valve train.

Valve faults

Damaged valves lead to poor compression and serious engine issues. Depending on the number of cylinders, valve failure in one cylinder can cause the engine not to run or to run poorly.

Valve failure almost always causes a loss of compression in the affected cylinders because the valve does not seal the chamber.

Burnt valves

A burnt valve occurs when part of the valve face is damaged by heat or corrosion. If the valve doesn't sit properly because it is bent or has a small crack, exhaust gases can leak through a tiny area in the valve. The concentration of gases in this area will tend to erode the valve head, leading to more wear. A burnt valve will create a poor seal, resulting in a loss of compression in the cylinder.

Bent valve

The valves constantly dance with the pistons, kept in synchronicity via the timing belt or chain. If the timing belt snaps or jumps, the powerful piston may touch the valve, causing it to bend. An engine where the piston and valve can overlap is known as an interference design, most modern engines are of this type. A non-interference engine has a gap between the piston and valve, even when the valve is fully open, and the piston is at the top of its stroke. Once a valve is bent, it will fail to seat properly, resulting in poor compression. Depending on the force of the contact between the piston and valve, further damage may be caused to the valve guide.

The Error Signs

Error signs are broad and a crucial part of a vehicle's operation. Understanding error signs helps you prevent potential issues with your car. It also helps you identify faults in a vehicle you are considering buying. As I said, vehicle error signs are broad and cannot be exhausted here. Kindly study an error-sign diagram to

learn what a given one represents, as each error sign points attention to one thing or the other. Research more about it online. Make sure you understand each sign, what it indicates, and how to fix it. This is very important, and its usefulness cannot be overstated.

Automotive Mechanisms Summary

Vehicle mechanisms remain a marvel that has transformed mankind, and this prototype mechanism has evolved into incredible inventions. As a result, all that we have discussed above applies to all automotive mechanisms. For instance, aircraft, robots, ships, etc., use sensors just as a car does. This also applies to the engine, gear, body, steering, brake, etc. Automotive mechanisms form the core systems that enable motion, control, and performance in modern mobility, whether on roads, in the air, at sea, or within robotic platforms. Land vehicles evolved from simple mechanical linkages and combustion engines to sophisticated systems integrating electronic control units (ECUs), hybrid drivetrains, autonomous sensors, and advanced safety algorithms. Their mechanisms now blend mechanical engineering with AI-driven diagnostics and electrification.

Aircraft mechanisms advanced from manual control cables and early piston engines to jet propulsion, fly-by-wire systems, radar navigation, and integrated avionics. Today's aircraft rely on high-precision sensors, aerodynamic control surfaces, and digital flight computers. Future mechanisms will include electric propulsion, AI-assisted autopilot systems, and ultra-light composite structures.

Ships transitioned from manual rudder systems and steam engines to diesel propulsion, turbocharged marine engines, GPS navigation, and autonomous route planning software. Modern marine mechanisms feature stabilizers, sonar-assisted control, and advanced engine management systems. The future will move toward hybrid-electric propulsion, automated docking, smart hulls, and AI-powered fleet operations.

Robots, once limited to basic mechanical arms, now operate with advanced actuators, machine vision, real-time mapping, and predictive learning mechanisms. They function through precise motion control, sensor fusion, and autonomous decision-making. Future robotic mechanisms will incorporate quantum sensors, neuromorphic processors, self-healing materials, and swarm-

coordination systems that enable coordinated mobility across complex environments.

Across land, air, sea, and robotics, automotive mechanisms continue to evolve from purely mechanical systems to intelligent, interconnected, and autonomous platforms. The future promises machines capable of self-diagnosis, adaptive behavior, and seamless interaction with human and digital ecosystems, defining the next era of global mobility.

As a modern automotive CEO, you must understand these mechanisms. Be curious to know the simplicity of an engine block and the complexity of a brainbox or sensory chip. You should also understand AI operations, robotics, and quantum computing.

CHAPTER FOUR

BUILDING A CEO's CHARACTER

This is the foundation of your success in this industry. As it is popularly said, character is everything, and in business, character is prime! Well, I will limit my discussion here to vehicle sales because it is our grassroots starting point. As usual, you can apply whatever you learned here to your chosen sector. You become a CEO as soon as you begin to operate independently. Regrettably, being an automotive CEO is far from being independent, and owning a few vehicles in your name doesn't guarantee success. What makes you a CEO is your character. And what guarantees your success in the business is also your character.

There are some characters you must drop, and some you must implement as a CEO.

The following are the key characteristics to avoid as a CEO: Complacency, frivolity, visionlessness, impulsive spending, unstructured business, dishonesty, corruption, procrastination, mediocrity, laziness, and an unhealthy lifestyle. Conversely, the following are the key characteristics you must develop as a CEO: A coherent vision, a fixed determination to succeed, self-scrutiny, managerial ability, time management, patience, consistency, honesty, diligence, humility, high aspirations, planning, and others. Beyond these key characteristics, a CEO must continually learn. The character of a CEO encompasses, but the ultimate are self-denial, precept, and integrity.

Understanding Business

Like every other field of endeavor, the automotive industry requires a good understanding of brands, the scope of services, the market, and evolution. Once again, I want to open your understanding to a certain fact: Never limit the automotive industry to vehicles alone. No! This will constrain your expansion ability. An automotive product is any self-propelled device or machine. In other words, an aircraft, a drone, a ship, a space machine, a vehicle, a robot, and all AI automation. Meanwhile, “vehicle” is not limited to cars, trucks, and the like; it refers to any machine that can transport persons or goods from one location to another, whereas a motor is any device or machine that can move. Thus, you have to think beyond cars. This will make your vision more encompassing and evolutionary.

The truth is that a time is coming when cars will be old-fashioned, and if you didn't plan well, your company will liquidate (and do not say that you might not live to see when cars will go extinct). No, the goal is that whatever dream or company you are building now must outlive you. So, the continuators of this future projection are your offspring and future generations. Therefore, plan so you can sell machines for travel to Mars and other interstellar bodies. In this light, you have to understand all evolving automotive brands and follow up closely.

Understanding the scope of services in the automotive industry will energize you and position you to utilize opportunities. In fact, what pinned me to the automotive industry over every other option is that it is the most futuristic.

The automotive industry is more futuristic than the real estate industry. As a matter of fact, the only thing that is more futuristic than the automotive industry is human beings themselves. I had said energy, but the utility of energy is still tied to the automobile. In fact, the campaign for harnessing energy is still tied to its use in space exploration, for which the automotive industry is the forerunner. Therefore, there is no end to the need for automobiles as long as mankind exists.

Apart from the evolution of the automotive industry, its market is enormous. As a matter of fact, in first-world countries, on average, every family has at least one car. If this demand were to apply to all mankind, especially in Africa, it would keep rising and remain

almost constant. For this reason, you must position yourself readily, knowing that the business you are in has high demand and is futuristic. Yes, a time will come when gigantic spaceships will be available for sale. Similarly, rockets and other space machines will be sold in an open market, just as we have cars today.

This sampling may not be on the Earth's surface but in the air. Automotive technology will be so advanced that these machines will be displayed in the air, as air suspension technology will be commonplace by then. In other words, a spaceship can be suspended in the air for as many years as it can be serviced. This technology will be so advanced that humans can cultivate farm products right in the spaceship, create artificial rain, and perform photosynthesis. This includes everything else that will be manufactured right on the ship: Phones, clothes, watches, furniture, utensils... just name anything! Children could be born on the ship, grow up, go to school, work, and die in space. There won't be a need to live on Earth's surface unless for a visit or in the presence of a harsh natural disaster. Even at that, the machine will be so sophisticated that it can withstand any type of natural disaster, even an interstellar collision. So, those living on the ship can only visit the Earth for tourism and other purposes, and then return. At this age, people will shuttle interstellar bodies as though they were the countries of the Earth. The demand for machines will increase, and the quest for more excellent technologies will also increase.

Humans will be so curious that they will colonize all space and discover all there is. More sophisticated telescopes will be invented, serving as windows into what we want to know about space, its bodies, and its existence in general.

Just imagine that the Portuguese government, for instance, gave you a contract to build or source and supply ten units of space shuttle machines to Mars. Or the US government gave you a contract to build a spaceship that is half the size of the Moon. You know, these are just the evolutionary markets of the automotive industry, and it all depends on your area of specialization. Opportunity abounds! You could specialize in tires, GPRS systems, AI, component parts, software development, space debris sanitation, and so on. So, you have to think about this age because it will give your business a solid foundation and a future for over 50 generations to come. Similarly,

this will put you on your toes and make you think smartly, knowing where time is going.

In chapter two, I have discussed the automotive industry not being limited to vehicles, the market scope, and the evolution. Yet, I discussed them in this chapter and may likely discuss them in subsequent chapters (s). The reason is that as soon as you understand these three things very well, you are 50% successful in the industry. This will serve as your root and compass in the business. As I said earlier, the evolution of the automotive industry is as unending as man's existence. Therefore, as a CEO, you have to structure your company as such that the ten generations to come will succeed. Plan so that you can manufacture vehicles in the future under your company's name.

The automotive industry makes the world go round today and tomorrow until man is no more. Our fantasy of touring deep space, living on an exoplanet, and achieving the speed of light is all tied to the automotive industry. Thus, the automobile is the world's evolutionary climax! It's through the automotive industry that the scientific community believes they can travel through the black hole. It's through the automobiles that man will tour deep space, understand celestial motions, and convincingly determine the elementary fabric of the universe.

Our preceding automotive CEOs in Africa achieved little because they limited their dreams indigenously; they wanted to operate successfully domestically, and that was their apex goal. As a modern CEO, you must think and plan globally. You must envision yourself creating a brand that America, the UK, China, and all the first, second, and third-world countries will patronize. You have to consider the international market, demand, and evolutionary trajectory. Think about the global automotive market as constantly as possible and consider its importance. You have to take notes of international production, consumption, future projections, and road-off statistics. This will serve as a window for you to determine what you can do to stay competitive and possibly outclass your immediate competitors. This mostly applies to manufacturers of vehicles, robots, drones, ships, yachts, aircraft, and spaceships. If you are entering manufacturing, you must pay close attention to the international market. This will help you stay up to date and future-

focused. For example, a manufacturer like Innocent Chukwuma of Innoson Motors must closely monitor the global market to stay up to date on the latest, futuristic, and trendy developments. The same thing applies to Ghanian Kantanka, Ugandan Kiira, Kenyan Mobius, Tunisian Wallyscar, Moroccan Laraki, and so on. This also applies to automotive marketers, artisans, reviewers, etc. They all have to grow in line with industry evolution and aspire to an international presence.

Going Professional

You have to step out of the conventional system and distinguish your operational structure from the norm. You have to be professional in all you do, from choosing the perfect name for your company to building a befitting logo, setting up a customer satisfaction service system, making excellent products available, imbuing qualitative communication skills, providing turnkey customer service delivery, establishing good relationships, and so on. Being professional is next to perfection, and this is achieved through a premeditated plan. When you are a professional in your discipline, everyone admires you. In fact, professionalism is contagious; people are naturally attracted to you when you are professional.

The following are the characteristics that make a person professional:

Knowing your self-worth

It pays so well to continually evaluate oneself. When you know who you are and what you are capable of, you will be able to determine your self-worth. Knowing your self-worth will boost your confidence and charisma, thereby bringing out the best in you. The yardstick in measuring self-worth is an individual's integrity, knowledge, and financial success.

Understanding your products and services

Yeah, to be professional in what you do, you must understand your products and services. Your understanding of your products and services will make you excellent at marketing and presenting. It will also make you appear fluent and confident before your clients.

Thus, make a serious effort to understand your products and

services. Do not say that you are only a dealer; therefore, you don't have to know about vehicle components - that it is the responsibility of automotive artisans. No, your client wants you to educate him or her about a vehicle that he or she wants to buy. For instance, she might ask you, "What is the function of the ABS system?" At this point, you are expected to educate her about it, and that will have a lot of influence on her, which makes you professional.

Do not say that you are a vehicle manufacturer; therefore, you don't have to know anything about coding and programming. Well, if you think this way, you have already limited yourself, and you are non-futuristic. The reason is that vehicle evolution is AI-driven, and AI is all about coding and programming. You do not necessarily need to do the coding and programming yourself; having a general understanding of it will guide you in the right way to achieve your goals and enable you to supervise your subordinates. You must do everything you can to improve your understanding of your products and services, as it shows a touch of professionalism.

Application of precept

This makes you as sharp as a knife's edge. The reason is that when you maintain a steady tenet, you collate all your body components into one, and precision becomes the outcome. The precept is the pattern with which you do things often and premeditatedly. So, in the presence of precept, all things fall in place and in harmony. These, however, are things that are of good report; you build precept on excellent things, and you must maintain a routine.

Self-discipline

Self-discipline is nearly synonymous with precept, but it is more analog than precept. To put it differently, self-discipline is a set of rules that you determinedly stick to because you believe it will take you to a better place in the future, whereas precept is its delivery in practice. Self-discipline can be challenging to adopt, but it ultimately pays off. I have exercised it in my life, and the results outweigh the demands. When you are disciplined, you become professional and precise.

Enthusiasm

Enthusiasm is compelling! When you are enthusiastic, you become effortless in bringing out your best. Inversely, when you are disturbed and in despair, your core potentials will be hidden; as a result, you become spooked and unrealistic. This, in turn, will vary and inhibit your professional dispositions. Thus, you must be or appear enthusiastic at all times to bring out the best in your professional life.

Honesty

I have come to understand that our divine nature is hidden in honesty. Honesty reveals our divine potential and turns us into magical beings. When we are honest in all aspects, we become clever, professional, and magical.

Wisdom

This includes knowledge, education, and talent. These are the things that make a man complete, and in them come fulfillment, perfection, and professionalism.

Technical-Know How

As I said in one of the books I wrote (yet to be published), God is considered a god because of His profound knowledge of His subjects. If man equals the knowledge that God has, man would unlikely consider God a god. Thus, because God knows everything and man does not, man is inherently conditioned to be reverent toward God. The amount of knowledge we have determines the height we have attained. Therefore, knowledge should be our ultimate goal. The amount of knowledge you have in a business you want to start is the benchmark for its success. Knowledge is everything, and in the automotive industry, it is our pathway because we are the vessel through which the world's evolutionary expectations are fulfilled.

You have to learn, learn, and learn. So far, the people who have broken even in the automotive industry have come to the limelight for their knowledge, deep insight, and curiosity. In October 2024, SpaceX successfully tracked the Super Heavy booster (the bottom segment of a rocket) back to the launch tower. This technological breakthrough has shocked the world and, of course, birthed a new generation of space exploration technology. Everybody had expected

that the super-heavy booster would have crashed into the gantry or landed in the Gulf of Mexico, but Elon did the magic, grasping it with the Mechazilla arms of the launch tower.

Mechazilla is a robotic technology that uses precision thrusters to control the path of a booster. Of course, knowledge and curiosity made this possible. Today, we have incredible technologies that simple minds believe are serendipity, not knowing that they were achieved intentionally through expertise and talent development. Smart minds have developed amazing technologies, knowledge, and deep insight. ChatGPT4, Gemini, DeepSeek, and other AI tools are breathtaking. These life-changing inventions started with the understanding of adding two or more binary numbers, and have evolved into a front-end that is smarter than a PhD holder.

So, as an automotive CEO, you must know as many things as possible, especially about the automotive industry. And as it concerns our grassroots grooming, below are the things you must know in the business that will put you on your toes:

Pre-engineering technical know-how

In Europe and America, the average car owner can fix their vehicle's faults at least 20% of the time. They try to acquire as much pre-engineering technical know-how as possible to make life easier for themselves. Apart from the financial disadvantage of relying solely on automotive artisans for all vehicle faults, being able to fix minor faults in your vehicle saves you a lot of productive time and makes you independent. As an automotive CEO, you must have basic pre-engineering knowledge to handle minor vehicle faults such as tire changes, battery issues, brake problems, leaks, etc. This empowers you to handle immediate issues without relying on mechanics. Of course, you are also expected to have basic tools for this purpose.

Understanding vehicle documents

You need to understand vehicle documents, as they allow you to relate to and educate your clients about them if need be. Secondly, crucial documents like the "Custom" should be thoroughly understood to identify a fake from the original. However, the best way to verify the authenticity of custom documents is to confirm them through the Custom database portal using the "C" number. The following are the

basic documents that FRSC requires from a vehicle owner:

- Proof of ownership
- Vehicle licence
- Allocation of plate number
- Third-party insurance
- Roadworthiness
- CMR and others, just as a given government may wish.
- Driver's license

Another advantage of understanding vehicle documents is that it affords you the opportunity to render after-sales service to your client. For instance, you can assist your client in registering a vehicle that he or she purchased from you. As a matter of fact, you can commercialize the registration, or better yet, do it for free. At Autohub Africa, we do it for free, and clients always express their satisfaction.

On more about custom papers, don't participate in faking a vehicle's custom documents. It always backfires! Thus, it is advisable that you do the right thing and factor it into the vehicle's cost. In the worst case, it is better to short-pay for a vehicle than to smuggle it out without payment. The advantage of short-payment over smuggling is that when a short-paid vehicle is accosted by customs personnel, you will be required to make complete payment. But in the case of a smuggled vehicle, it could be seized without contention. Therefore, always go about it legally for a peaceful and prosperous business. Another scenario is when you or an end-user loses a vehicle's custom papers. Don't manipulate a fake document to stand in; instead, tell the vehicle owner to swear in an affidavit and get a police report for the loss. This is legal and much more justifiable.

Meanwhile, a better approach is to use the vehicle's chassis number to search for the custom papers in the Custom database. Although this will cost you a chunk of money, it is cheaper than using the "C" number. This brings me to the message I want to pass along to all automobile dealers and vehicle owners: When you bring a vehicle into the country, or buy one in the country, always check the vehicle's "C" number on the customs paper and save it. This is important because when you lose the custom papers, you can always use the "C" number to print another set of custom documents from the custom database at a low cost.

And to the Nigeria Customs Service, I suggest you upgrade your database so that a vehicle's chassis number can also serve as a custom document's "C" number. This will save everyone the stress of deep searching using the chassis number when the "C" number cannot be found.

This search usually costs more than that of the "C" number. For this reason, it should be made as easy as going to the Customs office to obtain a reprint of his or her vehicle's registration within 10 minutes at a very low cost.

Learn How To Drive Professionally

This is very peculiar for an automotive CEO. I have mastered this act to the point that I drive instinctively today. You can't help but be a careful and skillful driver. The advantages cannot be overstated. However, the most important benefit is that it protects your vehicle from scratches caused by reckless drivers, thereby preserving its value, saving you money and time. Also, as a CEO, you must ensure that your staff is well-trained and experienced in driving. This gives you confidence when moving a vehicle from one location to another, as good driving skills can prevent all unfortunate circumstances.

For one hundred percent risk-free on vehicles awaiting to be sold, you would have to undertake a comprehensive insurance policy on them. This covers you for all casualties; however, you still need to handle the insured vehicle with great care. One of the subsequent chapters will provide more information about vehicle insurance. When you are moving a vehicle for a client from one location to another, if you are not the driver, make sure it is given to someone who is experienced and skilled at driving. Someone who will be able to see dangers ahead and avoid them, being able to drive for others subconsciously. Apart from focusing on safely delivering, there are two measures to consider for a smooth operation. Number one is ensuring that the driver has a valid driver's license. Number two is to ensure that you move the vehicle with your "dealership plate number." This will prevent unnecessary interference from government law enforcement agencies.

A company or individual who wants to buy a vehicle and resell it in Nigeria must have a dealer license before they can legally operate. In addition to government recognition, a dealership plate number is

required on unregistered vehicles when plying the roads.

The following are the requirements for processing a dealer license:

- A photocopy of the CAC certificate showing your company name.
- A photocopy of a valid regular identity card, such as a driver's license, international passport, voter's card, or national ID card.
- A company letter-headed paper, two copies or more.
- Intending dealer's two passport photographs, preferably on a plain background.

Depending on the agent processing it for you, it might take a month or more, after which you would be issued a dealer certificate/license valid for a year and renewable annually. Included in this are four pairs of dealer number plates used for moving unregistered vehicles.

Creation Of A Database

After a few months of operation, it is time to start collecting data. This data includes: clients, affiliate dealers, investors, and financial institutions. Data gathering is an exercise you must intentionally work on. You must do this daily; write down vital information and the contacts you congregated. These data are as good as wealth because "appropriate utility brings wealth" – J-ib. Below, we shall discuss the best way to gather this data, as well as its storage and utility.

Clients

The best way to make steady sales is to have forensic data on your clients and use it to your advantage. This data includes phone number, email, birthday/anniversary date, and, if possible, office address. The phone numbers can be used to stay in touch with clients by calling to check in, appreciating them once more for their patronage, and asking how well the vehicles they bought from you are serving them. You can also call, send an SMS, or email them on special dates like birthdays, anniversaries, or other congratulatory events. You can suggest good offers to them. You can also utilize this via mail or WhatsApp. If your clients' catalogs have grown large, you can create a broadcast message and send them information as often as necessary.

You need their address when you have a present to deliver to them, especially if you want to make it a surprise. You can also use the address for both presales and aftersales services. For example, you

informed your client of an available vehicle. He picked up interest and demanded that you bring it to him for inspection. Having already saved his address, he will feel like he belongs and is special, knowing that you already know it. Similarly, a client might buy a vehicle from you and demand that you deliver it to their house. And since you have known his house, delivery will be easier, and this will also make him feel special.

Note: You don't gather data from clients premeditatedly. Some of them might feel embarrassed and inadvertently bounce you back. In our operational structure, we don't ask a client for their data; rather, we provide a form for them to fill out during or after every transaction as part of the sales documentation. Adopting this method will make it easier for you because they will feel at ease doing so.

Affiliate dealers

Any dealer with whom you have had a business relationship is your potential affiliate. However, we consider only dealers that we have profiled and verified as affiliates. This verification involves physical visitation and written or verbal discussions. After this process, we can sign the person up on our website, cover his or her vehicles, and market them. Now, the importance of having dealers' data is invaluable. Number one is that when you have verified a dealer, you can confidently market his/her vehicles. Number two is that you can always network with your affiliate dealers. For instance, you can create a business WhatsApp broadcast where you can give them information about your vehicles that are up for sale. You can also give your affiliate dealers your branded promotional materials for advertorial purposes. Finally, affiliate dealers provide information on vehicles for sale. If the vehicles are business-worthy, you can buy them and make fortunes. You can do so many things with affiliate dealers' data that I can't enumerate them all. It all depends on your business scope and vision.

Investors

This is very important, especially when you need grants or loans to run your business. You can gather this data online by randomly searching for a list of investors in your country and overseas. Once you have successfully saved their data, which includes phone

number, office address, and email, you can randomly contact them and send your business plan to them on demand. Well, this is just as it concerns data keeping; however, I advise you to discuss this with your lawyer before approaching investors.

Financial institutions

Having the data of bank managers in your country and overseas will be a huge advantage. You can utilize this data in many ways; however, the most effective is for loan gratification and business consultancy. When you have the contact information of a bank manager, it becomes easier for you to have a one-on-one relationship with such a manager, whereupon you will be free to discuss whatever financial help you want. The best way to get the data of bank managers in your location is to visit the bank physically. Dress well, exude confidence, walk into the bank hall, and demand to see the manager. If anyone questions your reason for seeing him or her, tell the person that you have a business proposal for the manager. Of course, having observed how well you dressed, your confidence, and your reason for the meeting, the person will grant you immediate access.

Apart from soliciting a business loan from a bank manager, you can also inquire about what it will take for them to accredit your company. When your company is accredited, it means you have qualified for vehicle loan services (granting car loans to automobile end-users while the bank funds them), and you know what that means.

Data keeping is very important for your company's growth. Outside the marketing aspect, the administrative aspect is also very important. Administrative aspects such as correspondence, login details, feedback, sold/available vehicles, etc. In fact, the importance of data-keeping is enormous. Above all, it is necessary that you also keep the database of your international affiliations.

Goal

What defines a CEO is his ability to set a goal and achieve it. You must set interval goals for yourself and accomplish them as predetermined. You can start small. As a matter of fact, no goal is too small as long as it contributes to your growth. You can set a goal that is as micro as when you started your business. You can set a goal

to buy two vehicles in two months or to increase to four vehicles in two months or to buy ten vehicles in a year or to rent a car stand in two years or to build a structured office and employ staff in three years or to start supplying vehicles to governments and corporate establishment in four years or to have more than two branches in five years or to have international affiliation in six years or to have vehicle manufacturing plant in ten years or to expand your marketing scope to global audience in twenty years or to diversify to other automotive sectors like aviation, space exploration, maritime, railway, AI, in fifteen years and so on.

I intentionally listed the above goals and the periods because I believe they will guide you in setting your goals. As you can see, outlining a goal starts humbly and grows with time. Meanwhile, one thing is to set a goal, and another is to follow it up to ensure it is accomplished. If you set a goal and don't follow it up, such a goal will fall behind, and all things being equal, you might fail in the process. Thus, develop a burning fire to accomplish your set goal. Don't elongate your goals. Don't think you are mediocre by forecasting one or two goals for a month or two. No! "It is more realistic to set a little goal within a short time and achieve it than to aspire to achieve the universe in eternity" – J-ib.

Regardless of the need to start small with your goals, you must be very futuristic about them. Don't set a goal in mediocrity—I mean, have a small vision. For instance, you just want to have a car lot with twenty vehicles, probably train your children in school, and build a house of your own. Well, I'm an advocate of contentment; however, inversely, you could dream of having an automobile manufacturing plant instead. You could dream of owning renowned schools and of running an NGO that provides free education to those who cannot afford it. You could dream of owning commercial estates across the world rather than building just one for yourself. Set a goal in ascending order. Do not say I must rent a car stand before I can aspire for international presence. No! "Set your goal from micro to macro" – J-ib. To put this in another way, the very day you set the little goal should also be the same day you set the big goal. And the very day you set the little goal should be the day you set the big goal, all things being equal. The reason is that both of them work synergistically. The little goals use the big goals as a pathway, whereas the big goals use

the little goals as foundations upon which they build. Polyphonically, they will align in harmony, and your goal will be attained.

In my goal organogram, I have a goal from the day I purchased the first vehicle in my name to the day I will start selling space machines and establishing a space shuttle. You can imagine how crude my country is regarding space exploration and scientific advancement, yet I have set a goal for space exploration. In fact, I have registered the domain name spacetravel.com.ng in my name. This is preparatory to my ultimate goal: space exploration, manufacturing, and selling space machines. My point is that you shouldn't say that because you haven't accomplished one goal, you will not set another. No! Set your goals from micro to the zenith, and they will all fall in place. Do not say that you don't have the financial capacity for such a colossal goal. Instead, set the goal without because your goal precedes the funding. When you have money and no goal for it, it becomes inert.

Utility

In your operations as a CEO, leave no stone unturned; make the most of every opportunity that arises. The importance of utilization is countless. Determine to utilize everything around you.

First, you must develop the ability to identify opportunities around you. Learn to identify opportunities in your office and surroundings from your clients, affiliate dealers, staff, friends, relations, societies, religious affiliates, etcetera. The importance of identifying opportunities is that it broadens your expansion. How can you identify opportunities? The best way to identify an opportunity is by being discontented with what you have achieved. Note, I don't mean you should be ingratitude or greedy. What I mean is that "if you are a striker that has scored ten goals, aspire to score twenty" – J-ib. This doesn't mean ten goals aren't a reasonable effort; it only means you can do more. So, be discontented with the bit of achievement. For example, if you have clients who buy ten vehicles from you in a month, persevere in increasing that volume by identifying other means that will make it possible for you to improve these sales to twenty vehicles in a month. Don't settle for enough; aspire for a lot – J-ib!

Another example is your staff; you must identify your staff's core strengths and utilize them maximally. Of course, your staff are

your strength, but if you don't identify their capabilities, they will be underutilized, and that reflects on your growth. Just like when I started, I started keeping data on dealers. At one point, I had over 400 contacts among automobile dealers, and I began to ask myself how best to utilize them. It was at this point that I created a WhatsApp group for dealers and a broadcast as well. Through this curiosity about utility, I became among the first to create an automobile dealers' WhatsApp group, and, when you look critically, I was probably the first. Today, Autohub Africa has 13 active automobile dealer WhatsApp groups and 1 Telegram group. Of a truth, Autohub hasn't made money from having numerous automobile WhatsApp groups, but the idea has paid off one way or another. I remember when we started, I was considered a star by dealers for being the group's admin. Dealers called and begged to be added to the group. When an offender is blocked, he goes all the way out to ensure he is added back. Anyway, the reverse is true today because of the countless automobile WhatsApp groups we now have.

Our prime gain from creating those WhatsApp groups so far is that it has made Autohub and me more popular. Thanks to the utility of this, it cannot be monetized. Another example is when dealers always called me to say they had one or two vehicles I should assist them with and market. So, it dawned on me that it was an opportunity to market dealers' vehicles and make money. It was in light of this that I employed a catalog manager who went about to cover dealers' vehicles. Before I knew what was happening, we had covered almost all the vehicles from our affiliate dealers in Lagos and a few in Abuja. Well, aside from this, the most empowering opportunity that I identified was the need for a classified automobile website. As an IT professional who came to bring change to the industry, I immediately built an automotive classifieds service, including a website and an App. Unfortunately, I didn't have the financial capacity to promote the website. Regardless, we reached as many people as we could. Today, we have loyal members on our website, and the number keeps increasing. However, this is not enough, as our top goal is to capture all automobile dealers and end-users and make the platform a reliable medium for automobile transactions.

Years back, I became disgruntled with the monopolistic nature of Jiji and then Olx. I realized that some dealers, especially the

upcoming ones, pay through their noses to use the Jiji and Olx platforms. Some cannot even afford the high tariff, so they don't use classified services.

These were among the things that spurred me to build a classified service, and the amber remains the same today. I want automobile dealers to have an indigenous classified service provider who has their interests at heart. Of course, our classified portal has been free from day one, and we hope to keep it that way for a while. Eventually, we will monetize it, and it will be very affordable for all.

Another sensitive opportunity I identified was when most clients from far away called about vehicles they wanted to buy but couldn't come to see because of distance, and they didn't have anyone to inspect the vehicle on their behalf. It was a wake-up call to this vacuum that I established what we call "inspection managers," and this metamorphosed into the inspection service that we have today. Apart from clients, dealers also use our inspection service. When you are not disposed to inspect a car that you want to buy, you can hire our inspection manager, who will give you a report on the exact condition of the vehicle. I can't count how many opportunities I have identified and used. You must develop eagle eyes to identify opportunities in all your engagements and use them appropriately. There are so many things on the threshold that we can identify and use. A practical example is this book. I came into the automotive industry with high expectations and outlined goals. However, I recoiled in dismay when I realized that 90% of the people in the industry are primarily for money making. Nobody understands the importance of reorganizing and developing the industry to meet the modern standard.

It is for this reason that I deemed it necessary to write this book, which aims to educate everyone in the industry on what they need to know and do to succeed with transformational innovations. This book dispels ignorance among automobile business owners and opens their eyes to the great opportunities and possibilities available in the automotive world.

Result

As a CEO, results are your reward. Results are what you look for on a daily basis. Meanwhile, this result could be positive or negative. We

shall discuss these two results to see how they affect our progression and retrogression.

Negative Results

Nobody wants to record negative results for any reason, but when it comes to a CEO, negative results are the grandparents of positive results. This means that negative results help to make positive results possible. The overall explanation is that the lesson you receive from a negative result helps you to work towards a positive result. As they say, failure is not the end but a stepping stone to success. Meanwhile, as much as negative results catalyze positive results, they are negative, and when they are not well managed, they can lead to despair and, eventually, irrecoverable failure. For this reason, I have written below the best way to manage negative results and convert them to your advantage.

Knowledge

Knowledge allows you to understand negative results, their causes, and how to overcome or avert them. Knowing who you are, where you are heading, and what you will accomplish will make you inured to all negative results. Knowledge helps you filter out negative results and identify the factors that will lead to positive outcomes. It gives you the power to thrust through your shortcomings and shoot for success. Therefore, with knowledge, you will be defensive of negative results, knowing that they catalyze your ultimate success.

Focus

Focus is a thread that takes you to your apex dream. Focus leaves you dead to all negative results. Focus positions your mind and thoughts on the prime goal, rather than distractions like negative results. This is why we must always stay focused and make no room for fear or frivolity.

Determination

Determination deters negative results; it is the antidote to failure. This is why you must be resolute and sternly determined to pull through in your endeavor.

Self-Acceptance

When you love and believe in your ambition and contribution, you will be indomitable. As a result, negative results become ignorable and ineffective. Thus, you must do what is right and be at peace with your inner person so you can build self-love and acceptance, with which you can conquer all opposition to your life goal.

Winning mindset

This automatically gives you victory over negative results. You must develop a winning spirit in all you do; build a mindset that always sees victory.

Positive Result

Big dream

The only way you can manage positive results is when your dream is big. This is because when your dream is big, positive results become significantly less to you. The reason is that you won't see it as an accomplishment but as a step towards your big goal. An example is when you import vehicles into your country and make a huge profit from them. Yes, this is a positive result, but it is a minor add-on in comparison to your big dream. Consequently, it doesn't negatively influence you, as in believing you have arrived, which usually causes many to underachieve. Meanwhile, a positive result must be recognized and managed very well. The best way to reap the best benefits of a positive result is to aspire to double or triple it as soon as possible!

Sobriety

One of the most effective ways to manage positive results is by being sober about them. Yes! When you see positive results toward your goals, you should embrace sobriety rather than excitement. This allows you to think it through and know how best to maintain the results so you don't fall victim to negative outcomes. Sobriety amid positive results draws us back and gives us the ability to reason within and out - for improvement and better results.

Building on

When you receive positive results in your business, you have to critically analyze them and aspire for more. Intentionally build on the results, ensuring that each subsequent result is better than the previous one, and so on. You can work on expansion to take your business to a higher level than its current one. Try new things in the industry that are related to your ultimate goal. Develop yourself and your team.

Self-reward

This is very important! When you accomplish a significant result, reward yourself. You can approach this in several ways. You can take yourself out for a special dinner. You can buy books for yourself or take a course. You can buy clothes for yourself or go on vacation. There are so many ways to reward yourself. It all depends on what works for you. This will refresh you and hold you accountable for performing more.

Gratitude

When there are positive results, express gratitude to God. Thank Him and ask Him to do more for you. The expression of this “thank” could be giving arms to the needy or assisting someone to achieve positive results in their business. This gratitude could be extended to your team. Appreciate them for helping you record a positive result. This will boost their confidence in the operation, and as a result, they will do more. Depending on the result, you can also express gratitude to your clients and affiliates. Depending on what you have accomplished, you can also show gratitude to yourself by buying new books, clothes, a vehicle, or anything else that motivates you.

Summary

Both positive and negative results are advantageous and disadvantageous. It all depends on how they are being managed. Meanwhile, always aspire to positive results and close all loopholes that lead to negative results.

Self-Discovery

Living a life as a CEO can be challenging and fulfilling. Every

business person's goal is to become a successful CEO. Meanwhile, there are prerequisite qualities a CEO must possess, as listed below.

Self-discovery is a lifelong journey of exploring oneself to discover one's identity, values, passions, strengths, and purpose. This knowledge helps one make aligned decisions, build meaningful relationships, and live realistically. Self-discovery improves decision-making in critical areas such as career, relationships, and lifestyle. It also boosts confidence and self-awareness, reduces self-doubt and external validation, and, above all, guides your spiritual path.

The key areas to note while on the journey of self-discovery are the nature of openness, conscientiousness, extraversion, agreeableness, and neuroticism, as well as vital principles that guide your life, e.g., honesty, freedom, and creativity.

Introspectively ask yourself some deep questions like, what would you do if money weren't an issue, what you love most in your life, what you're good at, what the world needs, what you can give back to the world, what you can't be paid for, how you want to be remembered, what is your personality mission statement, and what is a question about you that you don't have an answer? Others are, what am I avoiding, when do I feel most alive, what is a recurring lesson in my life, who am I, why am I here, where shall be after I die, what am I naturally good at, what are your hidden fears, what triggers me, and why, what do I like doing without rewards, who do always remember when I am excited, who or what do I always sober in reflection whenever I'm sad, what motivates me in every direction, what is my life prime goal, among many other things you can ask yourself. Self-discovery is not about finding a "final answer" to your question but about living in the direction of your answers for alignment. As a CEO, you must first know yourself, as it is a determinant of what you will become in the future. For more about self-discovery, read *The Road Back to You* (Enneagram) by Ian Cron, *The Gifts of Imperfection* by Brené Brown, *Man's Search for Meaning* by Viktor Frankl, *The School of Greatness* (Podcast) by Lewis Howes, and many others.

Health

You must pattern your life so that your health comes first in everything you do. Run a comprehensive diagnostic evaluation to

assess your health. This will enable you to treat a given illness before it metastasizes. Early detection is an excellent measure of cure and prevention.

Ensure you maintain hemostasis, eat organically and selectively for complete body nutrition, avoid processed, fried, and sugary foods and alcoholic drinks, and avoid hazardous pollutants like dust and vehicle emissions, especially from a smoking engine. Exercise as often as you can. Make sure you maintain good posture. Avoid a sedentary lifestyle; avoid sitting for more than an hour, especially in a car. Don't enter more than five vehicles a day. This is crucial because of your spine. From proven experience, entering and exiting different vehicles a day can affect your lower back, leading to disk bulging or herniation.

Avoid avoidable stress; don't hang out with friends or stay late at night. Rather, review the goal you have achieved for the day, focus on the work plan for tomorrow, the food for the night, and the number of hours you will sleep for the night. Don't strive for what is not at hand. Always reflect and work with patience. Work on your emotional health. Don't let a failed business worry you. Don't allow a hard time to grasp you. Let go of anger, forgive timelessness, and refresh your mind. Pay less attention to and rely less on money. Focus more on your legacy and the people in your life, especially those who depend on you. If possible, maintain a chaste lifestyle, but if you cannot, make sure you have a good sex education and make sure you don't engage in unprotected sex. One of the many odd experiences you will receive as a CEO is the number of women making passes at you. Of course, your success and status as a CEO catalyze this. Thus, it is left to you to handle these women with wisdom and avoid getting carried away, thereby forgetting where you started. Sexually, a woman is good, but women are bad. Stick to one woman and avoid multiple sexual relationships with women. They will either kill you or subject you to so many failures, of which the worst of them is degenerated health. Make it a monthly or quarterly duty to check your body comprehensively; it depends on exposure. Constant medical check-ups will prevent you from any impending illness. Avoid smoking of any type; rather, smoke success – J-ib. Distance yourself from smokers so you don't turn out to be a passive smoker, which is as dangerous as smoking practically. Avoid alcohol, but if you cannot

control yourself, don't consume it in excess. Flee from hard drugs; they are everyday poison. Drive premeditatedly and always fasten your seatbelt. Avoid engaging in an unplanned journey, especially one you would have to drive. Be security-conscious; avoid visiting places where you might encounter bandits, thieves, or kidnappers. You can't help but live a healthy life as a CEO because you have to shoulder your responsibilities, sustain your success, and live. Thus, the number one attribute that qualifies you as a CEO is good health.

Education

Given our age, the highest level of education a modern CEO should have is High school. Education is very important, especially in this age. As a CEO, there is no limit to the knowledge and skills you should have. As a matter of fact, this is what makes you a CEO. You can research the CEOs of prominent brands and realize they are all educated and intelligent. Even those who dropped out of school are still intelligent and possess numerous skills. For example, if Mark pulled out of school, where did he get coding knowledge from? Of course, he had already acquired the skill. Therefore, he was educated.

I want to point out that even the CEOs we know today who dropped out of school were educated and acquired specialized skills. Regardless, after their time in the limelight, they pursued more professional courses. Therefore, you must build yourself academically. What I mean here is that you should gather useful knowledge and skills, not necessarily that you hold a PhD. Enroll in courses that will be useful to you in your daily pursuits. Read a course that you are passionate about. It will boost your desire, thereby enabling you to accomplish it effortlessly. You may choose to go for courses that don't require your presence. There are courses that you can run effectively online. You can randomly learn about anything online without having to seek admission of any kind. In fact, if I could access Harvard University's curriculum, I could study all subjects independently online and pass with flying colors. As a matter of fact, I found it very difficult to stick to one line of study because of my viral quest to know "one thing in everything". Today, the numerous courses I have taken online are more productive than my years in university, and I see no end to this.

My point is that you can acquire knowledge and skills without

getting admission to a higher institution. Your cell phone is a mobile university. Always remember that you are limited socially and entrepreneurially without education. Therefore, you must do everything in your power to educate yourself and stay informed about global developments. Read news in every field morning and night. Be good at history and current affairs. This will make you relevant when you are among learned people discussing. Of course, nothing can relegate a man like being in the midst of people discussing and not knowing what to contribute.

Integrity

This is the hub of a CEO's attributes. Integrity determines all you will become in life; it is the key to business. As a CEO, you must maintain unwavering integrity. You must start and close every business engagement with integrity. The nature of our industry is full of temptations, especially when you are not financially comfortable. If you haven't mastered the power of integrity, you will be compelled subconsciously to take a shortcut in your dealings.

You might come across deals where the referrer dealer is not present, and he might be making double the amount you and the vehicle owner are making. If you haven't embraced integrity, you might be tempted to compromise by either cutting his money or coming up with cock and bull stories just to give him less than his bargain. Na! You must defy all odds and stand on your integrity, no matter how tempting the situation. As much as integrity is sacrificially demanding, its benefits outweigh the sacrifice. By the time everybody knows you are a man of integrity, they will flock in admiration and be ready to engage in business with you, no matter the amount involved. A proven integrity brings businesses and accolades. Apart from the business benefits of integrity, you can also be recognized socially and politically.

Appearance

I will define this topic into two categories: Physical and character appearance.

Physical appearance

As a CEO, you must look charming and professional at every

engagement. Always dress sensibly and responsibly. Try to wear standard clothes as much as possible. People will look down on you when you wear cheap or fake clothes, no matter how wealthy or educated you are. In fact, it is advisable to wear genuine second-hand clothes rather than brand-new, fake ones, such as shoes or other fashion accessories. Take a bath at least twice a day and brush your teeth twice a day. Use a good soap and toothpaste. Get quality moisturizing cream as well. If possible, go to the spa (heating/steaming) at least once a month. Have a good haircut, whether low or high; always make sure it is neat and trimmed. Apply anti-perspiration, body spray, and a good perfume.

Avoid overdressing and too many accessories, such as wearing more than one ring on a finger. As a male CEO, don't wear an ear or nose ring. Always cut your fingers and toenails.

Character appearance

Avoid using a lousy phone ringtone. Ensure that your phone's ringtone is mild and pleasing to listen to. When you call someone once, and they don't pick up, give the performer at least 15 minutes, and if they don't return your call within that period, call again. If the person didn't pick up your call, stop calling. If the reason for your call is very urgent, you can send a text message. Avoid incessant calls, such as calling someone five times in a row. It is very uncivil and makes you appear cheap. Don't hail anyone, even if the person is wealthier than you. You can admire or cheer the person. Hailing someone makes you appear cheap and unreal. Don't offer to shake a person who is older or more influential than you unless the person offers to do so first, and then you can reciprocate. Some might take this as disrespectful, and you might not stand the shame when you first stretch your hand and are turned down.

Avoid appearing too busy and uncoordinated. "Be cheerful and always smile at every encounter, even if you don't feel like smiling, fake it" – J-ib. The gain thereof is greater than when you didn't smile at all. Don't express your anger in public. Always reflect on the inside and address the matter later in secret. Don't dance loosely in public, no matter what the celebration is about. As a CEO, treat your dance moves with dignity. Avoid sweating in a gathering; it will repel you before others. However, you can make a handkerchief

(in white, which is more dignified) available to mop the sweat away immediately after it comes out. Avoid taking too many selfies and indiscriminate photos. If you so desire, hire a photographer to cover the event when it is special to you. You can also talk to your PA or your wife about doing that for you. It all depends on the nature of the event. Well, as a CEO, you should aspire to build your influence so that the media covers you wherever you go.

If a friend or a business partner gives you his phone to look at an image or any other thing on the phone, don't attempt to exceed what he gave you the phone to look at. Don't scroll sideways to view another thing. It is uncivil and makes you look cheap and uncivilized. As a CEO, adopt the spirit of urgency in everything you do. For example, when such a phone is given to you, glance at it and act as if you are too busy to dwell on it. As a CEO, avoid dressing all red; it might be mistaken for a red flag. Anyone who is not close to you might misconstrue your dress and take you to be a cultist or someone who belongs to a dark society. Always dress as acceptably as possible. Choose white, blue, black, and mixed colors that are not more than four colors. Choose good colors that will give you a better image. Don't cough without covering your mouth and moving away from people nearby. Don't chew gum in public unless it is a recreational gathering. Don't spit indiscriminately; when triggered, look for a safe place and do so, and make sure it is not visible. Don't eat your fingernails in public, regardless of how addicted you have been to them. Avoid turning to look at a woman's buttocks, no matter how voluptuous they are. Be mindful not to do this, especially when you are with people or in public.

As a CEO, you must always exert self-control and make it a point of duty because it will be disgraceful to you when you are caught turning in public to look at a woman's buttocks, especially when you are married. Train your eyes to look at a woman without carrying the heart along – J-ib. This will save you from avoidable embarrassment and leave you more determined.

Don't be late to a meeting, especially when it's for business. Don't give office appointments and leave visitors waiting for hours. Work hard to be punctual at every engagement, and this will stand you out as a CEO. Don't separate a quarrel when you don't know the parties very well. Similarly, don't judge a matter when you haven't

duly heard from both parties. Don't give someone your phone to type a contact number; instead, tell the person to read the number out loud while you type. The reason is that the person's palm might be contaminated, and he or she will transfer germs to your phone, and all things being equal, you will be infected.

Don't tell somebody something and tell him or her not to tell anyone because it's a secret. When it's a secret, keep it secret. Any secret shared is no longer a secret. Don't save up money or do business that warrants you entrusting money to a woman you are dating, especially one you don't plan on marrying. She can siphon your money tomorrow, and you won't do much to recover it. If you report her to the police, she can say that you have been sleeping with her; therefore, she has monetized her value. With the above statement, even the police or the court will do less in your favor. Don't argue with any of the authority agencies if you are accused or suspected of having committed an offense. Cooperate with them and sort them out as quickly as you can. As a matter of fact, you have to build a relationship with these authorities and make yourself known to them. Pay a visit to the DPO of the police division covering your area. If possible, present a gift to him or her. Similarly, carry out the same act on LASMA, VIO, ROAD SAFETY, and ARMY bosses who cover your area. If within your capacity, join their community members and become a member. This will make you recognized by them, and they will assist you in some way or another whenever the need arises.

Choice Of Words

As a man is, so he speaks. You must remember this sentence whenever you want to talk, especially in public. The number one rule is never to speak to impress; instead, speak to express an opinion. Be mindful of the fact that a word spoken can never be recalled. As a CEO, you must speak with wisdom and dignity. Don't talk about what you know nothing about. Get the facts bottled up before you speak over a matter. Avoid arguments and never tell lies. Be determined to be known by your words; let your word be who you are. When talking to someone or a group, be projective, maintain eye contact, and exude confidence. Keep your words limited and concise. Avoid exaggeration and prideful speeches. Address people with courtesy

and readily apologize when necessary.

As a CEO, in a meeting, whether with your peers or subordinates, don't dominate the conversation. Always allow room for other people's opinions and considerations. Be open enough to absorb new ideas and suggestions. Listen attentively even when the speaker is not impressive. If you are in a meeting that you are not chairing, speak only when you are told to. Don't interrupt someone speaking, no matter how impressive what you want to say is.

Avoid blundering, heavy grammar, and using simple tenses to express yourself. Make sure your audience comprehends you. Build your accent to a standard and avoid using vernacular in public unless otherwise permitted.

Creativity

As a CEO, you must be creative in everything you do, from designing your brand's logo to presenting your company to the public. Creativity is a gift we have innately been given, and we can create wonders as long as we can conceive them. Therefore, you must develop the quest to create and distinguish new things from others. As a matter of fact, the only way you can interpret your philosophy of life is through creativity. For example, before you come up with your company logo, you should define your company's vision, then choose a color that conveys it through your logo. Now, creativity does not end with your choice of color and logo; you must keep applying it to everything you do as long as your company exists. In your office, you must be creative with your arrangement and style so that whoever visits you will know it is a heart-shaped printout. This should apply even to your personal life; how you dress, how your home looks, how you solve problems, your visual output, your graphic designs, your ideas, etcetera.

As a CEO in the automotive industry, the height of your creativity should be unlimited. For instance, if you go into vehicle manufacturing, you need a unique, creative mind to come up with designs that are competitive. Although you have a specialist who will do this for you, you must apply your creative intuition. You would have to contribute to the design until it interprets what you visualized. This applies when you are going into AI or space machine manufacturing.

Being creative will make you a more intelligent and brilliant CEO. Above all, it will define your uniqueness and unleash your imagination.

Managerial Quality

From the very day you start your company to the time it goes global, your managerial quality will be a determinant. As a matter of fact, it is not the fact that you would manage people under you that you earn the name CEO. In other words, if you don't have people that you manage in your down-chain, then you are a ceremonial CEO.

The following are the qualities that make you a good manager:

Visionary

As a manager, you must be visionary. You must visualize your dream and wear it on the inside.

You have to create a vision of who you want to become in the future, because it will guide and keep you moving forward on a daily basis. Without a vision, you will work in oblivion, and failure is inevitable. Your vision may be to grow and build AI, Space machines, Drones, Ships, Aircraft, Vehicles, Vehicle Parts, and Accessories, etc. Whatever your vision is, be determined to excel in it and earn a reputation as a good manager. Meanwhile, do keep in mind that no vision is static; it is a pathway to what you can achieve. For example, you may wish to grow and build a vehicle that is fuel-efficient, but only then will you realize that electronic or biofuel engines have usurped vehicles with petrol engines. At this point, your vision will be on a trajectory, and there won't be any option left but for you to join the evolutionary trend. This is just a topical example.

Therefore, a vision is a pathway and not a fixed journey or adventure. Your vision and life goal are limited to age and evolution. So, make your vision open and dynamic. However, it should be within the environment of your chosen industry.

Planning

One thing is to have a vision, and another is to plan forensically toward it. Planning is essential as it acts as a script for success. Create a planning ladder in this pattern: daily, weekly, monthly,

quarterly, annually, decade, and so on. Make sure you don't start your day without outlined plans. Of course, your daily achievements birth your weekly, monthly, and quarterly achievements, and vice versa. Just as my saying goes: "When you plan well today, tomorrow becomes familiar" – J-ib. Meanwhile, for MACEOS beginners, your routine planning should involve buying vehicles, reselling them, and building your capital.

Before resuming at the office in the morning, ensure you have a list of prospects for sales and purchases. This will condition your movement for the day and expectations. Upon resuming, quickly take inventory of your vehicles, warm them, and determine their state. Wash them and get them ready for the day. Note that you can engage your employees in these activities if you have any. Having done this, go through your work plan, which may include fixing faulty vehicles, inspecting vehicles for purchase, networking with affiliate dealers, marketing your vehicles on your sales platforms, attending to clients, and other miscellaneous tasks. Planning is very important in whatever we do, as it brings effectiveness and focus.

Coordination

A CEO must have good coordinating skills. You must be able to work under pressure and maintain tranquillity. Make sure that the situations around you are under your control and arrestable. Don't give room to anxiety and pressure. Be the captain of the ship and sail effortlessly. Avoid taking on too many projects at once. Prioritize what should be done and focus intently on it until the result is achieved, then proceed to another. "Precept upon precept"! Don't allow situations scatter you; rather, run them to your advantage.

Hard-working

To achieve your plans, you must work and work. You must work! Do not give procrastination or a complacent attitude towards job execution a chance. The best approach to executing your plans is to adopt a sense of urgency in anything you do. Always presume that you are already working behind time on what you have to do. This will spur you to finish faster with enthusiasm. Another method is setting a goal for yourself and being resolute in finishing it. Adopt a high-concentration approach; give your ears a break from

distractions and unimportant things.

Make work part of you and never see whatever you do as work; rather, see it as a lifestyle. Work strategically and prioritize by the scale of preference.

Recognition

A good manager must recognize opportunities around him and take advantage of them. Maximum utilization of your resources should be your resolution. To start with, you have to master recognizing what you have. Some people have so many things on their thresholds, but don't utilize them because they don't recognize them. Thus, you must recognize what you have before you can utilize it. "What you have" as used above could be the location of your office, your character, your patience, eloquence, appearance, and choice of words. It could be your employees, your client base, your affiliates, your country, the name of your company, how stylish your logo is, the economy of your country, the technologies available to you, etc. Identify opportunities and make appropriate use of them.

Listening ear

A good manager must have a keen ear for listening. This brings you closer to your employees, clients, and business associates. Avoid wanting to be listened to all the time. Ideally, you should talk after others have talked. As a CEO, you are expected to speak intelligently and concisely. Allocate 99% to listening and 1% to talking.

Compassionate

Yes, this is very important. You must be compassionate as a CEO, with strong managerial skills, and as a human being. This trait will bring you close to many and even cause people to genuinely love you. When your employee, client, or business associate is having a hard time, reach out to them and share the moment. Always show that you care, and you have to care honestly.

Generous

As a CEO, you must be generous to a fault. Help people in need and give unconditionally. Identify people who lack the basic things of life and help them. For example, a child whose parents can't train

in school. Helps such a child acquire basic life knowledge. Identify what your community is lacking and provide for them within your capacity. Tip people working for you periodically, such as your PA, secretary, security guard, or driver. Tip people at the grocery store, gym, hotel, or anywhere as your spirit leads. When you master this act, all will love you, and it will open doors for you. Above all, remember that whatever wealth you have accumulated does not belong to you but is for the welfare of others. I have made up my life, and I mean this to my last breath; my life investment shall be in the people whose lives I have changed for the better. I own no money for myself; rather, it belongs to all, especially the needy! Be generous, and you won't exhaust all that will come.

Forgiving

This is highly recommended, especially for your health and facial appearance. Unforgiveness burdens the heart and leaves wrinkles in the face. In fact, when you choose not to forgive someone, you are the one who suffers, not the offender. The offender might even have forgotten what happened, and here you are, poisoning your heart with unforgiveness. Forgive everyone who has offended you, even when the person hasn't apologized. Forgive your staff, clients, relations, and business associates readily. In fact, I would advise you to practice forgiving before one even gets to offend you. Forgive and remain healthier!

This is an area of my life that I keep thanking God for. I lack the innate power not to forgive. More often, people offend me, and when they get back to me, and I'm so welcoming, they become apprehensive, fearing I might have a hidden agenda. Fortunately or unfortunately, I have sincerely forgiven the person and seen them as a newborn baby. I do this without forgetting to keep such acts at arm's length, thereby curtailing a recurrence. I always see an offender as a victim, having lacked the wisdom to avert such offense. Regardless, offenses are bound to happen. It is then up to us to make up and move in correction and harmony.

Rewarding

Adopt the attitude of rewarding people in your life who have done so well for you. Start by giving your clients after-sales incentives. Outline

staff incentive programs like sales bonuses, best staff of the month rewards, punctuality, dress, and innovation. As a CEO, make an effort to attend some social events and present awards to performers. For instance, you can stage rewards for football tournaments, music concerts, college student quizzes, etc. This will increase your social acceptance and, of course, make your brand more well-known. Always engage in this act, knowing that you receive one indirectly when you reward someone.

Unsatisfactory

Please don't mistake this for ingratitude or greed. What I mean by a CEO being unsatisfactory is that he never feels he has arrived. He should always consider whatever he has achieved as nothing and strive for more. Remember that the ten billion you have as your net worth is another man's monthly income somewhere. And this man's monthly income is another man's daily giveaway. Thus, we shouldn't relax once we have made a little money, because so many responsibilities will take it. As a matter of fact, the money you make doesn't belong to you; it is all for problem-solving. You will realize that the money you think you have built cannot even fix a forty-mile road in your community, start a good business for ten people in your community, take care of twenty motherless homes in your state, give financial grants to five SMEs, start more than three branches for you, etc. Now you realize that the colossal amount of money you think you have made is nothing but a peanut. Thus, be dissatisfied with the amount of money you have made and strive for more. Do this not out of greed, but out of a framework ambition aimed at changing the lives of others.

Wealthy

An identical attribute of a CEO is wealth. As a CEO, you must be wealthy. That is your crown! Therefore, you must be focused and unrelenting until this is achieved. We have other categories of wealth, such as spiritual, social, wisdom, health, etc. A CEO should still ensure that he acquires these categories of wealth, especially wisdom and spirituality. Of course, your financial wealth will be short-lived without your spiritual wealth. In fact, a CEO should work hard to ensure that he has them all. This will make him whole and complete.

Being financially wealthy is very important because it makes life easier and opens up opportunities. Above all, it affords us the opportunity to resolve financial issues in our lives and the lives of our dependents and disadvantaged people around us. Dream big, work smart, and get wealthy. Wealth is a very vast topic. As you know, from the beginning of this book to this stage, all we have been discussing is how to harness a successful business and amass wealth.

Therefore, there is nothing earthly about it. However, the summary is that you should visualize, plan, work, make as much money as possible, manage it, and use it to help people and solve problems. Remember that no wealth is enough! This is because there are projects that can take whatever amount you have made and even demand more. The more money you have, the more you realize that there are many unexecuted projects.

As of November 2025, the total value of physical currency in circulation worldwide is approximately \$8.27 trillion, which includes both physical currency and the funds held in savings and checking accounts. Meanwhile, the total value of money in investments, derivatives, and cryptocurrencies exceeds \$3.3 quadrillion. Let's assume that you own this money. If you start space exploration projects, like building an interplanetary city, you will find that this money is not even 10% of the amount required for the project. Elon is worth more than \$400 billion, yet he may struggle financially to execute his ambition to inhabit Mars. Thus, no amount of money is enough, as unprecedented universal projects will dwarf any budget. Dream to amass innumerable wealth, but don't forget that wealth is not for self-gratification but for the benefit of others.

Humility

This is an aspect that you have to take very seriously and pay attention to. Success comes with pride, and most often, this pride can manifest subconsciously. So, you must be very careful to check yourself at all times. Don't get unbalanced by the accolades that you receive from admirers. You must be humble at all costs. Another reason you should be humble is that whatever you have is just pocket money for someone somewhere. Secondly, the fact that your wealth, no matter how large, can vanish irrecoverably at any time. Refuse to acknowledge unnecessary accolades, knowing that you have nothing

because the billions you think you have today can vanish tomorrow. Humble yourself and always appear unassuming. This will make you approachable and loved by all. Remember that before upliftment, there must be a low level. Therefore, consider any position you have attained as low-level; without this perspective, upliftment will be nonexistent – J-ib.

Adventurous

Yes, a CEO must be adventurous. Being adventurous here does not mean traveling worldwide for tourism and discoveries. It is all about being discontented with where you are and aspiring to reach a higher level. Develop an innate acquisitiveness to explore new things. For instance, if you are currently involved in buying and selling vehicles, start reading and learning about how vehicles are manufactured and the components that make up their bodies.

Start reading and gathering knowledge on how aircraft are manufactured, AI is developed, software applications are developed, space machines are built, satellites in outer space operate, energy is generated from different sources, and so on. This will broaden your understanding, scope, and possibilities. Don't limit yourself to selling and buying vehicles alone. Rather, start to build interest in other automobile-related fields. As I said earlier, the automobile industry is not limited to vehicles; it encompasses anything that is self-propelled. Thus, the industry is expansive, with endless opportunities. The best way to become adventurous is to be curious and dissatisfied with what is presently available to you. This is why founding automotive companies upgraded and changed the look of a given vehicle model each year. So, there is no stagnancy in every field of endeavor, and evolution makes this possible. Be evolving, be adventurous, discover new things, and bring them to reality.

Fitness

Maintaining physical fitness is crucial for every CEO, as leadership requires sustained energy, clarity, and resilience. A healthy CEO is better prepared to manage the intense pressures of decision-making, long work hours, and frequent travel that come with executive roles. Regular exercise improves mental alertness, focus, and emotional stability, which directly impact strategic thinking

and leadership effectiveness. Physical activity also lowers stress, strengthens immunity, and boosts overall stamina, helping to maintain productivity and composure under pressure. Furthermore, a healthy lifestyle sets a positive example for employees, promoting a culture of discipline, wellness, and high performance within the organization. Essentially, a fit CEO leads not just with vision, but with vitality and endurance.

Relaxation

As a hard-working CEO, this is mandatory. You must create time for refreshment and rejuvenation. Allocate time for your annual leave when plotting your calendar.

During this leave, you should engage in recreational activities. Exercise very well and eat good food that interests you. Avoid attending to too many business calls; you can delegate this responsibility to your PA, Sales Manager, or Secretary. Spend time with your immediate family and feel the warmth of your children.

Relaxation time is a time to treat yourself special, as though pampering a newborn baby.

It is a time to reward yourself with gifts and other things that will motivate you. Buy anything that has been your fantasy during this time, and be determined to make the money back when you return to work. Go sightseeing, visit a museum, a mountain, a recreational park—anything that moves you. If you are spiritual, you can use this period to strengthen your faith by having a lonely and sober time with your Maker. Your relaxation time is also a time to review your company's performance. It is a time to think deeply and jot down sensitive ideas that will help the company grow.

Conclusion

The attributes above are those of a CEO. Reflect on them very well and act accordingly. These characteristics will reshape you and bring unprecedented growth to your company. Meanwhile, building a CEO's character in today's business environment requires more than operational intelligence; it demands strategic depth, emotional maturity, ethical grounding, and technological foresight. A modern CEO must cultivate resilience, adaptability, and a global mindset, navigating rapid disruptions while maintaining clarity of purpose.

and integrity in decision-making.

Today's CEO develops character through transparent leadership, disciplined execution, continuous learning, and the ability to unite teams around a shared vision. He must balance data-driven logic with human-centered empathy, managing crises with calm authority and demonstrating accountability in an era where public trust is fragile. In the future, CEO character will be shaped by even higher demands, such as AI-aligned leadership, where ethical oversight and digital governance become core virtues, global adaptability, as businesses operate across physical, virtual, and autonomous ecosystems, sustainability commitment, anchoring decisions in long-term planetary and societal wellbeing, quantum thinking, where leaders embrace complexity, uncertainty, and multi-dimensional problem-solving, and interplanetary perspective, as industries expand into space, robotics, and ultra-advanced mobility systems. A modern CEO must embody a character defined by visionary courage, technological literacy, ethical strength, and an unshakable sense of responsibility, guiding businesses through unprecedented innovation while safeguarding humanity's collective future.

CHAPTER FIVE

WAYS TO RAISE MONEY

This topic is crucial, as it will start your journey to becoming a successful automobile CEO and lead you to the zenith of your goal. Before I begin, I want to inform you of the two platinum fundraising rules. Rule one is to never default on repayment, and rule two is never to forget rule one – J-ib. We all need funds to make our dreams a reality. Every budding and established company requires money at some point. Elon Musk solicits funds to execute his various projects, as do Jeff Bezos, Aliko Dangote, and any CEO of a global brand! Therefore, we need funds, and as it concerns the automotive industry, the amount required is colossal; it all depends on the scope of the business.

Understanding Money

This is very important because it is the real objective of the business in the first place. The number one rule is that you must treat money as your immediate partner – J-ib. In other words, you are the physical partner, while money is the liquid partner. Both of you must work together with equal respect; otherwise, failure is inevitable.

Rule number two is that you must not spend your capital. When you make expenses from your capital, you have betrayed your partner, and as a result, both of you will disintegrate. Your capital is your partner with whom you must build your company together. As a matter of fact, you are not justified in spending your profit until your liquid partner is stable. To put it differently, don't spend your

profit if you haven't doubled your capital.

Rule three is to never sell on credit or loan money to someone as a beginner. At all times, passively decline loan and credit sale advances. These two financial indiscretions have crushed many start-ups. Be resolute about this and give it a chance only when you are well-established.

Rule number four is that no money is enough and inexhaustible. You must understand that doubling, tripling, or quadrupling your capital has not made it safe for you to start spending unscrupulously. You must stick to your long-term goal and need a considerable sum to accomplish it. Even when your long-term goal is achieved, invest in other industries and diversify. As a businessman, it's better to hug the sun than to exhaust your capital, especially when your company is established. It is tantamount to liquidation!

Spend only on charity and for your immediate family. Apart from your immediate needs, such as a house to live in, a car, clothes, etc., every other expenditure should be for investment, which will, in turn, yield more money for reinvestment. Outside this principle, you can blow up the money you worked for a year in a single day. You can ask some celebrities and lottery winners why they still go broke after months. The reason is that they felt the staggering amount of money they had could never be spent, not knowing that money that didn't yield more could not be counted - J-ib.

Rule five is to create a comprehensive accounting structure. You must respect money at all times. Like I said earlier, treat money as your liquid partner. Be accountable in all your dealings with money. Don't spend indiscriminately, no matter how small the amount. Always calculate very carefully before approving any expenditure, and ensure it is a type that will give you a return. Hire an accountant to assist you in keeping records. Ensure that your accountant has strong experience and is verified by credible guarantors.

If these things are checked, allow him or her to handle your accounts. It will reduce the burden of transferring money to different people daily. Another advantage is that your accountant will keep more records than you, being that he or she would have to give you an account of every transaction. Pay your accountant very well and make him or her understand your business comprehensively. Introduce your bank account officers to him or her for efficient and

quicker operations.

The Bank

At one point in my life, I started studying the banking industry as though I wanted to become a bank CEO. This was prompted by the realization that no successful business would have made it without the bank. If there is anything that I want you to understand very well in this topic, it is definitely the banking system. This knowledge is never useless, as you need the bank even as a housewife. You need the bank to become a successful CEO. Without the bank, your business will plummet. Therefore, you must understand how the banking industry operates. Anyway, the basic service a bank provides is to hold your money in their care and let you withdraw it whenever you wish. However, it does not stop here; banking services are as many as its understanding takes you. But as it concerns a budding CEO, prioritize your relationship with the bank as follows:

Build your account statement

Building your account statement has many advantages, especially when it comes to obtaining a loan and proving your cash flow to prospective investors. To illustrate how important building an account statement is, if you want to get a loan from a bank with collateral, even if your collateral's value is ten times more than the amount that you applied for, the bank will not grant you the loan if your account statement doesn't measure up. In other words, your account statement is a window into your financial capability. Therefore, you must build your account statement to show your performance. Some people avoid building their business accounts because they don't want to pay taxes, but the truth is that the disadvantage outweighs the advantages. Get your tax certificate, get a good tax manager, and always pay your tax bit by bit, and you won't regret the step.

You have to note that the tax you pay is value-added tax (VAT), which is expected you would have collected from your clients on behalf of the Federal Government. To explain this better, for anything you sell, add the equivalent VAT percentage to the price of the goods or services, and then remit the VAT to the government. Your account statement might be useful when you apply for a business visa. Of course, you would be required to present your account statement and

tax clearance when traveling to a country like the USA or the United Kingdom for a business trip or any other purpose. Similarly, some government or international business grants require you to present your account statement before approval. They might require this to determine how well or how well you have operated your business. Above all, when your account is well run, you become a friend of the bank, which increases your opportunity to access other products besides loans. In summation, run your account statement very well while awaiting opportunities.

Know your bank branch managers

Determine to officially meet all your bank branch managers and build relationships with them. If possible, get to know the regional managers and board of directors. This will make your banking journey with them easier. Meanwhile, this relationship is made possible only when you maintain a good banking history with them. Or you have a feasible business proposal. Nevertheless, the significant advantages of banking with them include being creditworthy, financial education, advanced investment options, and swift resolution of banking issues. If there is an SME grant program that is going on, they can graft you in because of your relationship with them, and as a result, you will become one of the beneficiaries.

Build a relationship with your account officer and other bank staff:

Yes! This matters a lot as it will be of immense help to you. A loyal and devoted account officer will always assist you with related issues, even when you are not in the bank. With your familiarity with other bank staff, they can also assist speedily when needed. Of course, you have to respond in kind to this group by tipping them as often as you can. As a CEO, you should always be benevolent. Adopt the habit of giving unconditionally; tip people around you.

Understand the products and services of the banks

Yes, through your relationship with the bank manager, you can always get information on the bank's products and services. Depending on your financial capacity and delivery, the manager will also advise you on which to enroll in.

Don't default

This is very important. You must not owe a bank. If you do, you will be reported to the credit bureau, and that will affect your creditworthiness. A bank will go all the way to see your business prosper as long as you are creditworthy.

Don't take shortcuts

Don't take shortcuts when dealing with the bank. Always present your deficiency to them and plead for assistance. This is better than taking a shortcut that might leave you in a corner.

For example, if unknown money comes into your account, no matter how huge or small, don't personalize the money; instead, report it to your bank and other relevant authorities. Similarly, if a bank grants you a non-collateralized business loan, don't abscond with the money or go into hiding when you didn't make good use of the money, and the bank is demanding repayment. Regardless of the circumstances and temptation, always deal uprightly with your bank. The reward thereof outweighs the latter.

Seek investment advice

It all depends on the level of relationship you have created with the bank. You can host your bank manager and, if possible, a top executive member for a business meeting and seek their financial advice. They will provide you with useful financial advice and can even link you up with helpful contacts.

Cause banks to invest in your business

This is for CEOs with a broad scope of dreams. Of course, you must be financially sound, with a strong structure and coherent revenue streams, before a bank can partner with and invest in your business. Therefore, it is imperative that you structure your business so that it is entrepreneurial enough for banks to invest in. Apart from your business structure, your account statement and financial history catalyze this process.

Build a relationship with international banks

Yes. This, however, depends on entrepreneurial insight and business capacity. If your business has grown below average, it is very

important that you have a relationship with at least one international bank, especially from a country with which you are already doing business. You can start by opening an account with this bank and making an effort to meet the branch manager. If, eventually, the branch manager agrees to meet with you, inform them that you are an international businessman and let him/her know about the nature of your business and how you want your transaction processes to be. This manager will, in turn, provide you with more information on international banking and the services you can obtain from them.

This will broaden your understanding and alleviate reliance on domestic banks and black markets.

Raising Funds

The following are means through which you can raise funds to cushion your automobile business, this is as it concerns our grassroots approach:

Affiliates

Apart from your personal start-up capital and the money you get from family, relatives, and well-wishers, your affiliates are the softest avenues to raise money. As it concerns the automobile industry, it is easier for you than other external sources. This, however, is tied to how sincere you have been in dealing with your affiliates.

The following are ways you can raise money from your affiliates:

Through sales of affiliates' vehicles: I had earlier talked a bit about selling affiliate dealers' vehicles; however, here, I want to talk about how you can raise money through it. Marketing affiliate dealers' vehicles can be challenging, but it is worth it. It requires patience and consistency. Meanwhile, the vocal target is to make money and invest in your budding business. By selling an affiliate dealer's vehicles, you can make as much as N100,000, N300,000, N500,000, N1,000,000, and above, depending on the transaction. Meanwhile, demand is your ability to make sales, and another is the discipline to utilize the proceeds thereof. I said this because many believe that the money from sales will always come, thereby squashing the money realized and saving nothing for his company. Well, I have talked about saving money in one of the chapters. By the time you

have convinced your affiliates of your sales ability, you can solicit them to drop their vehicles with you. They will honor this with less resistance, having ascertained your trustworthiness and sales ability.

When this happens, the opportunity has been called, and the rest will depend on how well you play along. I called this an opportunity because when a vehicle is in your possession, you are more confident and tend to make more money. Of course, this erases the frustration of having marketed a vehicle for a long time. Luckily, you got a serious prospect, only for the owner to inform you that the vehicle has been sold. We all know how disappointing this could be. This has happened to me numerous times, and it's heart-sinking. There are some scenarios in which I have collected money from a client, and upon remission, the owner would tell you that he had collected a deposit the night before. The outcome is always deadening and crestfallen. You can make and save enough money by marketing dealers' vehicles as affiliates. You can make as much money as it takes to start a business for you.

Recommendation of good deals to your affiliates

Another way you can make money from your affiliates is by acting as an outsourcing agent. Search for vehicles across various sources and recommend good deals to them. You can then earn a sales commission. A precautionary measure here is to never take a shortcut by recommending a vehicle that has concealed faults, all because you want him to buy it, so you can maximize profit. You must deal with your affiliates on a clean slate at all times, regardless of how pressing your need is. If your affiliates trust you, they can even send you to inspect a vehicle and buy it on their behalf. Of course, achieving this level in your relationship with your affiliates would indubitably catapult you to heights you might not have expected.

Loans from affiliates

The third and final means of raising funds through affiliate dealers is through loan grants. Yes, this method is real and is the most convenient. An affiliate dealer can give you a collateralized or non-collateralized loan, depending on the security provided. I have obtained a collateralized loan from an affiliate dealer when I newly joined the industry. Inversely, I have given loans to both upcoming

and established dealers, many of whom I regretted. For this reason, I advise you not to grant a fellow dealer a loan when you're not well-established, especially if it's unsecured. This is risky because, in the event of default, you can't legally pursue the beneficiary unless you have a license from the CBN (or the financial regulatory agency of your country for non-Nigerians).

Aside from CBN, a lending certification from the state government you are operating from can serve. On the other hand, when there is security, and you have personally assessed the dealer, you can grant him the loan. Meanwhile, the best collateral for dealership loans is vehicles. This is because you can easily sell off a vehicle submitted as security when the beneficiary defaults. Note, always ensure you collect an authority-to-sale letter from the beneficiary. And ensure that the vehicle actually belongs to the loan seeker or, if it belongs to a third party, ascertain that the owner duly authorized him to use the vehicle for such purpose with backed-up documentation. On a large scale, if you have a license from the CBN or a lender's certificate and your structure is tightened, you will have a slim chance of losing your money to defaulters. This might just turn out to be a soft business for you.

This brings me to addressing the big names in the industry to create a dealership loan system through which financially struggling dealers can obtain low-interest funds to strengthen their businesses. This is not limited to dealers alone, but also to other automotive sectors that require funding to function. Commendably, Shekel Mobility has taken the lead in tackling the financial difficulties that automobile dealers, especially budding ones, face in their businesses. We need more of this positive gesture to lighten the weight of financial limitations in the industry.

In summary, as discussed above, you can raise business funds from affiliate dealers through loans or other means. This possibility is only as limited as the credit you have earned and also as expansive as the personality you have built. Therefore, you must always do it right in order to be presented with opportunities.

Grant

A grant is the second way to raise funds for your automobile business. The Government, International Organizations, NGOs, and Private

Establishments give grants. One good thing about grants is that they are almost free. Grants differ from loans because their objectives are different. A grant provider wants to know your business idea, and if it's promising, they will fund you and encourage you to grow and help others. This means of raising start-up capital has become common globally. Global bodies like the World Bank and other global financial bodies usually make the platform available. This is usually aimed at financing and developing small and medium enterprises (SMEs) over time.

You can find information about available grants in newspapers, on the Internet, and elsewhere. Whenever there is an opening, apply for it and follow up promptly. You can visit <https://startuptalky.com>, <https://www.feedough.com>, <https://rocketdevs.com>, or <https://makemoney.ng/> and apply to anyone who interests you.

Business Reality Show

There are business reality shows that come with start-up grants. A good example of this type of platform is the TITAN reality show in Nigeria. This reality show (often in collaboration with the government) identifies individuals with a great and feasible business plan and funds them with additional side prizes. I have attended TITAN twice. There are also other global business reality shows, such as Shark Tank, Dragon's Den, How I Made My Millions, The Apprentice, and Undercover Boss. By the way, Autohub Africa has already projected a possible reality show for automotive dealers and others. This proposal is still under review, and I believe its implementation is imminent. We believe it will give us the opportunity, under the hood, to discover potential gurus who can bring positive change to the industry.

Banks

Banking is one of the aids to trade; as a result, its importance to business development is immense. Banks offer different kinds of loans to the general public. Thus, one of the surest means to raise funds is through a bank. Meanwhile, a bank loan requires you to present an account statement from which the bank determines the amount you're eligible for. For this reason, it is advisable to run your account very well so you can get a loan from the bank.

Like I said earlier, the number one rule in raising money is to never default on repayment, no matter who you are dealing with. As for banks, you must not default, as it will affect your creditworthiness. If you are unfortunate enough to be reported to the credit bureau commission, it will cost you a whole lot, as no other banks will grant you loans until you repay the outstanding amount.

Banks offer different types of business loans. They have monthly repayments, an annual overdraft, and others. Well, the point that I want to make here is that it's better to seek a loan you can repay annually rather than monthly. Monthly repayments are very difficult, and many people have defaulted repeatedly. I had collected many loans with monthly repayments, and the experience wasn't child's play. I did well on some of them, and I defaulted on others, which I regret giving a chance. The best type of loan is an annual loan with a low interest rate. Unfortunately, out of desperation, we give sharky loans a chance that often leave us indebted in the end.

Meanwhile, it's rare to see a bank that can grant you an overdraft without collateral. Unless you have built a strong business relationship with them and earned their trust, it will be very difficult. If you are desperate for a loan, you can use your available vehicle to secure one. Microfinance Banks can give you instant loans when you present a vehicle as collateral. As a matter of fact, here at Autohub Africa, we offer dealers loans secured by vehicles. And the advantage you have in dealing with us is that we market your vehicles on your behalf while in our custody as collateral. We can also grant an advance payment to a dealer who submitted his or her vehicle for us to sell on his or her behalf at a reduced price, usually by 25%, depending on the amount of advance payment that the person wants.

Investors

I will go into detail about this because it's the most important way to raise money. Also, it is all the businessmen's choice, as investors bring life to a business and grow it after the founder's window. I will cover everything you need to know about this topic, taking it step by step. Regardless of how incredible your business idea is, you need funds to execute it. Thus, pay close attention to this topic to understand the appropriate way to attract investors to your business.

Why You Need Investors

The primary reason a founder of a given business needs an investor or investors is to raise capital. When an investor shows an interest in a business, he would put as much money as the business would need. Therefore, you need investors to raise funds and achieve your business goals. Another reason you need investors is to structure your business and build it into a household brand. Yes, most investors are business gurus; thus, they study your business plan and know how to bring it to life with huge profit-making opportunities. The third reason you need investors is that they will broaden the scope of your dream and even turn your business into a global brand. Since these investors already have thriving businesses worldwide, it is easier for them to get your business affiliated with international brands, thereby enabling rapid, ongoing expansion. I will lose count of enumerating the importance of bringing investors into your business.

What Investors Need From You

Investors are certainly dependable sources of business advice and often have a strong network you can access. However, a potential investor will have specific reasons for investing in your business. They focus solely on one goal: earning a return on their investment.

Investors don't let emotions influence their business decisions. They are highly principled and focused on business. They know what they want and will only make an offer after evaluating your business and estimating its return on investment. They don't laugh, and they don't offer a free lunch!

Reasons Investors Invest In Your Business

Figures

An investor first looks for data analysis of your business. He wants to make money, so he will take his time studying your business history, in- and outflow of transactions, and profits.

Therefore, it is imperative that you maintain a clear record of your business operations before inviting an investor.

Business plan

A feasible and comprehensive business plan demonstrates to an

investor what your business is all about and how prospective it is. Of course, no right-thinking investor would put his money into a business whose projections are unclear. Therefore, you must make your business plan as detailed as possible.

Executive summary

The executive summary includes your company's mission statement and the products and services you plan to offer or currently offer.

Business description

This component comprehensively describes your business, including its goals, products, services, and target customer base.

Market analyses and strategy

This requires you to state your company's primary target audience, where they could be found, and plans to sustain them.

Marketing and sales plan

This aspect gives details on how you plan to market and sell your products and services.

Management and organization description

This introduces your company's leaders, qualifications, and business responsibilities.

Product and service description

These provide information about your products and services, including how you make them available, how quickly you sell them, the needs they meet, and the cost of creating them.

Competitive analysis

Here, you will write a detailed competitive analysis that clearly compares your company to your competitors. Outline your competitors' weaknesses and strengths, and then state how your company can exploit and outpace them. State the distinctions that your business has over your competitors in the open market.

Operating plan

State how you plan to operate your company. Include information regarding how and where your company plans to operate or have more branches. Your operating plan should provide details on personnel operations, such as the number of employees you would hire in each department.

Financial projection

Your financial projection explains how your business would generate revenue. In this section, state the amount you need for your business and the amount you hope to generate with the money within a stipulated time. You can include your financial statements, their analysis, and your cash flow projection.

Customer base

State the anticipated number of customers that can patronize you within a given time. Also, state this figure, relating it to when you are operating the business and the amount you are asking for.

Profit and loss forecast

State your profit and loss forecast, especially for the amount you are requesting.

Next steps

This aspect is very important as it gives a prospective investor insight into your knowledge of what you are doing. Relate your next step to when you start an operation, using the amount you are asking for.

Exhibits and appendices

Include exhibits and appendices to support the viability of your business plan and give investors a clear understanding of the research that backs your plan.

Summary

Give a summary overview of your business plan.

Application for business financing

Write an application to prospective investors and apply your business plan to it.

Cash flow projection

Include your cash flow projection in your business plan. Your projection covers cash at the start of the month, other cash inflows, sales, receivable collections, income from sales, other income, stocking, utility bills, promotion, marketing expenses, salary, and miscellaneous.

Return on investment

An investor wants to know what his investment return will be and when. So, you must convince a prospective investor exactly what you want the fund for, how you intend to use it, how long it will take, and how much you will be making for them.

Investment structure

An investor wants to fully understand the investment structure before accepting your offer. This includes details like ownership arrangements, such as whether the investor joins as a partner or shareholder in the business. Make sure to clearly state this in your investment agreement.

How To Choose The Right Investor

After sending out your application and business plan to investors, depending on how attractive your business idea is, investors are likely to show interest. At this point, you would have to hire an expert to filter interested investors and make the right choice. You can do this yourself; it all depends on your level of knowledge and understanding of this topic. Of course, you wouldn't choose a person who might end up being wrong for your business and your life. To be safe, here are some things to consider when selecting an investor.

Types Of Investors

Personal investors

Business owners often depend on their close acquaintances, friends, or family to invest in their businesses, especially at the start. These types of investors are called personal investors, and even though they can assist with funding, there is a limit to how much they can invest in your company. Especially when it concerns the automobile business, which most investors are apprehensive about its usual delay in sales. This is why most banks don't give business loans to automobile dealers. However, it is easier to convince this category of investors without extensive documentation. Nevertheless, whichever category of investors you choose, ensure you get your lawyer involved for appropriate documentation.

Angel investors

Angel investors are those who invest in small start-ups or new entrepreneurs. They are the most famous type of investor that most people work with. An angel investor might even be close to the start-up owner, such as a friend, family member, Church member, or schoolmate. Angel investment is typically either one-time funding to propel the business or an ongoing investment to support and

advance the company in the initial stages. They usually offer terms much more favorable than those of other types of investors. This is because angel investors invest in the entrepreneur opening a business, not in the company's viability. In fact, angel investors are always focused on helping start-ups grow in the early stages rather than making a profit from them. Angel investors are also referred to as business angels, seed investors, private investors, angel funders, or information investors.

Venture capitalists

A Venture capitalist (VC) is an investor who provides capital to start-ups with long-term growth potential. Venture capitalists are normally investment banks, well-off investors, or other financial institutions. Even though this is a risky way to invest funds, a successful payoff is worth it. A venture capitalist invests his resources in a company he believes has the potential to grow, and in return, he demands equity and an overall say in its decisions. Since entrepreneurs can receive both open funding and the advice of an experienced, knowledgeable person, many choose these types of investors. In a venture capital deal, large chunks of the business's ownership are created and sold to investors through independent limited partnerships formed by venture capital firms.

Sometimes, these partnerships are composed of a pool of similar enterprises. An essential difference between other equity deals and venture capital deals is that venture capital deals typically focus more on growing companies seeking substantial funding for the first time. If you want to start your business career in the automotive industry and work with investors with long-term experience and knowledge, this option is a good fit.

Peer-to-peer lenders

Peer-to-peer lenders are groups or individuals who provide capital to small business owners.

To raise capital from these types of investors, the seeker would need to apply to companies that specialize in peer-to-peer lending, such as Kiakia P2Vest, AjoBox, Lending Club, Prosper, and others. As soon as a peer-to-peer company approves your application, the lenders will determine whether your establishment is a good

investment.

Incubators and accelerators

As the names suggest, incubators and accelerators are gateways to various investors. Suppose you get accepted into any incubator or accelerator programs. In that case, you might get anywhere from \$1,000,000 to \$10,000,000 (it all depends) in seed money to develop your idea (projection) and gain traction while profiting from additional investment and assets. Assuming everything is going well, you will pitch to more prominent investors, which will help you advance to a higher level. Meanwhile, you should be prepared to hustle harder because these programs require you to grow rapidly to advance to the next stage.

Banks and financial institutions

I have previously discussed bank loans. Here, I will briefly discuss investment. Banks are not core investors like the others we have discussed above. However, they can be a source of capital.

Conventional banks are not sources of capital for new companies and independent ventures, especially when there is no good financial record or collateral. However, if you gain a foothold and prove otherwise to them, they might offer you advance loans. There are government programs that provide grants for a specific type of project. In most cases, they use financial banks to dispense the money. So, a bank can conveniently enroll you in this program when it's convinced of your business plan.

One thing to note about government programs is that they are accompanied by specific limitations and restrictions that can be difficult for new businesses. For example, a government might give you a grant and demand that you employ and train ten personnel at your expense. The objective is that the government wants to empower its citizens through self-employment or employment. Thus, they give a grant to one person with a good business plan and then implore the person to build for other people, all things being equal.

Corporate investors

When big corporations invest resources in a budding business, they do so for various benefits, and they're always big. These benefits

include supporting their development, diversifying their assets, and distinguishing between talent and innovation, which can help them withstand industry changes and generate significant profits. Some corporate investors have assets to invest in new companies; as a result, they are well-funded and always resourceful. Many corporate investors are investors in accelerators and incubator programs. They build environments to develop every business opportunity and maximize profits.

Corporate investors can be great partners in taking your business to heights you can't believe. However, they can be unique in their work compared to other investors. In corporate investment, any integration or collaboration across sales channels, systems, and the customer base is rigorously analyzed with zero tolerance.

Summary

I took my time on this topic because I want you to understand business fundraising very well. Also, I want you to aim high and look forward to a stage of your business growth when you need these investors. I don't want you to limit your business scope and opportunities; I want you to grow and build a conglomerate. Every business requires funding. As a matter of fact, even investors get funded. What matters is the structure you put down to ensure your business thrives.

How To Get Investors

Having written your business plan and application, the next step is to look for investors. There are many ways to reach out to investors, but the number one is through personal search. Although finding investors can be unsettling, regardless, you only need to search for them in the right place. You can search online for investor databases such as the Angel Capital Association, AngelList, and Angels Den. You can also find investors by talking to people you believe have more experience than you. They will often recommend investors to you.

Another step that works wonderfully these days is self-promotion.

You can participate in community business activities like business networking. You can even publish a blog about yourself and the company, and contact influencers to promote it for you. These approaches can bring potential investors to you rather than having

to go to them. The third method is going through an agent. Some agents specialize in sourcing investors. You can contact them, pay for their service, and meet investors of your choice.

Defending Your Business Plan

After you have prospected an investor, the next step is for you to have a roundtable business meeting, during which you are required to defend your business plan. Your ability to defend your business plan is tied to how transparent you were in writing it. If you were natural and truthful with your business plan, you would also be natural and truthful in defending it. Some people fail while defending their business as a result of false claims and exaggeration. Meanwhile, as soon as you have an investor's attention, the first thing you must do to exude confidence and have a perfect pitch that will interest them in approving your proposal is to emphasize more return on investment and your business turnover.

Post-Approval

Having gotten an investor, you are to handle things with utmost care and sobriety at this point. You must be extremely careful and clever to stand out in your business and maximize profits.

Make sure you maintain regular meetings with your new investor(s) and are insightful enough to learn from them. Always look for the businesses that both of you can introduce and execute.

You must embrace sincerity in all your dispositions. No shortcuts, maintain a little or no side hustle, be transparent, and be ambitious. This arms you to stand firm and self-justified should your investor misbehave amid your business contract. Remember, investors can make or break you. You have to deal with them with utmost wisdom and introspection. Investors can frustrate your business if there is discontentment. Some might even outsmart you and take over the business through an equity contribution. This is why you must fully understand them and always have your lawyer by your side.

Conclusion

Raising money is crucial to every business, and following the steps above will definitely yield positive results. Meanwhile, you must understand your business and the dynamics of your return

on investment before raising money, especially if you are seeking financing with interest. Raising business money today is more dynamic and accessible than ever. Entrepreneurs now combine traditional financing, such as bank loans, equity investors, and government grants, with modern digital funding options, including crowdfunding platforms, angel networks, venture capital, peer-to-peer lending, and online microfinance services, as discussed above.

Technology has made it easier to pitch ideas globally, access investors in minutes, and showcase business traction through digital analytics and social proof. Data-driven credit scoring, fintech innovations, and alternative lending platforms have also reduced barriers for startups and small businesses, allowing faster approvals and more flexible repayment structures. The future of fundraising will be shaped by AI, blockchain, and decentralized finance (DeFi). Entrepreneurs will raise capital through tokenized assets, AI-matched investors, smart contracts, and global digital marketplaces. Funding will become more transparent, automated, and borderless. Investors will rely on real-time data, predictive analytics, and digital twins of businesses to assess risk in real time. Entrepreneurs may secure loans or investments without physical collateral, but by using digital reputation scores, transaction histories, and blockchain-verified performance records.

Terms and conditions will be automated; interest rates, equity distribution, and repayment terms will adjust dynamically based on the business's concurrent performance. Compliance, risk management, and fraud detection will be handled by AI systems, reducing processing time and increasing trust between both parties.

There would be faster access to capital with minimal paperwork, higher approval rates due to data-based assessments, global investor reach through digital platforms, flexible and performance-based repayment, and reduced bias because decisions rely on transparent algorithms. As well as better risk assessment through AI-driven analytics, real-time monitoring of business performance, lower fraud risk with blockchain verification, automated repayment and reporting, and access to global investment opportunities. In summation, raising money today is technologically enabled, diverse, and more accessible, while the future promises borderless capital, AI-powered evaluation systems, and automated trust structures, benefiting both entrepreneurs and investors in a fast-evolving global marketplace.

CHAPTER SIX

SALES AND MARKETING

Sales and marketing are the heart of every business. Marketing announces a product's availability, provides information about it, and educates prospective buyers on why they should purchase it. On the other hand, sales mediates exchange, standing in the gap when a given amount of money is paid for a product or service. Marketing is more effective than sales because it actually gets the job done. It is the laborer who finishes the work and then passes it on to "Sales," which in turn seals the transaction. Apart from sales, marketing also involves activities that build brand awareness, promote products, generate leads, source new clients, build public acceptance, and gather data.

Sales, on the other hand, provides clients with the opportunity to absorb the brand, get closer to the products, develop interpersonal relationships, bargain, and give spontaneous feedback.

Sales presents the company's operational tradition to a client. It brings a client to a landing page and strengthens both parties' interests. Above all, it provides the company with the information needed to determine product acceptance, utility, sales forecast, and remarks. You must understand sales and marketing because they will drive your business's success. Although this is a vast topic, I will limit it to vehicle sales, which is our beginner's starting point.

Meanwhile, whatever is taught here could be applied to any other sector of your choice. Axiomatically, I cannot discuss all the sectors concurrently here. Thus, our grassroots starting point is the case study we have chosen. Therefore, I will discuss sales and marketing

here, as they pertain to vehicle sales. However, whatever is discussed here regarding sales and marketing applies to every other sector, including aviation, space exploration, AI, and non-automotive industries. What we shall discuss below is a modern sales and marketing system applicable to all endeavors. As I said earlier, the MACEOS platform runs 90% online, including sales and marketing. Thus, our automotive marketing activities will be 90% online and 10% offline. As in our tradition, we will start from the basics and then grow to the advanced. Therefore, I would like us to start with the basic sales channel: social media.

By the way, I want to let you know that you can sell anything on social media. You can sell space machines, yachts, aircraft, your company, and more. So, as much as we consider social media to be a basic sales and marketing platform, it is very powerful. Although it is information-based, it is as powerful as a sales discussion in a CEO's office. Visiting a company and discussing your business proposal with the CEO might yield billion-dollar sales, but this is fixed and inelastic. Conversely, social media can give you one thousand-dollar sales but in one billion duplicates. This is about one thousand times sales; if I must be frank, it is a limitation of social media compared to one billion-dollar sales in a sitting. The reason is that if one salesperson could physically visit a CEO in his office and close a deal worth one billion dollars, then social media would reach a five billion audience and close a deal of one dollar by five billion, which is five billion dollars, making it five times more than physical marketing to an individual or more.

The point here is that physical marketing is less effective than social media marketing because reach is limited, unlike social media platforms, which are universal. In other words, online marketing has the propensity to reach everyone on Earth, and this could even be achieved simultaneously. For this reason, you would need to thoroughly study and understand social media platforms. You need strong sales channels to market your vehicles; without them, you would be limited, and your products and services would be unknown.

I want you to understand these sales platforms and their functions so you can use them to the fullest. Meanwhile, some of them offer free services, while others charge. We shall be discussing both

concurrently. The advantage they have is that, when set up successfully, they serve as the company's profile, presenting key information that provides an overview. Vital information like the company's name, address, phone number, email address, and services. This provides potential clients with a window into the company and its products.

The following are the top sales platforms:

Facebook

Create a Facebook account and a page from it. Then, invite people to join your page. After that, start creating content. Depending on your sector, make your content as relevant as possible. Regarding vehicle sales, start with the simplest content: Posting your vehicles for sale.

Build a template that provides detailed information about the vehicle and the other services you are offering. Create graphics and advertorial short videos. If you already have a website, link your posts to it so your audience can visit it. You can go live to talk about your business and share educational information that will broaden your clients' understanding of your products and industry. You can promote this content to reach more audiences through paid ads.

Instagram

Instagram is almost the same as Facebook. The only difference is that on Facebook, you create a page, whereas on Instagram, you can use both a page and a timeline. Therefore, whatever I have said concerning Facebook could be applied to Instagram. And of course, they both work concurrently.

LinkedIn

LinkedIn is for corporate networking. Many have used it as a job search hub, but its utility goes beyond that. LinkedIn is more about individual profiling and the exchange of values and services. You can use LinkedIn to create an audience for your company. You can achieve this by linking your company to your profile. Whoever views your profile will likely visit your company's website and other relevant channels.

TikTok

TikTok is similar to Facebook and Instagram, although it differs slightly from them. TikTok is the wave of social media today, serving as a hub for many activities, especially those related to daily life. You can use TikTok to grow your company beyond its limitations by creating engaging content.

YouTube

This is a very useful platform that can grow your company and your products. It all depends on your scope of dreams; you can actually create documentaries about your business and products and post them for public education. You can even start blogging, creating a lot of content that will help you build more followers. All things being equal, your company will be known by many, leading to increased sales and growth.

X

Formerly known as Twitter, X is a great platform for promoting your company and its products. X's advantage over others is that it is much more textual. To put it differently, you can reach an audience through text alone, unlike others, where you may have to include images and videos. Notwithstanding, X also has image and video upload features. With X, you can tell the world about your company and products on the go.

WhatsApp

WhatsApp, to me, is the most effective sales and networking platform for automobile beginners. What can I say about WhatsApp? It is very practical and useful. WhatsApp enabled me to network with as many dealers as were available. It also allowed me to reach many clients. Today, WhatsApp is still as useful to me as the company's website.

There are four major ways to use WhatsApp: groups, broadcasts, statuses, and squeeze pages.

Group: You can use a WhatsApp group to create a business empire. All you have to do is determine your leagues and bring them together by creating a WhatsApp group where you can transact and share business ideas. For example, you can create a WhatsApp group with the dealers you are networking with, making it easier for people to

transact. We have made appropriate use of the WhatsApp group, and its gains cannot be quantified. Proudly, Autohub Africa has 13 different automotive WhatsApp groups with one dealer per group. These groups are transactionally active 24 hours. You can create a group for purposes other than transactions. For example, you can create a forum group for automotive dealers to discuss automotive-related articles, a group for vehicle reviews, and so on.

Broadcast: This lets you send multiple messages to your WhatsApp contacts at once, provided you have previously added them to your broadcast list. The advantage that broadcast has over group is that it goes directly to the receiver's chat log, unlike group, which is limited. Broadcast messages appear to be private, so they often receive faster attention. Therefore, create a broadcast to send available cars to your contacts daily, both to dealers and end users.

Status: Your WhatsApp status is an on-the-go advertisement. It allows you to reach a large audience in less than a minute. Avoid posting too many pictures of your status. For instance, one car image is enough to create an impression. The reason is that too many posts repel viewers. Instead of posting five images for one vehicle, post a picture for each of the five vehicles.

Squeeze page: This is your chat log where prospects are already talking with you. This stage is sensitive and opportunistic. However, the bottom line is that the squeeze page helps you stay in touch with your clients. In other words, it allows you to summon prospects' attention and use it to your advantage. The results from your squeeze page depend on your communication and marketing skills. The squeeze page also allows you to send immediate advertorial content to your prospects. The above are the ways to use WhatsApp effectively. WhatsApp is very effective; if you can use it as stated above, you will boost your sales and awareness.

Paid channels

There are other advertorial platforms that require payment immediately before you can use their services. An example is Google Ads. One would have to pay before a Google Ad can go live, even if it is a pay-per-click subscription. This is unlike other platforms that offer paid and free ad options, such as Facebook, Instagram, YouTube, X, TikTok, etc.

Displaying office

This is also very effective in creating awareness. However, its disadvantage is that it's limited to passers-by. Regardless, having a car stand/show room is very important, as it serves as the base from which one operates, both online and offline. It's also a ground for physical inspections.

Classified websites

A classified website is a “marketplace” portal where sellers and buyers meet to conduct transactions. Autohub, Jiji, Carmart, etc., are examples of automotive classified websites in Nigeria. You can sell your vehicles through classified websites and reach a vast audience. However, some are paid, while others are free. The platforms above are where we can sell our products and services. This is just as it concerns 2025, because a more effective platform might come along tomorrow. Be that as it may, social media platforms have come to stay, and they evolve daily. Therefore, be ready to take advantage of its enormous business prospects and social connectivity.

Getting Ready For Sales

Nothing worthwhile is achieved in casualty. Thus, you have to intentionally prepare yourself for sales. This involves making your product available, determining your prospects for the day, and preparing your appearance, character, and special sales skills to thrill your clients.

Below is a daily sales checklist preparatory to a successful sale:

Making products ready

You must ensure that your products are 100% prepared for your client's appeal. When it comes to vehicle sales, you have to make your vehicle ready before a client arrives. Make sure the vehicle performs as advertised in your advert. Have it washed and warmed before your client arrives. Make arrangements for the route the client will take for a test drive. And ensure that the vehicle's documents are verifiably available. With a concrete arrangement, you will be coordinated, and your client will be pleased. As a result, there is a higher tendency to close sales. Therefore, sales preparation is essential. You must avoid being casual about sales and be intentional and fully prepared.

Determining your prospect

This is very important! Before you resume in your office every day, ensure you have analyzed how many clients will visit that day, when they will visit, and what they want. This is key as it will prepare you. This excludes erratic clients who will be visiting your office for purchases, inquiries, and the rest.

Appearance

Appearance is an excellent rule in sales. In fact, it has been proven that people sometimes patronize you, not because of the product they want to buy but because of your personality. Thus, a good appearance is a sales catalyst. Take a bath at least twice a day. Apply a good moisturizing cream, deodorant, and perfume. Wash and iron your clothes as steadily as possible. Wear good, average-length clothes and shoes. Avoid excessive jewelry, body piercings, and any tattoos. Talk courteously to all clients. Avoid unneeded conversations. Be precise about your goal, which is to always close a transaction. When you don't know what to talk about, say good things about the vehicle that you want to sell.

Even when a client tries to talk down on your vehicle by pointing out bad parts of the vehicle, address his/her complaints politely and passively while you respond afterward by talking more about the good parts of the same vehicle. Always check yourself for body odor and try to control it as much as you can. Body odor repels customers and causes discomfort for parties during transactions. Avoid using vernacular or pidgin English frequently unless a client speaks to you in the same language. Be humorous and unassuming during a transaction. Smile effortlessly at a client and compliment him or her on merit. Prepare very well before you meet a customer. Remember that “preparation brings courage and courage brings excellence and excellence brings delivery and delivery brings result and result brings success” – J-ib. Don’t bleach your skin to control sun effects; rather, make sure your cream is UVA and UVB protective. Prepare readily for a client and maintain an enthusiastic attitude around them.

Networking

Networking is vital in every business. Nobody is an Island in the automotive industry; most sectors depend on one another. For

example, some aircraft components are imported from different countries. These are countries that specialize in one component and excel at it. So, there must be business networking among the parties to achieve one goal. The same applies to other sectors, such as space exploration, AI, and automotive. The importance of networking in the automotive business cannot be overstated. And when it comes to vehicle sellers, every automotive dealer must network. This is because you can't independently certify your clients' needs. As a result, you must outsource, and this entails unending networking. There are different ways you can network for different purposes. However, your direction is tied to a purpose that you want to achieve at a given time.

Reasons for networking

- To know those in the industry, how they operate, and how you can work with them.
- To know available vehicles and current prices.
- To know vehicles that are on request.
- To sell your vehicles and those of your affiliates.
- To receive information about what is happening in the automobile industry.
- For aspiration, inspiration, progress, and so on.

Means to network

One-on-one meeting: Yeah, when you know someone who is doing well in the same line of business as you and within reach, approach the person and schedule a business meeting with him or her.

Phone call: You can source the numbers of the people who matter in the industry, call them, and discuss business.

SMS: Catalogue the numbers of those doing well in the industries and send text messages to them, either to introduce your products and services to them or to inquire about their products and services.

WhatsApp groups: Strong platforms for networking in the automotive industry, especially among vehicle sellers. In WhatsApp groups, vehicle sellers post vehicles for sale and request vehicles they have prospects for. The same thing applies to other sectors. You should be surprised to know that Elon Musk networks on WhatsApp among his peers in the automobile industry, and so does any other

big name in or outside the industry. Just name any human of any category, be it Dangote, Trump, Pope Leo XIV, Peter Obi, Cristiano Ronaldo, Pastor Chris Oyakhilome, Lady Gaga, Ngozi Okonjo Iwala, Davido, in fact, name anybody of any class; they all make use of social media and network among peers for business deals.

As a vehicle seller, your ultimate networking strategy is through your vehicle-for-sale catalog. In the group, post the vehicles that you have for sale and request the vehicles that you are getting for your clients. You can also request vehicles you can buy and resell. Meanwhile, while making use of an automobile WhatsApp group, avoid the following:

Posting too many vehicle images on the group: One image of a vehicle with an abstract description can convey enough message to your prospects. Anyone interested will contact you privately to request details, including additional images of the vehicle. Don't discuss automobile-unrelated topics in the group, nor post unrelated ads or content: Be strict with automobile affairs and network unreservedly. Don't exchange uncouth or abusive words with group members: Always be courteous and tolerate/ignore erring dealers. In a worst-case scenario, report a trespasser to the group admin, who will, in turn, take disciplinary action against the person. Don't swindle a dealer who entrusted you with a client: Always be transparent with co-dealers and ensure they receive their due commission. If a dealer swindles you, don't fight him in the group. Instead, contact him privately and follow up. If, in the end, he doesn't reconcile his character, report him to the group admin or an automobile union leader in your area. In summary, there shouldn't be any fraud, confrontation, or altercation in the group.

Don't exit the group without informing the admin; indiscriminate exits can negatively affect other members. The reason is that people follow a fad; when you exit, a member might exit in commiseration, and all things being equal, another member might exit, and so on. Thus, it's better to inform the group admin to remove you than to exit alone.

Classified websites: You can network with dealers through classified websites. You can achieve this by visiting the website, searching for a vehicle, contacting the advertiser (dealer), and then networking with the person. Apart from the ad that prompted you to contact

the dealer, you can discuss other vehicles or automobile-related businesses with them.

Social media: You can also network with many dealers on social media channels. The same approach for classified websites applies to social media.

Unions and associations: You can meet and network with dealers at an association gathering. Here, you can meet dealers of different calibers and establish a business relationship with them. Your success in achieving this depends on your social skills and business acumen.

Street: This is another effective way for dealers to network. It involves visiting car lots within reach and networking with the dealers in charge. Apart from dealers who are on car lots, there are auxiliary dealers attached to remote areas such as streets, closes, houses, etc. They are non-dealers, yet they have vehicles in their possession, perhaps ones sent to them by a relative overseas. Try to discover this category of people and offer to market their vehicles for them. At the same time, be open to any other business that could ensue along the line.

At Autohub Africa, we have a few of these auxiliary dealers, and we have done healthy business with them. It all depends on the scope of your business; apart from the people in your vicinity, when you make yourself known publicly, perhaps through adverts or other means, these categories of people will come to you unabated. There are other ways to network in the automobile industry. You can attend automotive summits, conferences, or corporate functions to meet men who matter in the industry.

Cataloguing

This is another important topic that is pivotal to automotive CEOs. Cataloging, in this context, means gathering and making your products and other data available, often for marketing purposes. Cataloging is key to the success of any company's marketing activities because it is a window through which you reach out to your clients. As it concerns MACEOS' grassroots, this concerns the number of vehicles, dealers, and clients you have available and within reach.

Of course, every business needs a catalog, especially in the automotive industry. No matter the sector you are in, cataloging is the foundation of product marketing. However, there are two types

of catalogs: Tangible and intangible. An example of a tangible catalog is the vehicles available; you have covered them digitally so that anyone, however distant, can access them. An intangible catalog, on the other hand, concerns the automotive industry. It includes the features of a machine built and presented as a thriller. An example is when you compile the features of a newly built robot and present it to your prospective buyers. Here, you are not talking about the robot, but its features. Another example is when you have an autonomous vehicle and decide to catalog its features rather than the vehicle itself, and present it to your client. Or, as it concerns space exploration, you may choose to create a catalog of the characteristics of interstellar bodies instead of the interstellar bodies themselves. These are intangible cataloging items that are often foregone in favor of tangible cataloging, unaware that the former performs better in sales than the latter. Regardless of which catalog you use, it must include data on your business affiliates and clients. These are also sales catalogs that aid your sales.

In the context of vehicle sales, vehicle cataloguing creates many sales opportunities. Apart from your available vehicles, this is about sourcing vehicles you can market, whether there are available clients for them or not. The truth is that no vehicle dealer has every vehicle in their lot, no matter how financially comfortable they are. So is every other business. To feel the vacuum of unavailable vehicles, you must network with affiliate dealers so as to cover their vehicles and add them to your catalog. Of course, the more catalogs you have, the more options you have for your clients and the more sales you will make.

Means Of Cataloguing Vehicles

Through physical coverage

This is done by visiting another dealer's lot and informing the person in charge that you are willing to cover their vehicles for marketing purposes. Remember that you can always apply what is being discussed here to your sector; thus, this coverage could apply to ships, aircraft, and robots. Some dealers might decline your request if you don't have a prior relationship with them, while others would accept it forthwith. Whatever the case, persevere to win the hearts

of these dealers so that they will always welcome you to cover their vehicles.

The best way to win the heart of a dealer is by being able to sell his or her vehicles after you have been allowed to cover them. This is all the more reason you must work smarter to make sales. Another way to win the hearts of dealers is to never exhibit a distrustful character, such as swindling a co-dealer of their sales commission or having a criminal record of any sort.

Online networking

This is a way to get pictures and information about vehicles from your online affiliates. A good example is the WhatsApp group and social media channels. The disadvantage, however, is that the sources of such vehicles may not be verified, and some may be ghost vehicles.

From relatives, friends, and well-wishers.

These are people who can call you up to sell their vehicles on their behalf. Some might release the vehicle to you, whereas others would prefer you cover the vehicle while they are in possession of it.

Through adverts

You can advertise at random and assist vehicle owners in selling their vehicles as an agent-dealer. As a result, people will contact you and seek your services. All things being equal, this will add up to your catalog. There are other ways you can catalog vehicles.

Data Cataloguing

In sales, cataloging is not limited to products alone. For instance, the information of every dealer you come across matters a lot. As a matter of fact, it must be profiled by and documented. This concerns their names, company names, office addresses, birthdays, and phone numbers, especially WhatsApp numbers. Make gathering this data a habit, and you will experience the business that comes with it. These data are very important for networking and prospective businesses. I have pointed out their utility in one of the subtopics. For example, you can use these phone numbers to create a WhatsApp group, a broadcast, or an SMS list.

You can create an email list of the email addresses in your catalog.

You can use their cataloged office addresses to create an automotive directory, and so on. It all depends on your priorities and business strategy. Similarly, cataloging clients' data is very important because it allows you to reach out to them for marketing and to appreciate them on special days, such as birthdays and marriage anniversaries. Get your clients' phone numbers and special days, such as birthdays, anniversaries, and special holidays like Father's Day and Mother's Day. Reaching out to them on these special days makes them feel special and recognized.

White Slate

By "White Slate," I mean doing it right without soiling your hand. The best and only way to succeed in any business is to uphold integrity and honesty. Though this is always hard to achieve, there is no substitute for it. You must be honest in all your dealings. This starts with a sincere declaration of your products and services. Don't state what you or your products are not; state it as it is! As it concerns vehicle sellers, you must not make a false declaration about a vehicle. If a vehicle you are selling has an engine knocking sound, make it open to your client. If the catalyst is no longer in the exhaust pipe, do well to inform your client, etc.

The advantage is that doing this will earn you more trust from your clients, build a good reputation, and give you peace of mind. Conversely, concealing the bad state of a product you sell will do you more harm than good. For example, a client who is dissatisfied with a vehicle you concealed and sold to them will return it or even involve the police. You might win or lose in the case, but mind you, you have offended a client and have lost, which is tantamount to losing ten prospective clients. Thus, you must finish on a white slate. When it comes to dealing with dealers, it's more sensitive than dealing with clients. A higher percentage of dealers are behaviorally extreme, with criminal tendencies. Therefore, you must be very wise and meticulous while dealing with a dealer.

All transactions must be transparent. If a dealer refers a client to you, work hard to protect his/her interest and send his/her due commission afterward without delay. Money is so powerful that it can mislead you when you're not strong enough to resist its temptation. For example, there are some transactions you will close, only for you

to find out that the dealer who referred the client to you made twice what you, the owner of the vehicle, made. Years back, I sold a vehicle and made 400,000, whereas the agent-dealer made 2,000,000. I couldn't contest it because I had already given the dealer price, and he worked him out. Although there was a great temptation to hold up the money, integrity demanded otherwise. You must trade on a white slate. You must not soil your hands for any reason. From your artisans to co-dealers and clients, they must all be treated with utmost sincerity. Don't give in to the temptation that comes with money. Don't swindle others, so you don't get swindled.

When your integrity is tested and proven, it will open many opportunities for you. Dealers and clients will entrust you with vehicles. Even artisans can convince their customers to either sell their vehicles to you or drop them off with you. Thus, your integrity is a by-product of your success.

Marketing (basic)

Sales are the backbone of every business. Every company works tirelessly for every hour to make sales. For this reason, marketing is very important in actualizing sales. Here, I will teach you the basics of marketing your vehicles. And, of course, this applies to other sectors as well.

In this new age, online marketing is the best way to market your vehicles. The era of physical vehicle displays is fading. For this reason, if you want to break even in the industry, you must master online sales.

The following are online platforms through which you can market your vehicles:

Classified websites

Classified sites such as Copart, Autotrader, Cars.com, CarGurus, Autohub Africa, Jiji, Carmat, Nairaland... It all depends on the country you are operating from. The point is that automobile classified sites are one of the sales platforms where you can list your vehicles and prospective buyers.

WhatsApp groups and status

This is very effective when gainfully utilized. WhatsApp groups are probably the most effective marketing platform, as their results are overwhelming. Similarly, WhatsApp status works magically; people will contact you when you post your vehicles and related information, including details about your status.

Social media channels

Social media channels like Instagram, Facebook, TikTok, YouTube, and others are very useful for online sales, as they attract more clients and drive more sales. In this chapter, we have discussed online sales platforms, their functions, and how best to use them under “Sales Channels.” You can page back or scroll up to read more about them.

Offline marketing

This is also important as you can close up transactions through it. You can attract clients through the vehicles you sampled in your lot. You can also market offline to your friends, relations, club members, Church members, neighbors, etcetera. You can market to this category of people in person or through other channels, and they can deliver volumes.

Marketing (advanced)

Under advanced marketing, you may have to go beyond the norm. At this point, you ought to have profiled your company to a credible level, such as obtaining relevant certifications.

It depends on the sector you choose to start your automotive business career in. However, the following are the relevant certifications and documents you should have:

- Certificate of incorporation.
- Tax Certificate.
- Certificate from the Association Of Motor Dealers of Nigeria (AMDON). This concerns vehicle dealers.
- Certificate From the Special Control Unit against Money Laundering (SCUML).
- Government licenses, like a dealership license, as it concerns vehicle dealers.
- Others, as it is relatable to your sector.

With these requisite certificates, you can advance to advanced marketing. In advance marketing, you will exceed the norm; for example, you can supply 100 units of humanoid robots to the Brazilian government at a price, whereas under basic marketing, you would sell to an individual at a higher price. As a vehicle dealer, you will exceed selling one vehicle at a time through advanced marketing. At this point, you can sell more than 100 vehicles at a time; it all depends on your efforts.

The following are targeted clients for advanced marketing:

Corporate organizations: Corporate organizations such as banks, hotels, telecommunications companies, oil companies, and schools.

Non-profit organizations: Such as Churches, NGOs, Humanitarian organizations, etcetera.

Corporative societies: Corporative societies from Government parastatals, companies, etcetera.

Government: This includes all Government parastatals and ministries.

International affiliation: This relates to your relationship with automotive dealers overseas, such as in America, Canada, Japan, and the UK. This also involves overseas automobile manufacturing companies, automobile marketers, and individuals.

In advance marketing, you must present yourself as officially as possible. Among the prospects listed above, aside from that of “individuals,” one approach applies to all of them. And the approach is through “a business proposal.” When you believe you can sell your services or other products to any of the prospects listed above, you would have to draft a proposal and submit it to them. Follow up until you register a positive result. After your proposal is accepted, based on your prospect’s request and the nature of the proposal, you must follow up with a high level of professionalism. Prepare thoroughly for execution and calculate every step with precision.

There are so many things you can submit proposals for besides selling and buying vehicles. It all depends on your area of interest. You can read down to where I talked about the things you can do in the automobile industry aside from selling and buying vehicles. Well, whichever you choose, you need the prospects I listed above for advanced businesses. They are the prospects that will give you big

businesses. As I stated above, the first and official approach to this client category is to draft a proposal and send it to them.

Consequently, you must know how to write jaw-dropping proposals. To prepare you effectively for this, I will teach you how to write business proposals. I will be brief about this because I believe you already know how to do it. However, I will discuss the key aspects theoretically.

First, you have to create your company's letterhead after the name on your CAC certificate. The reason it has to be after the name on your CAC is that banks and other sensitive organizations usually dishonor a company's letterhead when the name on it is incongruent with the name on the CAC. On your letterhead, include your company's logo, name, address, contact phone number, email address, and social media handles.

In writing a proposal, be convinced that you have a good knowledge of what you're offering, the service that you want to render, or the business that you want to go into with your prospects. The amount of knowledge you have in what you are offering determines your confidence in following up on the proposal and its outcome. Before you start writing your proposal, determine the subject. The subject is important because it provides an overview of the proposal. So, having chosen the subject, you can then proceed with the letter. Write the date on the top right corner of the letterhead, just below the graphics margin. Then address the letter to the direct recipient, who could be the Manager, CEO, MD, Secretary, Procurement Manager, Sales Manager, etc. Write it on the left top of the letterhead, just the following line after "date," and then write the prospect's address below it. After this, write a pre-subject greeting such as "Dear Sir, Good day, Madam, Greetings to you, Hi, Hello Sir," etc. Then, it is time to write the subject, which must come in capital letters (although small letters can still be tolerated when underlined).

Examples are: A PROPOSAL TO SUPPLY 100 UNITS OF THE 2030 MODEL OF IVM IJELE TO YOUR COMPANY, A REQUEST TO PARTNER WITH YOUR ORGANIZATION FOR SPACE EXPLORATION, AN APPLICATION TO INTRODUCE YOUR NEW BRAND OF VEHICLE INTO THE NIGERIAN AUTOMOTIVE MARKET, and so on. You can bold the letters for a better distinction. After the subject comes the body of the proposal;

write after this pattern in the body of the proposal, although it all depends on the purpose of the proposal:

- What do you want from your prospect, what do you want to do for your prospect, or what business relationship do you want to go into with your prospect?
- Your experience and capacity in what you're offering, if possible, include similar things you have done in the past with other organizations.
- Close the letter by telling your prospect of your anticipation for his/her response, and then add "Thank you" below. Then sign below "Thank you" and write your name and your position in the company. You can apply for authentication using your company seal. In the body of your proposal, don't exaggerate your capacity; state it as you are and be sincere in whatever information you have to give about you and your company.

Follow up your proposal for approval with professionalism. If your proposal is eventually approved, do everything within your capacity to impress your client/business partner. The reason is that when the first business is executed with utmost diligence and transparency, it will pave the way for bigger businesses.

Absorbing Sales Bounce

Like in every business, there is a time for acceptance and rejection. A "bounce" occurs when a client declines your business offer or proposal. This decline could be due to so many reasons you may not even imagine. It's because of this that we will be discussing some factors that led to a sales bounce. Experiencing a bounce can lead to disappointment and discouragement. However, studying what led to a bounce is more critical than being entrapped in its effects. Below are things that lead to a bounce or may lead to a bounce: (I will use vehicle dealers as a case scenario here, and of course, it applies to other sectors as well).

Over-value

This is an exaggeration or a false declaration of a vehicle that you are offering. These are the most common reasons you may receive a bounce. Clients are often disappointed when a highly presented vehicle falls short of expectations. For this reason, avoid hyping

your vehicles for sale; always state them precisely as they are. When taking photos of a vehicle, for example, take them naturally. Don't filter or edit the images to make them appear more attractive. In fact, it's better for a vehicle to be under-presented than over-presented. When a client eventually comes to inspect a vehicle that was underrepresented, he or she will be wowed. As a result, his/her expectations will be exceeded, and the transaction will consequently be successful. Meanwhile, this applies not only to the vehicles you are selling but to every other aspect of your business engagement. For example, when you are writing a business proposal, don't claim what you are not; otherwise, your prospect will be disappointed, and a bounce is inevitable.

Overpriced

Yes, an overpriced vehicle can attract many bounces. Similarly, if a client requests a quotation after accepting your proposal, consider your pricing and don't overcharge. You have to understand that you have competitors and that most clients conduct market research beforehand.

Faulty state

If your vehicle is faulty and you didn't fix it, disclose it to your client before inspection, or reduce the vehicle's price to cover up the fault, you will receive a bounce. Therefore, fix your vehicles before you put them up for sale. Conversely, ensure the vehicle's price is proportionate to its condition. This is why you must determine a vehicle's state before buying it. If you don't know much about vehicle mechanisms, you can hire an automotive mechanic to inspect a vehicle on your behalf and give you a report on its state. This will guide you in your bargaining as well.

Client options

A client's choice can also cause a bounce. Some clients are choosy about their vehicle choice, especially when it comes to brand and price comparisons. Most clients, when checking online for a vehicle, usually have 5 or more options. As a result, they scan through until they find the best deal. To avoid a bounce, always make sure your vehicles are in top condition and at a good price. In addition, your

marketing skills will make your vehicle a client's choice.

Proxy buyers

A proxy buyer is someone who is sent to purchase a car or other items on behalf of the true buyer. Most often, this category of buyers cares more about their 'take-home' in the business. Consequently, they scrutinize everything; they want to buy the best vehicle and the lowest price. Thus, the likelihood of a bounce from this client category is high. Regardless, always make an effort to offer them a good deal by buying a good car at a reasonable price.

Bank-related issue

I have had occasions when I lost transactions due to a bank-related issue. This could result from poor network connectivity, issues with the bank account, or other factors. It can really be disappointing when this happens. I have had an occasion when a client (buyer) paid into my client's (car owner's) account, and the money sat for days. The client withdrew from the transaction and followed up with her bank for a reversal. I was to make so much money on the transaction, but its failure was a nightmare. I can't keep enumerating other similar experiences from failed transactions. Well, a palliative solution is to build a good relationship with your account officer, who will, in turn, make an effort to help should a bank-related issue threaten the success of a given transaction.

Unreadiness

A bounce can occur due to the client's unreadiness. Some clients are scanners who inspect and price cars for the sake of inquiries. Some may even be expecting unrealistic money, and in their

fantasy, they go about excitedly, inspecting and pricing vehicles in advance. For example, some folks will place football bets and, in anticipation, go window-shopping. This also applies to Internet fraudsters who, in anticipation of their odds-on victim, inspect and price vehicles.

Similarly, some clients are waiting for salary, gratuity, or any other source of finance, so they inspect and price vehicles in anticipation. Therefore, you must make an effort to identify this client category and manage your time with them.

Inability on your part

A poor delivery from you can bring a bounce. This concerns your sales experience and overall intelligence. Your technical know-how of vehicle mechanisms goes a long way toward helping you grasp your client's audience. The way you address a client is also a consideration. When you address a client poorly, it results in a bounce. So, you must be intentional and brilliant while attending to a client. In like manner, if you submit a proposal and, after your client accepts it, start performing poorly, it will lead to a bounce. The solution is to always prepare very well for every business engagement.

Bad record

If you have defrauded someone in the past, it will blacklist you; for this reason, you will receive a bounce. If you're known to always sell faulty vehicles, referrals will be few, and those who come to you regardless will come with a high level of caution; consequently, at the slightest mistake, a bounce is inevitable. This is why many well-known brands have recalled vehicles with factory defects, all in an effort to improve their reputations.

Poor presentation

Presentation is compelling in sales. This has to do with your dressing, your words, how you package your products and services, etc. Therefore, when you give a poor presentation, you will kill expectations and permanently lose the client. For this reason, you must master the act of presentation in sales. Make sure that you present yourself charmingly in appearance, character, and words. Above all, the most important thing is the satisfactory quality of your products and services. Make sure that your vehicles are well presented. I can't say you must ensure all your vehicles are faultless, because I know you can't achieve that for the sake of variety, given that you can buy any type of vehicle and resell it. For instance, you may buy a vehicle with an engine fault and choose to sell it in the same condition. You may also choose to fix it and sell it, just as the case may be. What is more important is whether the vehicle has a fault; you must present it to a client as is and at commiserate pricing. Regardless, you may choose to sell only top-notch vehicles with defined standards. Of course, there are so many automotive CEOs

who do this. For example, Coscharis and Globe Motors sell only brand-new vehicles, as do many other automotive CEOS. Selling brand-new vehicles saves them the stress of component faults and repairs. However, they would still have to address factory defects, which are covered by product warranties. Well, this is just in their category and business classification.

We have various vehicle dealers, each focusing on a specific category. For instance, the immediate opposite of the brand-new specialists is those who specialize in non-salvaged, foreign-used vehicles. The direct opposite of those who buy non-salvaged foreign used vehicles are those who buy salvaged vehicles from overseas, fix them locally, and resell them.

We have specialists in Nigerian used vehicles; they buy them, fix them, and resell them.

In like manner, we have those who buy salvaged Nigerian used vehicles from insurance companies and other sources, repair the damage caused by the accident, and resell them.

Finally, we have those who buy scraps in the Nigerian market or from overseas, butcher the vehicles, and sell the parts to vehicle part sellers, who will, in turn, sell the vehicle parts to vehicle end-users. All things being equal!

Competitors

When your client has options from your competitors, the likelihood of closing a transaction with that client becomes very slim, leading to a probable bounce. Well, the bottom line is that you have to work hard across the board to meet your clients' demands and expectations. You also have to study your competitors very well and build an advantage over them. Note that I used the word "build advantage"; I didn't say "compete." There is no competition in the automotive industry—there is only "distinction!" Set a standard and make your products and services stand out. Regardless, your competitors' products are as good as yours when you understand the power of partnerships, affiliations, and networking in business, especially in sales. So, in a quote, your "competitors" products are also your products because you can sell them to your clients and make some gains.

Agent dealers

Most often, a bounce comes from the money loaded onto the vehicle that the agent-dealer is selling. For instance, you can give an agent dealer a car for two million naira, and he or she might load five hundred thousand naira on it. As a result, the vehicle will be overpriced, and clients often frown upon it. Well, I'm not against an agent dealer loading money in a vehicle because I'm an agent dealer, one way or another. Even if I'm not, it is not a bad practice. My concern is that before such a large amount of money is loaded, the agent-dealer in charge ought to have determined the client's financial capacity and spending will.

Also, the agent should follow up on the inspection to help convince the client. Please don't refer a client to a car owner or dealer when you're overloaded. The reason is that the end result always falls short of expectations. This is because the dealer or the vehicle owner to whom you referred a client will calculate what commission is appropriate for you and then work that out, which might be against your expectations. For example, you might be expecting three hundred thousand naira for a transaction of two million five hundred thousand naira, and the dealer or vehicle owner later gave you one hundred thousand naira. In this situation, you won't have a choice but to accept the commission. However, the story would have been different if you had gone with your client. You would have been able to manage the transaction, and as such, you met your target.

Meanwhile, I want to use this opportunity to address dealers who determine an agent's commission without first discussing it with the agent. It is wrong and a betrayal, of sorts.

When you want to reduce the amount loaded by an agent dealer on a vehicle in order for the transaction to go through, it is advisable to reach an agreement with the agent dealer before you make such a decision. This is fairer than making a decision on behalf of an agent-dealer, only to call him after the transaction is closed to inform him of the token you created for him. It is undesirable and should be discouraged. I understand that some agent dealers have marred many transactions due to their heavy loading, but we just have to remember that we are one body in the industry and should have each other's interests at heart. And to you, agent dealers, be realistic with your loading and avoid causing a bounce. Or, follow your client

on inspection, act as the principal that you are, and go home with your expectations.

The above are just a few factors that drive sales bounces in vehicle sales. Regardless of the above bounce triggers, what makes you a great salesperson is your ability to absorb a bounce and embrace corrective measures. Personally, I have absorbed so many bounces, and some of them were heart-wrenching. Some will come at the point of payment, and some will come up when you had believed 100% that a transaction had been closed. Well, whatever the case, a bounce provides an opportunity to reposition. Meanwhile, in the presence of a bounce, don't chicken out; instead, outsource a similar product (when your client is willing to wait), sell it to them, and then earn a commission. This is another reason we should have vehicle catalogs in our repertoire.

Receiving Sales Commission

This is the last step in a transaction, and it's the crown of your efforts. Sales commission is the money you earn from the sale of a vehicle owned by a third-party agent, such as an affiliate dealer or a client. There are three types of commission: percentage, loaded, and pre-negotiation commission.

Percentage commission

This is a commission you earn from a given percentage of sales proceeds. For example, you negotiated a 10% commission on the total sales of a client's or an affiliate dealer's vehicle, and after a deal is closed, that would be paid to you. The advantage of a percentage commission is that both parties are on equal footing regarding the selling price. The client has the final say on the price, and the agent dealer has nothing to lose because his commission is a percentage. This is unlike the loaded commission, where the agent-dealer can influence the selling price.

Loaded commission

This is a commission you receive from loading money on the price of a vehicle above its original price. For example, if a client or an affiliate dealer gave you a car to sell on his behalf for one million naira, you then loaded the sum of two hundred thousand naira and

sold it to an end-user. Over this, you would make a profit of two hundred thousand naira. We discussed related experiences in this category in the preceding episode.

Pre-negotiation commission

As the name suggests, this is a commission you negotiate with the vehicle owner or the affiliate dealer in charge before a client bargains. This is how it works. For instance, if you have a client who wants to buy a client's or an affiliate dealer's vehicle of which you have the sole information and contact, you then condition (bargain with) the client (buyer) to give you a given amount of money as your commission in the business before you can give him or her the contact information of the client or affiliate dealer that is selling the vehicle.

Pre-sales commission, on the other hand, is given when a transaction is closed successfully and not the other way around. Pre-sales commission has many disadvantages that can deter you from completing the transaction. For example, the buying client can betray you in the end by paying less than the agreed amount, refusing to pay you at all, or going behind your back to buy the vehicle. The worst scenario is when the vehicle owner or an affiliate dealer in charge conspires to close the deal without involving you. They will give you the impression that the transaction failed, whereas they had dealt. This is another reason you must network with affiliate dealers who will have your best interest at heart at all costs. In addition, building a qualitative skill in following up on a transaction will go a long way in keeping you from being cheated.

Sales is the backbone of every business, and its scope is limitless. Aside from domestic marketing, try as much as you can to build a global marketing scheme. For example, having the network to market Canadian vehicles when you are in Canada, Japanese vehicles when you are in Japan, and American vehicles when you are in America, the UK, China, Dubai, Germany, Italy, etc. Making global marketing possible is not hard. It is as simple as understanding and applying my grassroots teachings for intending CEOs. The same system will allow you to catalog vehicles wherever you are in the world and market them on the sales platform available to you.

Professional Marketing

This involves strategic promotion of products, services, or brands through ethical, data-driven, and customer-focused methods to support sustainable business growth. It combines research, planning, creativity, and communication to understand customers' needs and deliver value effectively.

Foundations of Professional Marketing

Market Research

Professional marketing begins with thorough research, identifying target audiences, studying market trends, and understanding competitors to inform effective strategies. This research could be from an individual, a company, or a government parastatal like NADDCC. Comprehensive market research gives you all the data you need to plan and execute accordingly. I had discussed a related topic in chapter two of this book; all that was highlighted there could be applied to every aspect here as well.

Brand Positioning

This is all about how a brand should be perceived in the marketplace, creating a distinct image that resonates with the target audience and differentiates it from competitors. This is a broad bid and requires professional approaches.

Planning

Marketing professionally is all about developing clear goals, strategies, and metrics to guide campaigns, ensuring that every action aligns with organizational objectives.

Integrated Communication

This is using multiple channels like advertising, public relations, digital platforms, and events to deliver consistent and persuasive brand messages.

Customer Relationship Management (CRM)

Maintaining strong, long-term relationships with customers through engagement, satisfaction, and trust is central to professional

marketing.

Ethics and Integrity

True professional marketing emphasizes honesty, transparency, and responsibility — building credibility and fostering brand loyalty.

Performance Measurement

Regular analysis of marketing outcomes using key performance indicators (KPIs) helps refine strategies and improve return on investment (ROI).

Summary

Professional marketing is not just about selling; it's about building relationships, delivering value, and shaping perceptions in a way that supports long-term organizational success.

Saving Money

Sales and marketing are the lifeblood of all businesses, but it's fruitless without saving up for the gain thereof. There won't be any progress without savings, no matter how good you are at sales. In fact, even if you run clearance sales daily, your business will not grow, and you will live in penury. This episode is essential, as it lays the foundation for your success in this industry. Unfortunately, the nature of this business leads a potential CEO to believe that money will always come. In truth, the money will always come as long as you work hard to close transactions. However, when this money comes, regardless of the amount, it is limited in the absence of preceding savings. In other words, whatever you make in a transaction is already shortened when you don't have money saved up. Therefore, you must make spirited efforts to save money on every deal you close. You may start this by setting a target for yourself on a weekly, monthly, or quarterly basis, just as the case may be. For instance, if you buy vehicles or other automotive products and resell them, and you have the financial capacity to buy three products, develop a predetermined plan to increase that to six as quickly as possible. Of course, a starting point for saving is cutting down on non-pressing expenses like womanizing, social gatherings, impulsive purchases, and showing off.

I know some people who have been in vehicle sales for years, and most of them cannot boast of owning a vehicle today. They kept marketing and collecting sales commissions without a sense of saving up to buy their own vehicle. You must do everything possible to save up. You can start a little. I can remember when I started, I had so many responsibilities that it immediately took away any money I made. As a result, I was unable to save up. Realizing that not saving up would keep me in a circle, I vowed to save 10% of every money I made. This decision was not easy at first, not because of the 10%, but because it was a poor amount to save up. Regardless, I maintained consistency, and over time, I increased the percentage, and the rest metamorphosed into what I am today.

Thus, you must discomfort yourself and start saving, no matter how little. Take a country's government, for instance: it engages in many multilateral activities, but in the end, what determines its growth is its currency and economic reserves. Thus, the crown of sales is savings for reinvestment.

Reinvestment

Reinvestment simply means using earnings —such as dividends, interest, capital gains, or cash flows — from an investment to purchase additional assets, expand your current business, or establish a new business, rather than taking them as income that has to be spent on needs. It is a business strategy aimed at growing wealth over time. Depending on an individual's interests and the type of business, there are different ways to reinvest profits. Before then, I would like us to discuss the reinvestment types therein.

Types of Reinvestment

Capital gain: This is the use of profits from the sale of assets, such as stocks or real estate, to buy new assets. An example is selling Dangote shares at a gain and buying Tesla shares, or selling a house in Dubai and buying another in the UK.

Cash flow: This is the reinvestment of profits from a business into expansion or other profitable ventures. An example is Amazon reinvesting revenue into Amazon, Blue Origin, or a new business entirely.

Dividend: Divided reinvestment automatically uses dividends to buy

more shares of the same stock/fund. However, in rare cases, a dividend can be withdrawn and reinvested into a business, depending on the amount involved. An example is reinvesting Microsoft dividends to own more Microsoft shares.

Interest: This is a reinvestment method in which you earn “interest on interest,” like with bonds, CDs, and savings accounts. An example is when a bond paying 5% annually compounds to 7.5% when the interest is reinvested.

Benefits of Reinvestment

Compounding growth

Earnings are generated over time. This means that a profit well reinvested is also a profit awaiting.

Curtailing unprofitable expenditure

When profits are reinvested immediately, unnecessary expenditures are discouraged.

Focus

Reinvesting a profit realized gives you a sense of focus toward actualizing your business's ultimate goal.

Limitless achievement

When you reinvest, you earn; all things being equal, your business growth will be boundless.

Summary

Money earned and spent threatens capitalization. To build a conglomerate and experience endless growth in your business, you must reinvest your earnings and starve all non-business expenditures.

Summary of Sales and Marketing

Sales and marketing are closely connected business functions that drive revenue and growth. Marketing focuses on understanding customer needs, building brand awareness, and creating demand through strategic communication, advertising, and market research. It sets the stage by attracting potential customers and positioning

the product or service effectively in the market. Sales, on the other hand, involves direct interaction with customers to convert that interest into actual purchases. It focuses on building relationships, addressing customer needs, and closing deals.

Together, sales and marketing create a continuous cycle; marketing generates leads and nurtures interest, while sales turns that interest into results. When aligned, they enhance customer satisfaction, strengthen brand loyalty, and ensure sustainable business growth. So many automotive brands have been very professional in their sales and marketing. Toyota, Mercedes, and a few other brands adopted smart systems that gave their brands acceptance. There is a spree of new automotive brands fighting for acceptance in Africa. Brands like Changan, Kantanka, Nord, Kiira, IVM, GAC, MIKANO, and many others.

A brand I admire for its sales and marketing strategy is GAC. GAC has implemented some unusual efforts to gain acceptance. For example, the LaGride with Lagos State Government, Davido's signing as an ambassador, exhibitions, constant advertisements, and reviews. Thanks to the managerial skill of Mr. Jubril Arogundade, GAC's sales and marketing efforts are already gaining traction. At least one can count on the average GAC vehicle out of 30 in Lagos and Abuja. It is not a surprise that Mr. Jubril was nominated as the Managerial Strategist of the Year in Autohub Africa's 2025 Automotive Award.

The professionalism and dynamism of sales and marketing are unlimited, and all forms are possible. The future of sales and marketing will be shaped by intelligent technology, hyper-personalization, and seamless global connectivity. Artificial intelligence will drive most sales processes, predicting customer needs, automating outreach, and enabling steady product recommendations across multiple markets. Sales teams will increasingly rely on data-driven insights, virtual selling environments, and AI-powered assistants to close deals faster and more efficiently.

Marketing will become more immersive and interactive, using tools like augmented reality, virtual reality, and holographic product experiences. Brands will build trust through transparent digital identities, sustainability commitments, and personalized customer journeys that adapt dynamically to behavior and preferences. Social commerce will dominate, with influencers, creators, and online

communities shaping buying decisions more than traditional ads. Globally, sales and marketing will be unified by borderless digital platforms, multilingual AI communication, and smart payment systems that allow companies to reach new markets instantly. The future promises a world where businesses connect with customers through deep personalization, intelligent automation, and global digital ecosystems, making growth faster, smarter, and more inclusive.

CHAPTER SEVEN

STARTING OPERATION

A thousand miles starts with a step, they say. As a result, it is time for you to start your business journey. Note that this topic applies to both beginners and established automotive dealers, as well as other automotive sectors, as long as the same system is applied. Buying your first vehicle can be euphoric and humbling at the same time. Nevertheless, you must take the bull by the horns and start the journey of your dreams. Meanwhile, the following are the things to consider before buying your first car:

Vehicles In High Demand

To avoid squashing the little money you have gathered to start buying your own vehicle, you must know the type and brand of vehicle that moves fast in your area. Without brand distinction, our country has three categories of vehicles: brand-new, foreign-used, and locally used. Just by their usage, the brand new has the lowest demand, foreign used is lower, and locally used is low. To put it another way, locally used vehicles have the highest demand, followed by foreign used and brand-new vehicles. Empirically, starting with locally used vehicles is a good business for a beginner. This will heighten your turnover and profit margin.

Thus, I advise beginners to start with locally used vehicles and progress to other categories as their capital grows. Conversely, if their capital is fat, they can start with either brand-new or foreign-used vehicles. Meanwhile, each category has advantages and disadvantages. For instance, you make more money buying

brand-new and foreign-used vehicles. As a matter of fact, the government and some corporate establishments can only purchase brand-new vehicles. As a result, you will lose out on the patronage of these categories of clients. Nevertheless, torrent purchases from locally used vehicles cover whatever gain thereof on brand-new and foreign-used vehicles, respectively. In conclusion, locally used vehicles move faster than other categories, so a beginner should start with them for quick sales. However, it is demanding because it's very difficult to source good locally used vehicles. You can always hire an automotive mechanic to inspect a prospective vehicle on your behalf. Alternatively, you can hire inspection specialists, such as Autohub Africa's OAS inspection services.

Budget

Here, I will not state the minimum or maximum budget you should have; rather, I will tell you how best to use whatever budget you have. Whatever your budget, always buy vehicles in smaller amounts. They are faster to sell, and you can make equivalent money or even above what you would have made on a big vehicle. Buying smaller vehicles affords you the purchasing power to buy more vehicles at a time. It is better than buying a big car that will take time to sell, and you might end up profiting less than you would have with a small vehicle. It all depends, though. Meanwhile, the disadvantage of buying small vehicles is that most of them are already overused. As a result, unlike big vehicles, which are barely used by their owners, you would have to fix them to a standard before selling them. As a result, they are usually in a "buy and resell" state without having to fix anything.

Another consideration is the vehicle brands in higher demand in your location. In Lagos, for example, Toyota is leading, followed by Mercedes, Honda, Hyundai, Ford, and so on. Therefore, you must prioritize your purchases according to the brand's demand.

Vehicle Inspection Checklist

Before buying vehicles in your capacity, you must have the prerequisite vehicle maintenance experience. Meanwhile, if you don't have experience at all, which is a significant deficiency on your path, you can hire a mechanic or the services of an automotive vehicle inspection specialist. Whatever may be the case, you must be careful

not to bargain high for a vehicle with hidden faults or obvious faults that you didn't ascertain. Always be vigilant and curious to ensure you pay the exact value for a vehicle. Because a single mistake you make when buying a vehicle can eat up all the gains you have ever made or, worse, your capital. Thus, you must be careful. On the other hand, a good deal can give you a tangible amount of money, thereby boosting your capital. So, vehicle purchases are highly slippery, and for this reason, you must approach them with introspection. The following are the things you must thoroughly inspect on a vehicle you want to buy:

Stage One

- Determine if the vehicle has been started for the day or not. This gives you a clue if the camshaft is making noise or if the oil pump is failing, and to ascertain the natural state of the engine.
- Check the engine, gear, brake, and steering oil gauge. Determining the lubricant gauge gives you a hint of a possible malfunction. For example, if you knew that the brake oil was very low, and incidentally, you stepped on the brake pedal, and it went flat, you would express less suspicion, knowing that inadequate fluid could cause it. This is unlike when you didn't know that the fluid was low. This also applies to the steering; if it's hard and you notice the lubricant is low, you won't raise eyebrows, knowing the oil shortage could be to blame. As for the engine, it will guide you. It will help you determine whether it is okay to start it. Of course, an engine can drain oil overnight for various reasons. For example, the owner may have driven the vehicle the previous night, unaware that something had hit the oil pan. It could be that the oil is leaking from the oil seal or between the top cylinder and the engine block, or it could be caused by something else. So, if you are ignorant enough not to have gauged the engine oil, you will start the engine inadvertently, which will likely damage the engine. Thus, checking the engine oil before starting the engine is very important during inspection.
- Check for engine and gear oil leakage, both outer and underneath: This is very important; you must determine if the vehicle has a trace of oil leakage, which could come from the engine, transmission, or lubricant hose or pipe.
- Start the engine and discern the sound. Engine discernment is

very sensitive, and it takes years of engine mechanical experience to discern and distinguish an engine's sounds. Yes, one thing is to discern an engine's sound, and another thing is to be able to distinguish the sound. For instance, you should be able to determine where the sound is coming from if it is from a camshaft, water pump, crankshaft, timing chain, pulley, roller, etc. So, your ability to discern and distinguish an engine's sounds will save you a whole lot in vehicle inspection. This will help you determine what is wrong with a vehicle's engine, thereby guiding you on its devaluation value. Personally, I can assess an engine's condition just by starting it; I don't even have to raise the engine to know. I will know as soon as the engine rolls. If I have to raise the engine, I will need to determine what has gone wrong further because the engine roll will definitely give me what I want.

- Determine error signs. Yea! After starting the engine, check the dashboard and note any error codes. Of course, determining the error signs gives you a clue about what has gone wrong in the vehicle.
- Scan the vehicle if necessary. Vehicle scanning is very important because it provides a clearer understanding of what has gone wrong with the vehicle, especially with complex components like the transmission, engine, and electrical system. I will take my time to explain how you can easily and effectively scan a vehicle. In the world of modern automobiles, where technology is advancing rapidly, vehicle diagnostics have become a window into understanding vehicle malfunctions and the best ways to fix them. This is very important when purchasing a vehicle, as it can save you a lot of money. For this reason, you must understand vehicle diagnostic devices and how to use them appropriately.

Vehicle diagnostic devices are advanced technologies that accurately assess your vehicle's condition using specialized tools and software. They enable the detection of hidden issues, monitor the performance of various systems, and even prevent potential breakdowns. Apart from the business aspect of diagnosing a vehicle, timely diagnostics play a vital role in extending its lifespan and ensuring its safety on the road. It enables prompt identification and resolution of problems, ensuring smooth, efficient operation of the engine, safety systems, and vehicle electronics. Thanks to regular computer-powered diagnostic devices, you can always keep an eye

on your vehicles and ensure 100% smooth operation.

Diagnostic Devices

It all depends on how thorough you want your diagnostic practices to be, your level of curiosity, and your financial resources. It is ideal to get an advanced scanner to detect every fault.

I'm recommending the following diagnostic devices for effective results:

The THINKTOOL Expert 399

R140 875,00

The THINKTOOL Expert 399 is a brand-new 14-inch AI diagnostic device developed by THINKCAR in 2024. It features a unique design, an optimized UI, and a powerful TCOS system. The 399 supports RTC dual-vehicle diagnostics with an additional VCI. It supports split-screen display to show data, modules, etc., and is capable of diagnosing passenger vehicles, electric vehicles, and commercial vehicles. Specs include a 14-inch screen, 256GB ROM, 8GB RAM, a 20MP rear camera, 41 maintenance functions, a 22,400mAh battery at 3.8V, and the TCOS operating system.

ANCEL AD410 Enhanced OBD2 Scanner

This is an easy-to-read screen with a simplified diagnostics method. It is compatible with all OBD-II cars made after 1996 and has a user-friendly interface with quick setup.

Innova 5610 OBD2 Bidirectional Scan Tool

This device comes with free updates that keep the tool current.

Support is available quickly from a US-based team.

Bidirectional control for comprehensive diagnostics.

Innova 5110 OBD2 Scanner with ABS and Smog Check

Compatible with vehicles from 1996 to 2022.

Provides free updates and verified fixes.

Compatible with both iPhone and Android devices.

TOPDON AD500 OBD2 Car Diagnostics Scanner

Comprehensive diagnostics for engine, ABS, SRS, and transmission.

It supports advanced resets, including oil, throttle, SAS, and TPMS. Free software upgrades for enhanced functionality.

FOXWELL NT624 Elite Car Diagnostic Scanner

Comprehensive diagnostic coverage for all car systems.

Includes lifetime updates for enhanced tool longevity.

User-friendly interface with clear, easy-to-read display.

ANCEL AD530 OBD2 Scanner Diagnostic Tool

Enhanced code definitions for precise diagnostics.

Visualizing battery status for simple tracking.

Comprehensive OBD2 functions with a user-friendly interface.

BlueDriver Bluetooth Pro OBD2 Car Scanner

Seamless compatibility with both iPhone and Android devices.

Offers detailed, professional-level diagnostic information.

User-friendly app offering clear, actionable insights.

Diagnostic Software

The software on your diagnostic device determines what you can detect. This is because it offers versatility, comprehensive search capabilities, accurate fault reading, quick clearing, a user-friendly dashboard, and customizability. Below are some good diagnostic software options:

OBD Fusion: OBD Fusion is a popular app for iOS and Android that allows users to create custom dashboards, read DTC codes, and estimate fuel economy.

Torque Pro: Torque Pro is an Android app that provides real-time data monitoring, customizable dashboards, and support for a wide variety of vehicles.

Car Scanner: Car Scanner ELM OBD2 is an app available on the Apple App Store for both iOS and Android, offering DTC reading, data logging, and more.

FORScan: FORScan is Windows-based software specifically designed for Ford, Lincoln, Mazda, and Mercury vehicles, offering advanced diagnostic and programming features.

OBD Auto Doctor: OBD Auto Doctor is an app available for both Android and iOS that provides basic OBD-II diagnostic functions.

Carly OBD-II Scanner: Carly provides an OBD-II scanner and companion app for various car brands, featuring live data, coding, and service resets.

Types Of Vehicle Software

Electrical wiring diagram

This software is used to create and visualize a vehicle's wiring diagrams. It helps engineers design wire routing and connections, ensuring proper functionality and compliance with safety standards. This software is very useful for auto-electricians, as it provides diagrams of a vehicle's electrical wiring, from the taillight to the brainbox. Determined and tactical electricians make use of this software.

Vehicle network management

This type of software manages the vehicle's communication networks, including the Controller Area Network, Local Interconnect Network, and Ethernet. It helps to monitor, diagnose, and configure the network, including the wiring connections.

Computer-Aided Design Software

Computer-aided design software is used in the initial design phase to model the vehicle and its components, including the wiring harness. It allows engineers to visualize the routing and placement of wires within the vehicle's structure.

Electronic Control Unit

The electronic control unit software controls various functions in a vehicle, including the electrical system. The software within the ECU manages the signals and data flow through the wiring harness, ensuring proper operation of connected components.

Diagnostic Tools

These tools are used to diagnose and troubleshoot electrical issues in a vehicle. They can access and analyze data from the vehicle's network, allowing technicians to identify wiring problems and their causes. We have discussed well about this type of software above.

Others are

Engine Control Software (ECU/EMS): Manages fuel injection, ignition timing, and emissions to optimize engine performance and efficiency.

Transmission Control Software (TCU): Controls gear shifting and transmission behavior for smooth driving and fuel economy.

Brake and Stability Control Software (ABS/ESC): Ensures safe braking and maintains stability during sudden stops or slippery conditions.

Infotainment System Software: Powers navigation, media, voice commands, and smartphone connectivity features.

Advanced Driver Assistance Systems (ADAS): Supports safety functions like lane-keeping, adaptive cruise control, and collision avoidance.

Battery Management Software (for EVs): Monitors and regulates battery health, charging, and temperature in electric vehicles.

Telematics and Connectivity Software: Enables GPS tracking, vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication, and remote diagnostics.

Module SoftwareBody Control: Manages lighting, windows, wipers, locks, and interior electronics.

Autonomous Driving Software: Uses AI, sensors, and cameras to enable self-driving or semi-autonomous functionality.

Connecting To The Vehicle

To initiate the diagnostic process, you must connect your scanner or computer to the vehicle's OBD-II (On-Board Diagnostics) port, which is typically located beneath the dashboard. After establishing the connection, the diagnostic device retrieves data from various vehicle systems, including the engine, transmission, brakes, and electronics. The obtained data is analyzed using specialized in-built software that compares current parameters with standard values and identifies any deviation. A report is generated based on the analysis's results, providing information about detected malfunctions and recommendations for their resolution.

Analysis And Interpretation Of Results

When the diagnostic exercise completes data retrieval, the next stage

is to analyze and interpret the results. This stage plays a crucial role in identifying issues and providing a comprehensive picture of the vehicle's condition. Let's explore the problems that can be identified and how diagnostic software aids data interpretation.

Problems That Can Be Identified

Engine malfunctions

Diagnostic data can reveal problems with the ignition system, fuel delivery, sensors, and other engine parts.

Transmission troubles

Diagnostics can identify transmission problems, such as issues with the gear, clutch, sensors, or lubrication.

Brake condition

Data can offer insights into brake pad wear, hydraulic system pressure, ABS malfunctions, and more.

Electronics and sensors

Diagnostic testing helps identify issues with electronics, including fuel level sensors, oil pressure sensors, the anti-lock braking system (ABS), and others.

How Diagnostic Software Aids In Data Interpretation

Comparison with norms

Diagnostic software compares retrieved data against manufacturer-defined standards to identify deviations and issues.

Report generation

After analysis, the data is shown in reports that visualize the condition of different vehicle systems and make the information easier to understand.

Repair recommendations

Diagnostic software can provide recommendations for fixing identified problems and maintaining the vehicle. The accuracy and

reliability of result analysis and interpretation in computerized car diagnosis help enable informed decisions about further maintenance and repairs.

How Errors Are Handled

Error codes

The diagnostic computer produces codes that identify specific problems with the vehicle's systems. Experts examine these codes thoroughly to understand their nature.

Data interpretation

Diagnostic data is analyzed with specialized software, enabling accurate identification of the causes of malfunctions. However, if the code is difficult to interpret, you can copy it and search for it on Google. In most cases, it will clarify the malfunction for you or direct you to YouTube or another site that explains the code in detail. When inspecting a vehicle for purchase, the code result will guide your decision about interest and the offer you will make for the vehicle, based on how much it will cost to replace the faulty part. Regarding the end-user's vehicle maintenance routine, vehicle diagnosis is highly beneficial because it helps you preemptively determine exactly what to do. It also enables you to apply pre-engineering technical knowledge, ensuring your vehicle's reliability and longevity.

Automotive Mechanical Tools

Automotive mechanical tools are essential for building, maintaining, and repairing mobility systems across land, air, sea, and robotics. For cars, tools include torque wrenches, diagnostic scanners, hydraulic lifts, and advanced engine calibration devices. Aircraft rely on high-precision tools such as borescope cameras, torque multipliers, composite repair kits, and aviation-grade fastening systems. Ships require heavy-duty marine tools like engine alignment equipment, ultrasonic testers, hydraulic torque tools, and propeller maintenance devices. Robots are assembled and serviced using specialized tools such as micro-precision screwdrivers, sensor calibration kits, and actuator testing instruments.

Across all sectors, traditional mechanical tools are being enhanced

by digital intelligence. Today's tooling integrates electronic sensors, automated diagnostics, AR-assisted repair systems, and real-time calibration software to improve accuracy and reduce human error.

The future evolution of mechanical tools will be defined by AI-driven automation, smart tool ecosystems, and advanced materials. Upcoming innovations include self-calibrating tools, robotic tool arms for automated maintenance, quantum-precision measurement instruments, digital twin-guided repair systems, and wearable AR/VR interfaces that project step-by-step holographic instructions directly onto machines. Nanotools and micro-robotic repair units will eventually perform maintenance inside engines and complex machinery without disassembly.

Ultimately, automotive mechanical tools are evolving into intelligent, interconnected, and highly precise systems, enabling safer, faster, and more advanced maintenance of vehicles, ships, aircraft, and robots, pushing the boundaries of future mobility.

Conclusion

Modern vehicles rely on a wide range of software systems that control performance, safety, comfort, and connectivity. These programs work together to make cars smarter, safer, and more efficient. The above tools are excellent for practical work. Meanwhile, others are lower in price than the ones I listed above, yet they are effective. It all depends on the individual's choice and what works for them. What is important is the ability to generate a given fault's code and read it appropriately.

Modern transportation and automation systems rely on highly advanced diagnostic technologies to ensure safety, efficiency, and reliability. Aircraft use integrated avionics diagnostic systems such as Aircraft Health Monitoring Systems (AHMS), vibration analyzers, engine trend monitoring software, and onboard sensors that continuously track engine performance, structural integrity, and flight control systems. Ships utilize marine diagnostic software like Condition Monitoring Systems (CMS), fuel analyzers, sonar-based hull inspection tools, and engine performance analyzers to detect mechanical faults and optimize navigation and energy use.

In the automotive sector, cars are diagnosed using sophisticated tools such as OBD-II scanners, manufacturer-specific diagnostic

computers, AI-driven vehicle health platforms, and advanced telematics systems that monitor emissions, electrical systems, and drivetrain performance. Robots rely on embedded diagnostics, AI-powered self-monitoring software, sensor health checks, and predictive maintenance platforms that assess motor function, actuator performance, and environmental feedback in real time.

The future of diagnostics across air, sea, land, and robotics will become far more intelligent, predictive, and autonomous. Systems will move from identifying problems to preventing them entirely. Future innovations will include quantum sensors capable of detecting microscopic structural weaknesses before they form, AI-powered predictive diagnostics that forecast failures months in advance, self-healing software that automatically repairs corrupted systems, digital twins, where virtual replicas of vehicles and robots run simulations to detect hidden issues, nanotech health monitors embedded in engines and machinery for real-time molecular analysis, cloud-based unified diagnostic platforms that connect aircraft, ships, cars, and robots into a shared global monitoring ecosystem, augmented-reality diagnostic glasses for technicians, displaying internal systems in real time, and autonomous diagnostic drones that inspect vessels, aircraft exteriors, or robotic infrastructures with high precision. These future systems will allow machines to diagnose themselves, communicate seamlessly, and maintain peak performance with minimal human intervention. That said, let's move forward with our inspection checklist.

- Check the exhaust to assess the engine's combustion, such as if it's smoking. This is important because engine smoke can reveal valuable clues about the engine's condition and other parts. White smoke usually indicates engine wear and tear, while black smoke might be caused by a faulty air-flow meter sensor. Sometimes, it could also be due to a broken exhaust pipe, sensor, or other issues. So, you must identify any smoke and determine what is causing it to guide your decision.

- Check for accident history; you can run the VIN online for this purpose, although this is just for the overseas record before it was brought into the country. You can look for physical impacts when conducting a domestic accident history check. Check the vehicle's chassis, boot, suspension, roof, and other body parts. If there is any,

you will know, and if there is one fixed and was improperly fixed, you will still know. This will guide your evaluation. Some vehicles don't require payment to check the VIN. Some yield results through a Google search. So, you can start by searching the VIN on Google. If it does not appear in the Google results, then consider paying for a VIN check. Additionally, there are VIN check sites that offer free services, which you may want to try before subscribing to a paid service.

- Check the overheating history: The main ways to determine if a car's engine overheated previously are to see if the radiator has water mixed with oil or if the cylinder has been opened before, showing a non-factory gasket and gum.

Stage Two

- Perform an eye scan of the body and walk around the vehicle 360 degrees. This gives you a broad view of the vehicle. It can help you determine if the car is still new or has been used extensively. This observation focuses only on the body, not the vehicle's mechanism. Some vehicles may appear new and clean on the outside, but their mechanical components may be in poor condition.
- Determine if any part of the vehicle has been painted locally. Yes, examine the vehicle's body closely to see if it has been repainted in specific areas. Of course, the value of a vehicle that has been repainted locally differs from one with original factory paint. This repainted vehicle falls into different categories; some have been painted once, some twice, some three times, and some even more. Therefore, you should be able to determine how many times the vehicle has been repainted and how much filler it has used. This will help guide your evaluation.
- Check underneath for rust or damage. Yes! Look under the vehicle to see if it shows signs of rust. Common vehicles with rust are Canadian and flood-damaged vehicles.

Stage Three

- Check for the seat if it's torn, faded, or re-sewed.
- Check if the dashboard has scratches or if it has been re-folded.
- Check the air-conditioner vents if any are broken.
- Check the roof upholstery for tears or sagging.

- Check the inner floor and the boot floor; determine if there is water leakage on the floor and the boot.
- Check the state of the door and boot mats.
- Determine the function of the tapping glasses and body sensors, such as the parking sensor, power boot, mirror automation, reverse camera, navigation system, etc.

Check the air conditioner to see if it is cooling well. Most vehicle owners will tell you that a faulty air conditioner is either short on gas or has none at all. Well, 99% of the time, it is not the gas. A functioning vehicle cannot lose gas because the gas circulates and does not evaporate unless the vehicle has been unused or parked for more than a year. Therefore, when you want to buy a vehicle, and the owner tells you the fault is the air conditioner, just keep in mind that you will either fix the compressor, condenser, leaks, valves, pipes, or more. Nevertheless, an Air Conditioner can have low cooling performance due to inadequate refrigerant levels resulting from long use, minor leaks, or an expired evaporator. However, this is how you will know if it is a gas-related issue: The passenger's air conditioner vent will still be producing faint cooling.

- Check the stereo, reverse camera, and other interior accessories.
- Check the seat's adjusting buttons and determine if they are functioning.
- Check the furniture and determine any damage or fading. Note that some furniture is resprayed, and if you are not good enough, you would think it is factory-made. You have to determine this because it amounts to devaluation.

Stage Four

- Test drive the vehicle.
- Monitor the RPM to comprehend the transmission. Use the revolution counting of the RPM to determine the function of the transmission, not by the mechanical sound, as many do. The reason is that modern vehicles produce little sound or vibration during transmission.
- Check the thermometer for overheating. To determine this, you may have to drive the vehicle for over thirty minutes.
- Determine the function of the steering. Note that bad electric steering can make noise that sounds like the vehicle's suspension.

If the steering makes noise when you raise the engine or turn the steering wheel, the pump is bad. The rack is faulty if it is hard and drags your hand beneath.

- Determine the function of the brake: If there is a brake error sign on the dashboard, it has given you a clue about a probable brake malfunction. Although brake error signs can be minor, such as a lack of lubrication or bad ABS sensors, in some cases, they can indicate a major fault, such as the ABS, master, or shaft, or other expensive sensors.
- Run on kick-down and slow running. While driving, pedal the intermediate to determine if the differential is kicking.

• Determine the suspensions, if possible, run on a rough road: This is very important, as well as your ability to discern a particular fault. You must know if the noise is from the shaft, shock absorber, leakage, ball joint, tie rod, connecting rod, axle, differential, wheel hub, etcetera.

All of this can produce sound under a vehicle when it malfunctions. It is up to you to determine which is the best. This is why you must understand vehicle mechanisms very well.

Stage Five

- While the vehicle is parked, engage the drive and reverse (D/R) gear and discern the loading sound. It is important that the engine be at a high temperature at this point. If there is an unnatural loading sound, determine the cause, which could be due to bad gear, shaft, engine sitting, etcetera.
- Check again for traces of oil leakage: This is important now that the engine temperature is high. As a result, the lubricants will become very light, which, in turn, will cause leaks.
- Discern the sound of the engine again: Yes, now that the engine is hot, raise it again and discern the sound that it produces. The reason is that some engine faults cannot be detected until the engine is hot, especially top-cylinder-related faults.
- Check the exhaust combustion: Check again if the vehicle's exhaust is emitting smoke. You can tell the owner to raise the engine for you while you observe the exhaust smoke. You can keep your fingertip in the exhaust pipe to determine the color and amount of smoke it produces.

White smoke indicates that the engine is weak; wear and tear are coming from the metal/rings, the pistons, or both. Black smoke, on the other hand, is usually caused by a malfunctioned airflow meter sensor. Note that these smokes could be caused by factors other than the common ones listed above. And finally, take the initiative to check and inspect other things that might not have been listed here.

Conclusion

Vehicle inspection is very important and should be handled with great introspection. Ensure that you inspect every vehicle unhurriedly. Ignore persuasions from vehicle owners because they will talk you into believing that everything about the vehicle is perfect. So, you must know what you want and avoid bringing up emotions about it. Be serious and determine the condition of the vehicle in totality.

How To Handle Your Vehicle

At this point, you must know how to handle vehicles in your possession. You must know how to fix a faulty vehicle using the right artisans. Always fix your vehicles to a high standard so you can receive positive testimonials from your clients, and, of course, this brings in referrals. Learn how to manage the car wash people, too. Make sure you use an experienced car

wash so they don't give you bad service instead of good. Ensure the person understands where the brainbox of a given vehicle is located so he can cover it and other water-vulnerable components. He should avoid using a pressure hose directly on the engine, as this can affect the plugs and coils. Always drive every vehicle that has been washed very well, so the plugs can burn, except when the engine has not been washed. Regardless, it is advisable that you drive your vehicle after every wash so the sparking components can dry up water and fire well. You have to know a little bit about a vehicle's mechanics, such as how the RPM gauge works, how to monitor the thermometer, how to read dashboard error codes, and so on. You can refer back to where we treated vehicle error signs. Study the graphics carefully so you can understand the message behind each error sign. You can also carry out online research about it. Understanding an error sign is basic and very important.

Sales Ability

One thing is buying a vehicle, but another is being able to sell it. Thus, you must consider how you will be able to sell your vehicles after purchase. We have discussed this in previous episodes; you can page back for revision.

Long-Term Plan

When you are making arrangements to buy your first vehicle, it is ideal to align your plans with your long-term goals. We have discussed this in previous episodes. You can revisit it for a better understanding.

Register A Business Name With CAC

It all depends on the scale you started with. Whatever the scale, you can register your company before or after starting. What is important is that you register your company. You can engage a lawyer to process it on your behalf. The advantage of having your company registered is that clients and the general public trust it more. Secondly, your company will apply for certain things, but they will be declined because it is unregistered. Therefore, company registration is pivotal. You can register your company as a sole proprietorship, limited partnership, limited liability partnership, private limited company, public limited company, or a public company limited by guarantee or a private unlimited company. Before that, I would like to explain the functions of each type of company registration briefly.

Sole proprietorship

A sole proprietorship is a type of business setting in which an individual, known as the sole proprietor, owns and operates a business. It is the simplest and most common form of business ownership. In this type of business, the owner is the company itself and is liable for any liabilities it incurs in the course of its operations. Similarly, the company's owner benefits solely from the profits it generates.

Limited partnership

A limited partnership is a business with at least one general partner, who has unlimited personal liability, and one limited partner, whose

liability is limited to their investment in the company. The general partner is responsible for managing the business in the day-to-day and making business decisions to achieve the company's proposed goals. On the other hand, the limited partner, sometimes called the silent partner, is responsible only for investing in the business, not for running it. In other words, he is a nominal or sleeping partner. The advantage of this type of partnership is that the risk of disputes between partners is very slim, as one partner doesn't interfere in another's decisions regarding the day-to-day running of the business. The only meeting time for both partners is during the profit-and-loss sharing.

Limited liability partnership

A limited liability partnership is a separate legal entity from its members, who are only liable for the amount of money they invest in the business, plus personal guarantees. A limited liability company has elements of both partnerships and corporations. In accordance with Section 746(1) of the Companies and Allied Matters Act (CAMA), "a limited liability partnership is a body corporate formed and incorporated under this Act and is a legal entity separate from the Partners". It is basically a hybrid business structure that fuses the features of a partnership and a limited liability company.

Private limited company

This type of corporation is regarded as a "juristic person," meaning that it has the right to sue and be sued in its registered name. A private limited company is considered a separate legal entity distinct from its shareholders. It can own property, enter into contracts, and sue or be sued in its own name. Shareholders are the company's owners, and the number of shares represents their ownership. Directors are responsible for managing the company's operations.

A private limited company has authorized share capital, which represents the maximum number of shares the company can issue. Shareholders subscribe to shares by investing capital in the company, and the number and value of shares held determine their ownership.

Public limited company

A public limited company (PLC) is a type of business entity that

offers shares to the public and has its shares traded on a public stock exchange. This type of company is required by law to publish its financial records annually for transparency and accountability.

Public company limited by guarantee

These companies are otherwise referred to as “non-profit organizations.” They are registered not to make money but to promote commerce, art, science, religion, sports, culture, education, research, charity, or similar objectives. They may have unlimited shares, but the owners’ (shareholders’) liability is limited. They also don’t sell their shares on stock exchanges because they are not in the business for profit-making.

Private unlimited company

This is a type of company where its shareholders have unlimited personal liability for the company’s debts and obligations. This means the shareholders’ personal assets can be used to settle the company’s debts. Similarly, the shareholders share the profits generated by this company solely among themselves, unlike the public limited company, whose profits are publicly declared and distributed to shareholders as dividends.

Steps For Registering A Company In Nigeria

After you have chosen a name that inspires you (you should choose two names during the name search for a backup), hire a lawyer to assist you in the company registration procedures. Your lawyer will submit your chosen names to the Corporate Affairs Commission (CAC) for a search. If you are lucky and your chosen name is available in the CAC database, you will then proceed to step two.

- After the name reservation is approved, commence the company registration with the availability code provided by the Commission. Make sure you are convinced that the name you chose is what inspires you. However, it's a business! You choose a name that the general public can easily relate to. Regardless, the name must inspire you as the CEO of the company. Names are powerful! Some companies gain public access quickly and grow rapidly because they have a strong name that appeals to the general public.
- Prepare the Memorandum of Association and all related documents

based on the objectives of the company to be registered. The Commission provides a template for this on its registration portal.

- Fill out the registration form on the Corporate Affairs Commission portal, which is to be submitted alongside other required documents, such as particulars and means

of identification of the directors and shareholders of the company, statement of share capital and particulars of shareholdings, utility bill (proof of address) for directors and shareholders, Memorandum and Articles of Association (for companies limited by shares), etc.

- After filling out the registration form and confirming the information provided, the filing fee and stamp duty fees are paid online via the Remita platform. Then, a follow-up is required to ascertain when the registration will be out.

Get An Office

Having started operations, for example, buying vehicles, it is important that you get an office, no matter how small. An office will set you apart and boost your reputation and confidence in the business. Just as registering your company with CAC is important, having a verifiable office will not only help your clients trust you but also attract more clients. There are so many advantages of having a business office that I can't go ahead and enumerate them. Make sure you get an office in a strategic location. For example, a place known for vehicle sales is for vehicle dealers.

Well, it all depends on the automotive sector you specialize in; it determines the kind of office you will get. Meanwhile, ensure you get an office you can afford to rent. Make sure you deal with a responsible real estate agent so your money doesn't get siphoned off.

Authentication of your office

One thing is renting an office, and another is fixing it so that anyone who steps in will believe you are real and not some sort of fraudulent scheme. If you rent your office, you can renovate it and repaint the walls in the color that inspires you. Then get at least a chair and a table for your office, and create a space for at least one employee, who could be a clerk, receptionist, or customer care personnel; it all depends on what you do.

Have a frame for your mission and vision statement and hang

it on the wall, ideally in a position where the client will see it upon entry. This is optional, though. If it's within your reach, you can get the official photo enlargement of the President and that of the Governor of the state you are in. Hang them in the sight of clients upon entering. This will go a long way toward building believability for your company and its services.

If you have registered your company with the CAC, obtained a state government license, and received any other recognition, you can frame it and hang it in your office. It will go a long way in convincing your potential clients of your originality. Meanwhile, these things are not too necessary when you have built credibility. However, as a starting point, they are essential for building a client base.

Official Documents

At this point, you can't afford to operate casually but to see your establishment as a company. As a result, you must embrace decorum and officiality. Start by designing your official receipt after your company's name and logo. Then add letterhead, invoices, and other official documents as you deem necessary. Finally, give the graphic designs to a good printing company to print out for you.

Advertorial Approach

Get an identification card with your company's name on it and one for your employee(s).

Get a complimentary card to raise awareness among your peers, business affiliates, and prospective clients. You can also print flyers announcing the opening of your new office. Invite people close to you to attend the opening on that day. Depending on the scope of your operation, you can customize official attire (like polos) for you and your staff. If you're financially capable, you can build signage and mount it on the outer entrance of your office. If your office is not conspicuous enough, create a directory for easier accessibility.

Affiliate Dealers

As you have opened an office and started buying your own vehicles, it is time to revamp and strengthen your relationship with affiliate dealers. You have to inform them that you have started buying vehicles in your name, which they can market on your behalf and

maximize profit. You can invite your affiliates to visit your office. This will increase their trust in you, and consequently, they will propose more businesses to you. Ensure you don't act abnormally, as this will affect your relationship with them. You can ask your affiliates to let you know about good vehicles for sale. Similarly, send them your available vehicles and remind them to market them on your behalf daily. If your new office comprises a car lot and you don't have adequate vehicles to fill it up, you can get vehicles from affiliate dealers and end-users and display them alongside your own vehicles in the lot.

Employee's Management

Yes, as I stated briefly under "office," as a new CEO, it is time for you to hire staff who can assist you with the day-to-day running of the business. You can start as small as possible. You can start with at least one employee, preferably a secretary, PA, or assistant, depending on which is pressing. An employee is crucial because she deputizes when you are indisposed. Secondly, she helps alleviate your workload by allowing you to delegate some responsibilities to her.

Above all, it challenges you to work harder, knowing that you are responsible for paying your salary, rent, and other miscellaneous bills at the end of the month. Secondly, it brings you closer to your long-term goal: A CEO must have a structured company with as many employees as possible.

Train your employees as often as possible. Pay her well and encourage her to believe in your dream. Don't owe her salary; uphold your integrity by paying her salary as and when due.

Similarly, provide her with a sales bonus whenever good sales are recorded. The sales bonus serves as an incentive for optimal performance. Make sure your staff doesn't arrive late to work or record absenteeism. Establish penalties for each default. Depending on the nature of his work, create a target for her.

As it concerns employees, everything ties back to the scope you want to operate in. Regardless, it's expected that every company will grow so it can employ as many employees as possible. Anyway, irrespective of the scope you want to operate within, it is necessary to understand employee management and utility. This will guide you on how best to proceed should the opportunity arise tomorrow.

The following are the things you should know and implement as an employer

Leading by example

The primary rule for managing employees is that you are the mirror through which they see their performance. As a result, you must be an example; whatever results you want from your employees, you must first give. If you want your employees to be punctual, dedicated, experienced, truthful, goal-oriented, well-dressed, and so on, you must first instill these traits in them. As a matter of fact, it has been established that a boss's characteristics rub off on his staff. Therefore, you are the performance and excellence of your employees.

Integrity

This is very key! Integrity is everything! If you want your employees to honor and emulate you, you must be a man of integrity. Your yes must be yes, and your no has to be no. You must not take a shortcut, however tempting it may seem. Redeem your promises and let your appraisal be equal. This also comes down to how you manage your relationships with the people around you, especially your clients and affiliate dealers. For example, you have never eaten money due to another person. You haven't told lies to take undue advantage of another person. In fact, you must not be found amid anything that is not of a good report. Don't soil your hand; you are determined to make it with a clean hand and heart. Ensure you arm yourself against unscrupulous men who will come to sell business ideas that will trap you. Resist any business proposal that is not justifiable, however enticing the gain thereof is. Determine to keep off from any demeaning character and deliberately model your employees through your actions.

Appearance

As a CEO, you must dress well. In fact, you are not meant to dress well but to dress rich – yes, rich! Please don't misconstrue my statement above; I mean, you should dress rich within your financial capacity. Don't spend your capital buying expensive wear and jewelry to impress as a CEO. Your appearance is your pre-assessment; your dress addresses you. Make sure you wear original things. Of course,

it is better to wear one original piece of clothing than many inferior ones. You have to note that your employees scrutinize your dress. They might even go so far as to ascertain whether what you wear is fake or original. They can even discuss your dressing sense among themselves.

Anyway, in summary, dress to represent yourself. Dress classy and straightforward. Mix your dressing based on the day of the week. For example, dress officially on Monday, Tuesday, and Wednesday, native on Thursday, casual on Friday, and sporty on Saturday. This is not static, though; you can shuffle them at your convenience and as your engagement dictates. If your company provides official wear branded with your brand to your employees, ensure you wear it occasionally. This will blend you in, and of course, you will appear exemplary.

Words

Yes, this is very important. Remember the cardinal saying, “Out of the abundance of the heart, the mouth speaks.” To express this quotation differently, you are what you have said. For this reason, what you intend to say must be duly chewed and filtered by you before it’s uttered. Mind what you say to your staff, especially when you are angry. It is better not to talk at all than to say what will degrade you. This is not limited to your staff alone, but in all your engagements. However, the best way to communicate positively in a work environment is to be positive and peaceful. I mean, always see a positive result from a negative one and turn a potential discord into a peaceful outcome. Adopting this mindset will limit what you have to say to positivity and peace. This approach will not only condition your words but also your dispositions. Make sure your use of English is in check. Avoid unnecessary vocabulary because it is not free of errors. Keep your tenses short and concise. Avoid long speeches; hit the point and move on to the next topic if need be.

Knowledge

When your employees, clients, and affiliate dealers notice how knowledgeable you are, they will respect you indefinitely, especially your employees. You must have absolute knowledge of your business. This will distinguish you as the CEO and reward you.

Come to think of it, how would you carry your employees along in the business when you lack the wherewithal? Of course, you won't make headway, and the business will plummet in the long run. For this reason, you must learn about the business daily until you have understood everything therein. This will earn you more respect from your employees, business associates, and clients. Apart from this, it can accelerate your business growth, since you know the front and back of it.

Your employees depend on you to guide them in everything. As a matter of fact, they regard you as someone who knows everything about the business and can give an answer to every inquiry. Agreeably, it's indeed your responsibility, and you must act otherwise.

Dedication

This is the backbone of every business. Dedication is not only the ladder to elevation but also the elevation of future generations. The zeal to become a successful modern automobile CEO should spur you to work tirelessly. In short, when you are genuinely on the path of your ultimate dream, you won't consider what you do as work but a lifestyle. The best way to develop a sense of dedication to work is to cultivate a sense of urgency in whatever you do. This works like magic! It implies that you subconsciously assume you are already behind on everything you do, which inevitably increases your pace and dedication.

As a new establishment, make it a self-imposed responsibility to resume work early before your staff. Sometimes, call them to your office and, indirectly, let them know what you were able to achieve before they resume. This will be very exemplary and, of course, contagious.

When you schedule a meeting with your employees, prepare in advance and sit before they arrive. During the meeting, appear serious and engaged in the discussion. Don't laugh loosely, however amusing the cause. If at most, maintain eye contact and smile. To avoid forgetting to follow up on office-related work, always jot down your activities so you can tackle them one by one. Also, to avoid carrying over work, set a plan for yourself in a day and ensure you achieve it before you call it a day. Insist on daily reports from your staff, as it would give you a lowdown on all the activities carried out

for the day. It also gives you the opportunity to correct what needs correcting. Above all, it also guides you in appraising your daily staff performance. Dedication is everything in an office environment. It's the pinnacle of every establishment, and its result is always excellence.

Independence

Being independent means you are the success or failure of your company. In other words, you take sole responsibility for whatever outcome in your company's day-to-day running. Realizing that you are alone in running your company, you are cushioned for excellence. Be determined to be responsible for anything that happens. And regarding your employees, let them know that none of them is indispensable. Let them know that you need them as a team, but that they are independent at the same time. I have had staff who got into the job and delivered their services effectively. Some of them started feeling indispensable at a point, as though the company couldn't function without them. In response, I laid off anyone who crossed the line. Your independence also involves standing firm in adversity and rising again when you fail in your business or any other endeavors. You just have to believe in yourself and think independently.

After I returned from the correctional center as a result of a stolen vehicle that I bought in error, I was shattered and weakened. I had concluded it was the end of my company.

Fortunately, my love for the industry and the dream of contributing to its revolution sustained me. I was deserted by many; I could confine myself to only a few— my inner circle. Against all odds, I was resolute; I took responsibility! Today, the fight remains the same.

Communication

Communication is the oil that lubricates a company's activities. Hierarchically, communication channels flow from the top down to the bottom line chain. And their effectiveness is without a bridge. As a CEO, you must build an effective communication culture so that everything flows in synchronicity, from the CEO's office to all the various departments to the least person. Create a platform for reporting spontaneous activities. Here, all employees state immediate developments. For example, if someone is attending to a client, he will state that he is attending to a client at the point that

he is doing so. If someone is going for lunch, she will state that she is going for lunch, and so on. This will carry everybody along, and communication will be afloat.

Ensure that the company's daily activities report is mandatory for all employees. Daily reports not only inform you of the activities each staff member carried out that day but also prepare you for what needs to be done the following day. Because of this, you must discourage your employees from carrying over reports. Communicate effectively with clients and follow up professionally. Manage all feedback very well. Above all, maintain an official language (English in Nigeria) and avoid vernacular in official communication.

Management

Before you can proudly accept your role as a CEO, you must have a high level of managerial skills. Managing employees is often considered the most challenging component of any managerial role. The difference between well-managed and poorly managed employees can be the difference between success and failure. How should you go about managing your employees? Below are a few things you should know about managing your employees. The number one rule of managing employees is not to over-manage them. This may be a bit tough to take and probably counterintuitive. The moment poor performance is recorded among employees, the first thing that comes to mind is that the employees are undermanaged. This means that the employees were not given directives and, thereby, allowed to slack off. Meanwhile, the opposite is likely true. The case in which employees are given too many guidelines and are watched over with rigid scrutiny. Employees need to feel free to explore their full potential. They can't have a guideline for every activity; otherwise, they won't be able to discover better ways to do their jobs. In fact, the best companies don't hire employees to do a specific task; rather, they hire problem solvers. Problem solvers need freedom and autonomy to do their work as they experiment with different techniques and solve problems. For this reason, don't employ a staff member for a specific assignment; instead, build the person to be versatile for maximum utility.

The goal is to lead people in solving problems rather than micromanaging them to finish tasks. Conversely, there is a point at

which you become too indifferent to what they do on duty, which will lead to them being undermanaged. Therefore, it is critical that you strike a balance for better results.

The fastest way to get the best out of your employees and get them to perform well without your supervision is to help them understand the company's goal. Let them know the company's vision and mission, and they will follow it. Make sure your presence is registered in the office as often as possible. If possible, walk around the office as frequently as you can during walk hours. This may sound overly simple, but it is incredible how most CEOs manage from their office and are never seen out and about. Some of them hardly even come to the office. Over this, I'm also a culprit, but I have improved at reporting in the office daily. Although I started skipping resuming work at the office after establishing a routine. Anyway, whatever the case, don't be a boss that no one sees in the office; it makes you predictable, and a bad employee can take advantage of this. As a CEO, especially of a budding company, be the person whom many employees see the most daily. Sometimes, while in the office, it can be as trivial as going to the staff water dispenser to fetch water rather than using your own private one. This allows you to interact with your employees and gauge their moods. Intentionally build the habit of walking around the office while on duty. This will abstractly put everything in check.

Trust your employees and give them a free hand to operate, but make sure you review their activities often. Reviewing employees' activities is a fundamental feedback mechanism. Giving them the freedom to complete tasks on their own comes with the added challenge of ensuring they are completed. You have to frequently review progress and base your assessment on meeting a set target. Ideally, you should set up a method to quantify success. Make their tasks clear to them. There is nothing less fruitful than calling an employee into your office to review her performance, only for the conversation to devolve into her saying she didn't get the task done because she didn't understand what she was supposed to do. In this scenario, you will be exhausted and feel underachieving. Thus, it is very important to state clearly and concisely what their task is and what is expected of them. While you give them the freedom to figure out the best way to carry out the task, make sure they know what

is required of them. Make it clear to them that you won't look over their shoulder, but you do expect clear, well-defined results.

Experiment with your employees and make them as flexible as possible. Flexibility at work is at the center of today's high-tech business world.

Try different employees on different assignments and see how it goes. If the employee doesn't adapt to a new task, then you have learned more about the person's capabilities. Conversely, if an employee can execute multiple assignments, you have learned the person's capacity, too. Develop a culture of staff experimentation. This will guide you in grading your staff by position and remuneration. This approach is not only required in today's business climate but also a good measure for fostering an atmosphere that leads to more flexible employees. Employee management is vast, but I will limit it to what we have discussed above. They are effective enough to give you the required results.

Protection

You have to provide your staff with high security in the workplace. This will condition their minds, and as a result, they will perform very well. If your office environment is threatening and insecure, you would need to hire security personnel to protect your office and employees from unexpected bullies and hysterical outbursts. Make sure you take precise security measures, such as ensuring there are fire extinguishers in the office, keeping the office neat at all times to curtail disease outbreaks, quarantining staff who come into contact with a communicable disease, and so on. During a vehicle inspection, don't allow a client to enter the vehicle with more than one person, including the client's mechanic or an accompanist. They should both sit in the front while your staff sits in the back. When the client is with a person in the vehicle during an inspection, ensure you provide two or more employees to join the test drive. But in a situation where only one employee is on the ground for the test drive, compel the client to either go alone or to stay behind while the accompanist goes. And if you have a security guide, he can join during the test drive. The reason for all this is to ensure the safety of your staff and, of course, to prevent your vehicle from being stolen. Some automobile dealers have lost their vehicles and, in rare cases,

their lives to criminals who pretended to be buyers.

Avoid driving unregistered cars at night, especially when taking them to risky rendezvous, such as clubs. So many unregistered vehicles have been snatched at night with no trace afterward. Similarly, avoid driving a car that is for sale. Get a personal vehicle you can use anytime. This will save you a whole lot. Be security conscious at all times and in all ramifications. Prioritize your staff's health. You can register with a hospital for an emergency ambulance. If within the company's financial capacity, you can sign up your employees for an HMO for monthly or annual coverage. Another aspect of security is when someone reports your staff to you for wrongdoing. Don't scorn the staff before the best. Make sure to protect your staff's image. Instead, maintain a passive response by saying, "thank you so much for sharing this with me or for bringing this to my notice. I will make sure I hear from Joel (the staff) and get back to you. Thank you." No matter the complaint, do not take the complainant's side; ensure you hear from your staff first.

Education

First, as a CEO, you must be educated. If you haven't gone to school, at least to a high school standard, you'd better enroll in one as a matter of urgency. The reason is that as a CEO, you will be exposed to many things that will test your academic prowess. For example, you have to make all office documents available, which would come from your initiative. You will write a proposal to companies, banks, and other relevant organizations, which you would have to do independently. You should be able to write your business plan if need be. You would need to conduct domestic and international meetings as needed. You should be able to understand basic IT technical know-how, gadgets, and languages. You have to understand basic computer applications, such as Microsoft Word, Excel, PowerPoint, and others.

As a CEO, your ability to acquire knowledge is unlimited. Learn at all times! Enroll in useful auxiliary online courses. Watch business summits online. Get a business coach and follow his coaching curriculum. Also, make sure that you recruit well-educated employees. This will bring standardization and efficiency.

Training

This topic is very important, and I will discuss it in detail. You may choose to hire a professional to train your staff or do it yourself. However, I will refer to you as the trainer here so I can be more expressive. As someone in charge of employee training, it's important that you adopt strategies to help each staff member acclimate to their role in the company. Whether you're training a new hire or equipping more seasoned employees to develop their skills, there are many techniques you would have to adopt to make this process more effective.

You can build a more productive and successful team with the right training and employee development. In this topic, we will discuss the importance of training employees more effectively and share steps to help you get started. Investment in staff training has incredible returns. Not only does training support developing skills, but it also shows employees that they are valuable. Training your employees effectively is vital for the following reasons:

- Align to your expectations: When your employees receive the right training, they better understand the company's goals and expectations. They also learn about the company's employee code of conduct. So, having an employee handbook to base your training on is a good start.
- Higher employee retention rate: Helping your employees fully understand their job descriptions may help them feel more confident about their work. This can increase job satisfaction, causing an employee to stay with your company longer.
- More skilled team: Thorough training ensures that your team members can properly do their jobs. It can also help them develop essential skills that lead to high-quality teamwork and substantive productivity.
- Increased inclusivity: Training can cause your employees to feel more connected to the company's goal. As a result, they will feel special being part of the team that will actualize this goal. They will feel they are part of the company, which gives them job security.
- Establish your goals: Create a list of the outcomes you want to see from your employees and the skills that would support their achievement. For example, you might want to increase productivity in a specific department or help to help the team develop management

and leadership skills.

- Choose a good training method: There are many employee training methods, and their applications depend on the caliber of the employees that you train. Your training objective also applies. You may need to adopt an independent learning approach when training only one staff member. This individualized training uses self-led, self-paced modules to teach an employee the knowledge and skills you want him/her to acquire. On the flip side, if you want to train all the employees at once, you may have to adopt the classroom method.

Group learning can be efficient, as many employees learn at once and support one another. In this type of training, you can use multimedia equipment or the traditional verbal method, both of which are more effective. In group training, make an effort to get your employees refreshments during breaks.

- Maintain ongoing training and evaluation: Follow up regularly with the employees after they receive training so you can hold them accountable for the targets and goals you have set. You can use performance reviews to track their work and assess whether they have met each task.

If you notice that employees have not used their new knowledge effectively, it demonstrates that you may need to restructure your training. Remember, employee training is an ongoing process. During training, irrespective of an employee's department, ensure you touch on general subjects like code of conduct, customer relationship, computer knowledge, job delivery, understanding of the company's goal, etc.

Quality assurance

If possible, create a quality assurance department. Quality assurance implies that everything works according to the company's rules and operational standards. Adopting quality assurance in your establishment will be a game-changer. It will keep everything in check and ensure that operations comply with the company's standards. Your quality assurance manager will ensure that all work is completed in accordance with the company's standards. He will supervise any job stated to have been done to verify its accuracy. He will review all the employees' daily reports and ascertain that what was said to have been done was actually done. Quality assurance is

the modern euphemism for brand management. Therefore, it cuts across brand management and public relations. This implies that the quality assurance manager is overseas, harnessing the company's brand representation and public acceptance.

As a CEO, this should also be your primary assessment—to ensure that everything works as you have planned. Work closely with the quality assurance manager and ensure he provides steady feedback. In other words, quality assurance is the company's adopted system for overseeing its daily operations, results, brand, and public image.

Incentive

Staff incentive works magically. Create a structure in which you reward a staff member who is performing well. Pay them bonuses and provide unique non-monetary incentives, such as gifts, excursions, outdoor games, advance salaries, asset acquisition loans, etc.

Staff incentives improve employees' productivity. They also prove to them that you love them and would love to retain them for a longer time.

Utility

This requires that you understand all employees' abilities and use them to the company's advantage. You might hire someone as customer care personnel, but in the end, you find out she is a business developer. Or, you find out that she performs better in business development than in her primary assignment. This is not limited to an employee being good in another department rather than the primary one. It could also be tied to the person's performance in her primary department; for instance, if employee B were employed in department J, the utility is that an effort should be made to ensure that employee B performs at her best to improve the department. Utility also involves time management. An employee's input during work hours should be prioritized. Some staff are idlers; they just want to warm their chairs and look up to the closing time. So, when there is a measure for staff utility, such staff would be compelled to improve their input, which will vary and add to the overall productivity. The utility also applies to you as the CEO. Think within and know what you can do. If you have any abilities that you haven't been utilizing, determine how to bring them out and use them for the growth of the

company. Be a steady thinker and make sure you are not lacking in anything. If need be, ask yourself at all times to achieve something new.

Getting the sleeping dog to be

Yea! What this means is that in a work environment, not everything you see is what you talk about. There are things you have to ignore and move on. Picking at everything makes you seem common to your employees, which is disrespectful. Ignore things that are harmless.

On the other hand, when you catch staff in action doing what is against the company's ethics, control your disapproval and wait for a private time to address the person. This will earn you more respect, and the staff will be more secure working with you. This also applies to how you pardon their shortcomings. You can pardon queries and other outlined penalties. Act indifferent in some situations that they expect you to react to. This will leave them in awe and make you more unpredictable.

Employees welfare

Employee welfare is synonymous with incentives. However, there is a thin difference. An incentive is a gesture taken intentionally to encourage employees' performance, whereas welfare is a necessity that arises. To make the concerned employee feel good, you must conduct a staff welfare exercise. This welfare includes birthdays, the burial of a close relationship, marriage, anniversaries, childbearing, housewarming, special recognition, and so on.

An employee's welfare could also include providing a free meal during work hours. Similarly, during special seasons like Christmas, for example, you can buy foodstuffs like bags of rice for your employees or do anything else that will make them feel special. A special visit to employees is also a good measure. For instance, if your employee is sick and unable to come to work for a few days, or if something peculiar has happened to the person, a visit will make the person feel special and like they belong.

Recognition of an employee's religion is also very important. For example, if you have a Muslim in your midst, allow the person to go for Friday prayers. This is also applicable to other religions. Whenever there is a need for a special religious service, allow the

concerned employee to attend. For example, allow a Christian employee to attend the Good Friday or Ash Wednesday service. If your employees wear company-branded clothing, make sure new ones are provided when the old ones fade. This applies to their ID, complementary cards, and other relevant office attire, such as name tags. Above all, encourage your staff to have a money-saving program. You can encourage them to establish a corporate society. This will enable them to unite and help colleagues, all depending on their constitution.

If your company has grown, you can give your employees a stake by selling a certain percentage of shares to anyone willing to buy. Personally, I have always wanted to co-own my company with my employees and as many other people as possible. As a matter of fact, I have sold this idea to my staff, but they all gave it a deaf ear because most of them believe in “now” revenue. This, however, is the exception of one person who came in as a passive investor. As an inter-business community company, our goal is to make our staff CEOs while they’re working with us. We will accept a staff member who wishes to buy shares in our company, provided that person has something to give in return.

Conclusion

The above are just preliminary ways to start operations as it concerns our grassroots standard. Otherwise, starting operations as an automotive CEO today requires a broad, forward-thinking approach that extends beyond traditional land vehicles. Modern mobility now cuts across maritime systems, artificial intelligence, aviation technologies, space exploration, and next-generation automotive engineering. To succeed, a CEO must understand global mobility trends, sustainability pressures, and the rise of intelligent technologies shaping the industry.

In the land vehicle sector, today’s focus is on electric vehicles, autonomous systems, sustainable manufacturing, and connected mobility platforms. The future will expand this into self-driving fleets, AI-enhanced traffic ecosystems, and ultra-efficient energy storage systems.

In the maritime industry, operations now emphasize cleaner propulsion, digital navigation, and advanced engine monitoring.

Looking forward, maritime mobility will transition to autonomous ships, hydrogen propulsion, AI-driven route optimization, and seamless port-to-vehicle logistics ecosystems.

For aviation, a modern automotive CEO must align with electric aircraft development, drone logistics, and smarter aeronautical technologies. The future of aviation includes vertical takeoff urban air mobility, AI-assisted cockpit systems, hybrid aircraft engines, and integrated sky-traffic networks.

In artificial intelligence, current operations rely on predictive maintenance, autonomous driving algorithms, customer experience mapping, and digital twins. The future will bring quantum-enhanced decision engines, self-learning mobility networks, and AI governance systems that manage entire fleets across land, sea, and air.

In space exploration, emerging automotive CEOs explore partnerships in materials science, robotics, propulsion research, and off-planet mobility. Future opportunities extend to lunar rovers, asteroid-mining robotics, and interplanetary transport technologies that draw on automotive innovation. To operate effectively today and into the future, an automotive CEO must integrate sustainability, intelligence, cross-industry collaboration, and a long-term technological vision, building a mobility empire that spans roadways, oceans, skies, and beyond into space.

CHAPTER EIGHT

BUSINESS RELATIONSHIPS

This is the backbone of every business! Building a business relationship is the foundation of every business. This is because the people you network with in a given industry will either make or break you. This is why you must be very careful when networking. Not everyone is someone with whom you can build a business relationship. You must filter and choose the best.

Building a business relationship in our age requires more than traditional networking. It demands digital fluency, authenticity, and future-focused collaboration. Today's business environment is shaped by technology, speed, and global connectivity, meaning relationships must be built on trust, transparency, and shared innovation.

Modern leaders strengthen relationships by engaging through digital platforms, leveraging data-driven insights, and maintaining consistent communication across time zones and cultures. Smart tools, such as AI assistants, virtual meeting environments, blockchain-powered contracts, and immersive communication technologies, make it easier to collaborate instantly and securely. Looking ahead, business relationships will increasingly depend on co-creation, where partners collaborate not just to trade value but to build new value ecosystems across industries. Trust will be reinforced through digital identity systems, predictive analytics, and real-time transparency. CEOs who embrace openness, technological adaptation, and long-term partnership thinking will thrive in this evolving landscape. In essence, business relationships lie in combining human connection with intelligent technology, enabling partnerships that are more

global, more efficient, and more innovative than ever before.

The following are the categories of people you should build business relationships with:

The wealthy

Yeah, this category of people you must do anything with your power to build and manage a business relationship with. Initiate the relationship and always present yourself to them as loyal and trustworthy as possible. Those who have gone far in the same line of business as you shouldn't be ignored. Intentionally make yourself known to them. Deploy all means to achieve this. Demonstrate your loyalty to them, and maintain absolute trustworthiness if any opportunity is given to you. Personally, I have been making passes at Elon Musk for years now, and I believe one day he will get to know me and probably give me a chance for a business relationship. This relationship may not necessarily be for transactions, but it could serve as a role model from whom I seek advice and directions while on my way to the top.

Apart from Elon, I could build strong business relationships with many other global automotive CEOs when I work tenaciously towards it. I can build a business relationship with Akio Toyoda of Toyota, Jensen Huang of NVIDIA, Robert Playter of Boston Dynamics, Innoson Chukwuma of IVM, Vikram Chatterji of Galileo, Wang Chuanfu of BYD, Satya Nadella of Microsoft, Fei-Fei Li of Worlf Lab, and Carlos Tavares of Peugeot. Others are Sundar Pichai of Google, Cosmas Maduka of Coscharis, Tejpal Bhatia of Axiom Space, Mary Barra of General Motors, Jeff Bezos of Blue Origin, Kenji Yamaguchi of Fanuc Corporation, Mark Fields of Ford, Mark Zuckerberg of Meta, Aliko Dangote of Dangote Group, Ola Kallenius of Mercedes-Benz, Mahe Bayireddi of Phenom, and so many others.

I may not meet these great individuals in person, but I can through many other ways. Among these is building my company in the same industry, so they can hear about me before meeting me. Thus, the best way to meet the kingpins in the automobile industry is to build your company into a global brand, and they will hear about you. As a result, you will be very familiar with them when contacted. As a matter of fact, some might even contact you before you do.

Aside from this method, there are other ways, such as sourcing

their email addresses and sending them business-related, professionally crafted emails. This is why you must profile and brand your company well so it can serve as a mirror that shows people what it's all about. A good example is dropping your social media handles and website URL in your emails as references. So, identify wealthy automotive companies in Nigeria, Africa, and the world at large, and build business relationships with them. You can start as small as you can, and, of course, you will pull through in the long run.

Those That Grant You Credit

Yeah, you must build a good relationship with any company in the same line of business that has agreed to grant you credit. If you manage a good credit facility well with a company, they can build you and change your life forever. Thus, you must hold this category of people well and develop and manage a strong business relationship with them. This is why I can't help but be grateful to Shekel Mobility for what they have done for me and so many automobile dealers nationwide. Shekel not only grants dealers loans but also builds convivial relationships with beneficiaries and ensures that such beneficiaries are established in the business and prosper. In my case, they stood for me when I had given up and gave me a lifeline after another. Thank you, Shekel.

Has An Office Close To You

Yes, these are also known as your business neighbors. Meanwhile, I'm referring to people in the same category as you. Work hard to build a business relationship with these people because they come to you when it matters. A good example is when a client comes to you for a product or service you don't have; you can always outsource to your neighbors. Another example is when there is an unavoidable dispute between you and a client or anybody for any reason, your neighbors will always come to your aid. There are so many things you will gain from your business neighbors. They can even grant you credit, lend you money, give you business advice, etc. Therefore, you must build and manage a quality business relationship with them.

By the way, my unreserved thanks to all the Amuwo Odofin dealers for always believing in us. You have never questioned any program that we came up with. Many of you allowed us to catalog our

website several times without having any doubt about our delivery. Thanks to those of you who have had numerous transactions with us. Thank you.

Those Who Are Credit-Worthy

This is a category of people in the same business as you who you have trusted with credit, and they have never defaulted. It is hard to have these types of people in a business environment; therefore, you must hold them closely and build a strong business relationship with them. This category of people could be your colleagues in the same industry, your reselling clients, or even the end users. Of course, many have trusted people with credit sales, and some of them ran away with the money or deliberately refused to pay. So, when you come across trustworthy ones, hold them jealous and build a firm business relationship with them.

I can remember when Stanbic IBTC visited me and gave me an offer; they gave me a non-collateralized loan and told me that if I could sustain a steady repayment, after some years, they would pop in a considerable amount of money into my business as a partner with little ROI, and no longer as a loan. This proposal opened my eyes to the advantage of being trustworthy. Similarly, after prospecting, my company, Vale Finance, sent us a proposal to inspect and evaluate vehicles on their behalf, to safely keep collateralized vehicles, buy them from them, or sell them on their behalf when a client defaults or instructs that a vehicle be sold. We accepted the proposal, and the partnership has been awesome. My point is that trust gave birth to this business relationship and reliability. It has also encouraged me to act more reliably and accountably in all my dealings.

Sympathetic Ones

This group of people is naturally good. They get emotionally invested in what concerns them and always make sure everything around them is fine. You could see that they care about you and mean well. Thus, you must reciprocate with love to this category of people and team up with them for “brother/sister” love. And as it concerns business, they can be relied upon because they will not play foul. Considering their nature, whatever affects you negatively indirectly affects them. Consequently, they are just on the invisible page of

hurting you in the course of business transactions.

Experienced Ones In The Business

Whether you gain financial help from this category of people or not, stick with them and learn as much as you can from them. Be friendly and loyal to them. Get close to them as much as possible and always ask them questions about the business as often as necessary. This set of people will give you insights and secrets into the business that cannot be monetized. As you may know, a given business knowledge can positively turn your entire company around. Thus, you must stick to this caliber of people and build a strong business relationship with them.

Imagine when Elon Musk adds you to his business WhatsApp group, where critical, life-changing business is discussed among great men. The result is that you will become smart in a few months and make a fortune. They may not fund your business in any way; however, the knowledge you will gather will be unquantifiable.

Has An International Presence

This group of business colleagues has businesses in other countries. Proactively build relationships with this category of people. Be loyal to them and convince them that you aspire to attain their height. When you have successfully connected with these people, you will learn a lot from them and might even start your international business through them. Meanwhile, I am taking advantage of this opportunity to teach a few things about international business. International business entails all commercial activities that cross national borders, including trade, investment, logistics, and global strategy. It involves navigating cultural, legal, economic, and political differences while capitalizing on international opportunities.

The concept of International Business is to expand a business globally, usually driven by markets, technologies, trade agreements, and the world economy. International business involves the import/export of goods, foreign direct investment in services, joint ventures/strategic alliances, licensing/franchising, and Cross-border mergers and acquisitions. International business offers vast opportunities but requires navigating complex cultural, legal, and economic landscapes. An individual or a company that engages in, or wants to engage in,

international business must adopt strategies for global trade while managing risks such as trade wars, supply chain disruptions, digital transformation, and others.

The significant challenges in the international market are trade barriers related to tariffs, quotas, and embargoes. A good example is Trump's trade war with China and other countries. This barrier can be detrimental to an international business due to its adverse nature.

Other regulations include the General Data Protection Regulation (GDPR), labor laws, intellectual property (IP) protection, trade laws, immigration laws, and others. These regulations can sometimes be unfavorable, dwarfing the success of a given international business. Others are political instability, such as sanctions (European/USA sanctions on Russia), coups, and policy changes, such as India's Foreign Direct Investment restrictions.

Exchange rate risk, due to currency value fluctuations, is another barrier facing international businesses. This can make a business global while reducing it to nothing. Inflation, interest rates, shipping costs, customs delays, and geopolitical disruptions are other barriers militating against international business. Some key players and institutions pilot international business. By key players, I mean multinational corporations that influence global business in various ways, such as Microsoft, Apple, Amazon, Toyota, Samsung, DHL, Boeing, Shell, Mastercard, and others.

Institutions, on the other hand, are international organizations that regulate international business. Examples include the World Trade Organization, which governs global trade; the IMF/World Bank, which provides financial support to nations, the International Chamber of Commerce, Regional Trade Blocs, the EU, SUSMCA, AfCFTA, ASEAN, and others.

Understanding the roles and influences of multinational brands and international organizations in international business is pivotal to successful international trade, both in terms of brand affiliation and trade regulations. You can research this further to gain a more thorough understanding. International business can be interesting and profitable if it is planned and educated adequately. It is advisable to understand the future trends in international business, such as Digital Globalization, AI, blockchain, cross-border e-commerce, Sustainability/Environmental, Social, and Governance, which are

for green supply chains and carbon-neutral policies.

Others are Nearshoring/Reshoring, which involves moving production closer to home, and Geopolitical Shifts, such as US-China decoupling, BRICS expansion, and international trade affiliation/disaffiliation. You must also strive to keep abreast of and trade on other evolutionary trends that may emerge in the future.

The importance of international trade is enormous, especially in terms of economic and technological factors such as market expansion opportunities, access to resources, economic scalability, digital globalization, e-commerce platforms, improved logistics/supply chains, and self-development. Meanwhile, to scale in international business, you must understand global marketing very well. You have to understand standardization, adaptation, cross-cultural consumer behavior, international branding strategies, and digital global marketing. These are advanced international marketing approaches that require forensic analyses before approaches. Kindly research this further, as it is the backbone of a successful international business.

While international business can be profitable, it also faces challenges that threaten its success. These challenges include language barriers, variations in business etiquette and religious/social norms, differing business laws, intellectual property protection, product standards, safety regulations, dispute-resolution mechanisms, currency exchange fluctuations, international taxation, payment risks, inflation, and interest rate differences.

Others include operational challenges such as supply chain complexities, cross-border quality control, risks of political instability, ethical dilemmas, and corruption. Well, there is still a solution to overcoming these international business encumbrances: Hiring specialists to assist you. The likes of an international trade specialist, a global supply chain manager, a foreign market analyst, an export/import compliance officer, an international business consultant, and a global brand manager. Irrespective of your ability to employ the services of the specialists as stated above, there are skills that are necessary to acquire. Skills like cross-cultural communication, foreign language proficiency, international negotiation skills, global financial literacy, risk assessment capabilities, adaptability to diverse environments, and so on. It all depends on your level of curiosity.

These are the types of documents required in international trade: Country-specific documents, insurance certificates, phytosanitary certificates, fumigation certificates, certificates of analysis, certificates of origin, packing lists, bills of lading, pro forma invoices, commercial invoices, and others. It all depends on the country concerned.

In summary, international business continues to evolve with technological advancements and shifting geopolitical landscapes. To be successful in international business, you must maintain agility while developing deep market-specific knowledge and a risk management framework. You also have to focus on your core objective in venturing into international business and give it everything it requires to succeed. I made this deviation because I wanted you to understand a few things about international business so that when you encounter an international business colleague, you will know how to approach him or her. Also, when a window of opportunity opens for international business, you will know how to grasp it, understand exactly what it entails, and take the right steps.

Relatives

So, back to our topic, the next topic is relatives. Although this is very slippery, regardless, a trustworthy relationship is a strong force to reckon with. When you have a relationship with someone in the same business line, work hard to build a business relationship with them. This will give you a sense of security apart from the business aspect. When you have successfully built a business relationship with a person or a company, it becomes like you have partners. You will share the good and bad times of the business with them, and they will always come to you.

These are the people with whom you can even merge money to execute one or more transactions together. The downside of this type of business relationship is that you must trade with caution; you must first be what you expect them to be for you. Hold them closely and make use of all the benefits therein.

Regular Clients

These are your steady clients; come rain or shine, they are there for you. This category of people must be held vehemently! They are to be managed so well that both of you see each other as partners.

Respect them and offer them help whenever needed. This will make them more reliant on you, and they can even bring more clients for you. Regular clients must be given prioritized attention when necessary. I recall a time when petrol was scarce in Lagos. Every fuel station was crowded with people struggling to buy petrol. I stood there helplessly, unsure of what to do. Suddenly, the petrol station manager approached me and exchanged pleasantries. Afterward, he called one of the pump attendants and instructed the attendant to fill my vehicle and the kegs.

When I spoke with the manager after he had instructed his subordinate to attend to me, he told me that he was prioritizing petrol sales to his regular customers, reserving 80% for them and 20% for irregular customers. Of course, I felt special that day, and since then, I have always bought petrol from the filling station.

Spiritual

This category of people will keep inviting you from one spiritual program to another. They will always pray with you whenever they visit your office. Build a business relationship with this set of people, as they will sharpen your spiritual life and strengthen your commitment to the things of God. Above all, because of their piety and spiritual awareness, they can be trusted to some extent in business dealings. Aside from business, they can sharpen your spiritual antenna, thereby making you alert. As a Christian, I believe that God is interested in every one of our endeavors, and business is one of them. So, going spiritual in our business would ward off invisible hostile forces and bring success.

Love You For Who You Are

They are so attached to you for nothing. They love you for who you are and are passionate about building a business relationship with you. Whatever troubles you troubles them. They just want to see you succeed. You must do everything within your power not to disappoint this category of people. Build a good business relationship with them, and never abuse their love for you. Of course, you can trust them with anything, knowing that they can't betray you because they are acting in love. Above are the categories of people in the same line of business (except clients) with whom you have to build and

manage a business relationship. Regarding our grassroots (vehicle sales), below are the categories of people you must manage in your business, along with how to handle them.

Affiliate Dealers

I made this a topic because of its importance. Understanding your affiliate dealers is as important as understanding your products and services. Before I proceed, I would like you to understand who your affiliate dealer is. An affiliate dealer is a dealer whom you have officially approached for a co-existing business relationship. In other words, a dealer you can do business with, like both of you selling each other's vehicles and mutually sharing other business relationships.

First, it's essential that you know your affiliate dealer's office. Ensure that he or she has his or her company registered with the CAC and certified. Read consciously such an individual's trait; if he or she has a reliable character. Also, endeavor to understand the kind of vehicle he sells and whether he sells clean, overused, or accident vehicles. Try to understand how he outsources for vehicles and if his vehicles are genuine or questionable. Your subtle investigation will guide you on whether such a person is worthy of being an affiliate dealer.

Regardless of gathering pre-emptive information about a prospective affiliate dealer, just be prepared for backstabs. The temptation for money usually sweeps away some dealers' integrity, and what follows is compromise and disappointment. For this reason, make sure you play your role very well. Predetermine never to eat a dealer's money; however, it appears to be enticing. Make sure that a dealer's vehicle in your possession is better handled than yours.

Uphold integrity when dealing with dealers, and you will see many of them clustering around you. This is because an average automobile dealer looks out for a trustworthy dealer to work with; unfortunately, this is as uncommon as gold. Meanwhile, this shouldn't only apply to affiliate dealers but also to other people you may have to go into business with in the automobile industry. In fact, it should apply to those outside the automobile industry.

Understanding Clients

This aspect is key to your business's success. You must recognize

that your clients have power over your business, and, consequently, understand them very well. We have different types of clients who must be well-understood and treated commensurately. The following are categories of clients with their attributes:

The Customary Client

This is a client with whom you have already built a business relationship. This client believes in your brand and is willing to do business with you regardless of your shortcomings.

This client must be treated with utmost integrity and sincerity. He must be steadily followed up through after-sales service and welfare, such as sending a message on his/her birthday, anniversary, child dedication, housewarming, marriage, etcetera.

This client must not be made angry at all costs. Premeditated care must be taken to ascertain the ultimate satisfaction of this client. You must be smart enough to anticipate this client's likely dissatisfaction and address it in advance.

This client is naturally happy dealing with you. He wants you to make sales and grow your business. He would even go further to refer prospective clients to you, thereby posing as a distant partner in your business.

Accident Client

This is a client who found your office by accident and purchased your product. This client is strange and very informal. He or she must be handled with extra care. They are "first impression" observers; their point-of-sale experience determines their subsequent moves. Thus, you must handle this client category professionally, ensuring they are treated satisfactorily. Make sure you or your staff enthusiastically interact with him or her during and after transactions. Assure them that you sell a high-quality, reliable product. Intentionally collect his or her contact information and inform him or her that you will follow up on the vehicle that he or she purchased from you.

Call him or her after every transaction to see if he or she has gotten home. Similarly, conduct a follow-up call after a week or two to see how the client is using the vehicle. You must continue to follow up with this client until he or she becomes a "customary client."

Proxy Client

A proxy client is a client referred to you by a current client or well-wishers. This client has too many expectations, relying on what thereferrer must have told him. Therefore, this client must be treated as both a customary and an accident client. A proxy client is a person sent to you by any of the client categories to purchase a vehicle on their behalf. This person must also be considered a client because he facilitates the transaction on the proxy.

Sourced Client

A sourced client is one you get through marketing or advertorial activities. You may be required to spend money to get this client. For this reason, this client must be seen as an output of an investment. This category of clients doesn't really have your interest at heart. They only came for the product that you marketed to them. They come with great scrutiny: You will see some of them coming with an electrician, a mechanic, and a panel beater just to inspect a vehicle.

They will scan, scan, and scan the vehicle until they find a fault. Funny though! When satisfied, this client leaves glad, yet he doesn't have your interest at heart. Following up on this client is always difficult because he is an itinerant buyer. He is also an internet scanner; he is always on the lookout for the best offer. As a result, the seller with the best offer becomes his immediate preference.

If this client eventually becomes satisfied and speaks well of you, he will bring many others in with him through word of mouth. To prevent them from puncturing their confidence in dealing with you, they must be handled with care and a high touch of professionalism. It may be very hard to win these clients, but you must never give up because they are your investment, having spent money sourcing them. However, if after you have won their hearts, you go ahead and give them a reason to question your reliability, they will become wild bulls, and winning them back would be chasing one's shadow.

Domestic Client

This is a client you are familiar with. For example, your siblings, friends, neighbors, colleagues, staff, church members, schoolmates, etcetera. These sets of clients are very sensitive and should be handled sensitively. The number one rule in dealing with this category of

clients is that you must not compromise on the kind of product you sell to them. For instance, you must not sell a vehicle with a concealed fault to them, whether intentional or unintentional. The reason is that they will always return your calls, whether unofficially or officially. They are very similar to customary clients. They have your interests at heart and always look forward to your success.

The number two rule is to never grant this category of client a credit facility. The reason is that getting the money back is always a herculean task. In fact, it is more advisable to sell on charity to this client category than on credit.

Regardless, they must be respected and handled with integrity. They are very good at referring more clients to you. As a result, they must always be followed up on, and after-sales service should be rendered to them at all times. It is also healthy to recommend juicy offers to these clients, as they act as distant partners. Call them up and let them know when you have a good vehicle at an affordable price. They will value this approach.

Handling Complaints

Handling client complaints is as sensitive as you would want your company to grow. The following are steps to handling a client's complaint:

Understanding the complaint

When a client calls to complain about a given issue, the first thing to do is to pay rapt attention to whatever he/she has to say without interruption. Only respond in accordance, indicating that you are listening very well.

Offering an inadvertent apology to the client

As soon as you understand the complaint, you have to apologize. Remember, this apology is not an admission of the complaint but a preliminary step to avoid an avoidable escalation.

Rooting for the cause of the complaint

At this point, thoroughly determine the problem. If it is about a faulty vehicle, for instance, have your engineer examine it and tell you what is wrong. If it is a document-related issue, seek your agent's

advice and follow up. Whatever the case, ensure it is established and handle it as amicably as possible.

Providing a solution and resolving the issue

You must provide an immediate solution that is satisfactory to the client. Make sure that whatever solution you provide is urgent and satisfactory. Above all, if a conflict might involve the police, kindly involve your lawyer and seek all necessary legal advice. Don't fight a client physically, or allow your subordinates to do so, under any circumstances. Always be on the side of peacemaking and upholding your company's reputation. Complaints can also come from affiliate dealers or other parties. However, treat all cases as stated above for clients.

Networking Advanced

As a budding CEO, the more you build your company, the more you should advance in networking. As a matter of fact, keep networking until everyone is your client and business associate. Meanwhile, advanced networking aligns with your goal and projected pinnacle. To put it differently, where you can reach is limited to where you desire to go. Your networking spans your client base, affiliated dealers, international ties, and the quest for new development.

Networking with clients

At this point, you must expand the tentacle of your client's base. If you are dissatisfied with the numbers you have presently, look out for irregular clients like corporate organizations, NGOs, corporate societies, Churches, governments, and international bodies. If it is financially feasible for you, hire a marketing manager to identify this client segment, write proposals for them, and follow up to achieve positive results. The manager will also ensure that every encounter with any of these clients is professionally handled. You must not miss appointments with these clients. Also, don't make your proposal clumsy or overly exaggerated. Ensure you follow up closely with every intense contact to ascertain mutual interest. When dealing with this group of clients, exude an oral sense of excellence, competence, and honesty. You must make uncommon efforts to convince them why they should deal with you rather than others. Above all, make them

feel special and pampered.

Affiliate dealers

As you read this book, you are either a MACEOS member or an independent entrepreneur who wants to broaden your understanding of the automobile business. MACEOS's primary objective is to identify, groom, and develop formidable automotive CEOs who will revolutionize the industry and drive contemporary change. The creation of MACEOS is an advanced networking exercise carried out by Autohub Africa. Although it is not for immediate gain, it is a lifelong platform that would enliven business relationships among automobile entrepreneurs. Thus, advanced networking with affiliate dealers involves presenting new offers or business proposals to your existing affiliates, identifying additional affiliates, and building relationships with them.

Brainstorm and work synergistically with your existing affiliates and present new business ideas to them. For example, if your relationship with your affiliate is for them to sell your vehicles and you to sell theirs, expand this business circle by bringing up something new.

You can start suggesting vehicles that they can buy and resell to them. Conversely, you can tell them to suggest to you. You can also develop business proposals outside of selling and buying vehicles. In one of the remaining chapters, I have listed other businesses you can do in the automotive industry. To strengthen your business relationship with your affiliates, attend their special occasions when you are invited. You can also invite them to your private or company events. You can also share your fliers, brochures, or promotional materials with them whenever you're conducting business awareness exercises. Be discontented with the number of affiliate dealers you currently have, no matter the numbers. Aspire for more! For instance, if your affiliate dealers are limited to Lagos alone, determine to visit and network with dealers in Abuja, Port Harcourt, Enugu, etc., and make dealers in these states your affiliates.

International ties

As I have said previously, don't limit your business scope to your country alone. If you want to be a successful automotive CEO,

you must embrace the uncommon and recognize the importance of international networking. Networking internationally is like traveling through the window of your goal. However, the scope of your vision determines the extent of your reach. If I may advise, I would say dream as though you want to own the universe. As a modern automotive CEO, you network internationally. And you don't have to travel to the USA, for instance, before you can network with automobile companies in the USA. As a matter of fact, none of my international affiliates had seen me in person unless they had been in this country or were in this country before traveling overseas.

My relationship with my international affiliates has been through email, WhatsApp, Zoom, and, in a rare case, phone calls. Therefore, it's easy and economical to build and maintain international affiliates. There are many ways to network with prospective international business allies. The best and easiest way is to have a website in your company's name and maintain a strong social media presence. This enhances believability and accelerates mutual interest. However, owning a website isn't mandatory for networking and building international business relationships. There are other ways to achieve this. For instance, you can visit dealer profiles on auction sites like Copart, ADESA, BidderBid, Auction Export, and Bidadoo. On these sites, you can meet credible licensed dealers with whom to network. You can also visit automobile brand companies like Toyota, Mercedes, Honda, Kia, etc., and, if you are capable, send a proposal to them based on what you want to do with them. Either you market their vehicles or work out a franchised assembly plant in your domain.

You can also network overseas using the people you have over there who may not be licensed dealers but have the capacity to link you up with licensed dealers. Regardless of how you were able to get these contacts, the primary lesson is to never take a shortcut; be truthful when dealing with whoever you come across. Building international affiliates is costly and demands the utmost sincerity, perseverance, and willingness to survive. If an affiliate overseas sends down vehicles to you, embrace the opportunity and never lie about how you go about it. When the vehicle is sold, remit the proceeds as immediately as possible. Do not desire to use the money and run domestic turnover before you can inform him or her that the vehicle has been sold.

The advantage of being truthful in dealing with your diaspora affiliates is that when you have eventually earned trust, the person or persons involved will recommend you to other international dealers who may be looking for sincere ones to deal with in your country.

Try to share your dream with them. You can request an invitation to visit the country with the most international affiliates. Of course, visiting such a country would be primarily for business, and when this is done, take your time premeditatedly to visit automobile brand companies for more networking, experience, and any other exercises that will utilize the expedition.

Quest for new development

This aspect of networking is essential. Seek new developments in the automotive industry, which can include new vehicle features, technological forecasts, and evolutionary dynamism. You must keep yourself abreast of all required knowledge. When you find yourself overseas for networking, make an effort to visit automotive brands' manufacturing plants. I know that gaining entrance to a manufacturing plant is hard, but you have to work it out regardless. Try to understand how vehicles are produced and assembled. If possible, learn every process in automobile manufacturing. This will broaden your understanding, increase your experience, and enhance your confidence.

Also, visit software development companies, AI, space exploration, maritime, and robotic companies. It all depends on your interest. However, visiting these companies, especially the manufacturing unit, will expose you to many things that will contribute to your success in the automobile industry. In every visit or encounter, persevere to discover a business of your interest and capacity and then send a proposal to the people concerned. For example, suppose you visited Japan and saw a brand of vehicle that is not in the Nigerian market. In that case, you can propose bringing such a brand to Nigeria and making it a household name, even across other African countries. Make your company known; share your business card and refer new people to your website.

Automotive Artisans

This topic is pivotal as you can't do without automotive artisans.

But you have to arm yourself with tolerance and forgiveness before you can deal with them. The fact is that auto mechanics can help you fix your vehicle, but be ready to suffer migraines. Select artisans who are good and dedicated to working with you. Always pay them well. And never give them room to distrust you. For example, if an artisan used his money to buy parts and fix the vehicle, and you are satisfied with his job, pay him immediately. Don't owe him for any reason. The advantage of adopting this character towards them is that they will always fix your vehicles, whether you have money or not. Determine the trustworthiness of each artisan before you start leaving your vehicle with him. If possible, let the person provide a guarantor, especially when his office is less collateral.

Make sure that you understand every fault fixed on a given vehicle, so it will be familiar to you next time. Reach out to an artisan who didn't show up for work; strengthening the relationship goes a long way. Some of them will do things that are very annoying and incriminating, but you must learn to manage these shortcomings and move on. If you keep disengaging them because of bad character, you will end up with no artisan. Let them have the changed parts; don't drag them with you. Pay them well, and tip whenever you feel like it.

The following are things that you shouldn't allow automotive artisans to do to your vehicles:

Using a vehicle's rim to pack it

Inform all your artisans before you drop a vehicle with them that they should never use your vehicle's rim to pack the vehicle or another person's vehicle. The reason is that a rim can be damaged during this process, leaving it with deep marks and scratches. Staining the car interior with dirty "mechanic hands", I mean, dirty hands and clothes. As I stated earlier, you must build your patience and tolerance to the brim to deal with artisans. This is because they can indeed be annoying. Sometimes, they will so dirty a vehicle that you gave to them that you would almost be tempted to physically confront them. They are so ignorant of these things, and all they can say in this scenario is, "Oga", don't worry, we will wash it, and it will come." They usually say this mischievously and sometimes mockingly.

Well, I have begun a campaign on our automotive blog platform to educate automotive artisans on how to handle vehicles in their roles. I believe this will impact them in the long run.

So, before you drop your vehicle off with an artisan, you have to warn him that you don't want the interior stained or otherwise manhandled. Meanwhile, it's suggested that you wrap the vehicle seats with nylon if you washed them before the vehicle's fault occurred.

Some artisans usually use local fabric to cover the seats while they work. You can demand that they use it to keep your vehicle's seat stain-free. Alternatively, you can demand that they wash their hands and clean their clothes before entering the vehicle. Overall, ensure that your vehicles don't get stained or abused. Some stains are stubborn to wash off, and some are indelible, especially on fabric seats.

Sleeping or resting inside the vehicle

Some artisans would get into your vehicles, turn the engine on, put on the air conditioner, and rest therein, sometimes sleeping. This can be very annoying, especially when you have enough petrol in the vehicle, only for them to return it empty because of what they did to it. Apart from petrol, there are other consequences to their doing this. Therefore, you must caution any artisan you are dropping your vehicle off with not to do this.

Driving the vehicle around

This is very important! So many artisans have destroyed their clients' vehicles in their possession. Some artisans use to drive clients' vehicles indiscriminately. Some would take it home for the weekend. Some would use it to visit their girlfriends. Some will drive aimlessly for fun. Some will return it with an accident impact, some will spoil it in the process and will be crawling to fix the vehicle, and so many other reasons that expose the vehicle to risk.

We had our vehicle crashed by a car washer. After convincing us that the vehicle wasn't ready for pickup, he took it out with friends at night because he had washed the floor rug, and it wasn't dry. Unfortunately, he took the vehicle out and had an accident. The consequence cost us so much inconvenience, aside from the financial aspect. We have had other similar casualties from car washers and

artisans.

With all seriousness, warn your artisans never to drive your vehicles in the vicinity for any reason. If need be, they should inform you because most of them do this, hiding under the guise of test-driving the vehicle.

Over-charging

My police friend once told me that I should consider every automotive artisan a potential criminal. Empirically, I will not rebuke what he said. A higher percentage of them are inclined to cheat or steal from vehicle owners. For this reason, you must take whatever an artisan tells you with a pinch of salt. If an artisan tells you the amount a given vehicle part costs, don't trust him; instead, conduct an independent market survey on how much such a part costs. This is another reason you must work hard to know at least 50% of the prices of vehicle parts. It will save you a lot. You can find bracket parts prices online on Jiji and other relevant portals. Alternatively, you have to build a relationship with a parts seller who will always tell you the truth about the price of a part you want to buy. A fact check is that no automotive artisan will tell you how much a part is sold for. They would always work their "cut" in.

Knowing the original vehicle part

Yes, one thing is to buy a vehicle's part, and another is to buy the original one. There are four categories of parts. We have brand-new parts from vehicle manufacturers, cloned versions (China), foreign used vehicle parts (Tokunbo), and Nigerian-used vehicle parts (Refurbished).

You have to understand each category and each part, and make sure the one you paid for is what you were given. Of course, you can give an artisan money to buy a part for a foreign used vehicle, only for him to compromise and buy Nigerian used refurbished parts for you.

You can pay for a brand manufacturer's part; he gets the Chinese version for you, and vice versa.

There are complex vehicle parts you must understand thoroughly, such as the engine, transmission, and brainbox. You don't buy this class of parts in a hurry. In fact, you don't purchase them forthwith;

rather, you reach an agreement with the seller and pay him after he has installed them and they are working very well. Meanwhile, there is still a hidden secret in any of these parts. The hidden secret is that although the parts may be functional very well, they already have a high depreciation value. For instance, Japan's engine, gear, and brainbox are newer than those of the USA. The reason is that the USA uses vehicles longer than Japan, Dubai, etc. As a result, their vehicles' mileage is usually higher than that of other countries. Consequently, the grade of their vehicles is lower than that of Japan and Dubai, for instance.

So, if a parts seller agrees to bring any of the subject parts to you, you would first have to determine whether the person is giving you USA or Japan. Although Japan is usually more expensive. However, always compare prices and go for the best offer.

False declaration of a vehicle's fault

This is true and prevalent among automobile artisans. When you bring a vehicle to them for an issue they've identified as minor, they will magnify it and tell you it's another, more expensive, faulty part, all in an attempt to defraud you. It could be that the fault does not require replacing the part, but they will tell you the part is bad. After you give them the money for the part, they will pocket it and then fix the problem.

I have witnessed a mechanic try to convince my logistics manager to collaborate with him in declaring that a given vehicle is faulty and requires the replacement of part(s). Then, they will share the money after it has been paid for. One had called about replacing the bad parts in a vehicle, so I decided to supply the parts to him because my instinct told me to. When my part supplier took the parts to him, the mechanic approached him closely and told him that not all the parts of the vehicle that he listed were bad, that he wanted to make money off me, and that he should tell me that those parts were faulty so they could both share the money.

Imagine such mischievousness! Of course, my logistics manager and the part supplier declined his offer and then confided in me. I wasn't taken aback, however, because I already knew those artisans' criminal tendencies. This is another reason you must make an effort to understand your vehicle's mechanisms. This will enable you to

know exactly what is wrong with your vehicle when it breaks down, thereby saving you a lot from fraudulent artisans. Indeed, it is rare for my vehicle to develop a fault, and I don't know what it is. This is the pre-engineering technical know-how I talked about earlier.

Quacks

Especially in Lagos, 50% of automobile artisans in operation are quacks. They know very little about vehicle mechanisms, especially those outside the Toyota brand. As a result, many of them do more harm than good. I can't give an account of several odd experiences from these quack artisans. They would exacerbate a given issue in a vehicle and even damage systems unrelated to the primary fault. Some would even go so far as to steal sensitive parts from the vehicle and replace them with faulty components. I have encountered numerous cases of catalytic converter theft. When you raise your eyebrows at why a vehicle that was previously in good condition now has serious issues after being given to them for repair, they will claim it's just the nature of vehicles that they can develop problems at any time. Arguing or contesting this makes one seem foolish. Therefore, the best approach is to look for quack artisans through a lens and avoid them. I recommend you use established Automedics with well-trained artisans. Although their services may be more expensive than those of regular artisans, the benefits are worth it. Regrettably, some Automedics setups ended up hiring unqualified artisans for lower remuneration.

Payment

As I stated in a previous episode, always pay an artisan his service charge. Make a spirited effort to always pay your artisans for their services. However, don't pay any artisan until he starts work. It's advisable to commit him to fifty to sixty percent of the total amount. The reason is that when you pay them in full in advance, they become less committed to fixing your vehicles. As a result, they would subject you to chasing them around to work for you. It takes responsible and established people to appreciate your gesture and respond positively in return. Meanwhile, always make sure that you pay for the parts they want to use to fix the vehicle; alternatively, provide the parts for them. Unless it is a type that you agreed with the artisan for him

to buy parts himself, and you will pay him (including for his service) afterward.

Upgrade

When you start using artisans in different areas to fix your vehicles, watch out for their improvement. The automotive industry's technology is advancing rapidly. As a result, the vehicles we currently have will soon be obsolete. Consequently, automotive artisans, especially electricians, must upgrade their knowledge as the clock ticks. Therefore, if you notice an artisan who works for you is stagnant in his experience, approach him and educate him on the need for additional training so he will stand the test of time. I have done this to so many artisans, many of whom have received external training from another.

I even have one who, after his training, was adopted by one of the automotive artisans' unions (NATA) to represent them in a radio show involving more than three radio stations. Of course, the guy is good, and he is so pleased with such elevation. I also have one electrician whom I told to get a smartphone and who always receives lectures online via YouTube. He took my advice and started off, and after two years, the man became "a sort of" product. Today, he is one of the best electricians for Hybrid vehicles and other luxury and complex vehicles.

I have cataloged these good, experienced artisans who are my team today. Thanks to their experience and dedication, they make the operation so easy for me. Anyway, the point I want to make is that you should work with good artisans who are continually updating their skills for future use. They will give you the best and make the work easy for you.

Security

This episode's topic is the most important because of its sensitive nature. You should drop your vehicle off with an artisan only when you have enough security to do so. In other words, don't leave your vehicle with an artisan you don't know very well or who hasn't provided sufficient security. Security can be a guarantor provided by the artisan, or it can be an office that is more valuable than your vehicle. In fact, you can fall back on anything you know in case anything happens to your vehicle.

CHAPTER NINE

AUTOMOTIVE SECTORS

As a CEO, giving back to people is your ultimate crown. Our true happiness in life is to give and put smiles on people's faces. As a matter of fact, whatever you have does not belong to you but to the whole world. We have discussed generosity as one of the attributes of a good CEO. Here, we shall discuss giving back to the people as it relates to the change you have brought to your endeavor's industry. Do not engage in any business for monetary gain only; instead, aspire to change the industry. As it concerns our industry, as an automotive CEO, make sure you introduce something new or modify what already exists. In fact, one of MACEOS's primary objectives is to build successful automotive CEOs who can revolutionize the industry.

The automotive industry is still in its infancy in Africa, especially in our country. Many automotive services in the rest of the world are not functional here, and we don't have the structures or regulations. Everybody wakes up and goes into a business they like without prior knowledge or training. For example, in our country, a man can wake up tomorrow and decide to become an automotive dealer, and that is all. There are no processes, scrutiny, training, or certification. As long as the person has the money to start the business, they go into it inadvertently.

Another example is automobile artisans. Some had little or no experience before getting into the job. And you can't blame them because they appeared from nowhere and started rendering automobile repair services without scrutiny or admission processes.

This category of artisans has apparently done so much harm to the industry. They spoil vehicles in their possession instead of fixing them. The worst of it is that they mischievously rip off the unsuspecting owners of the vehicles, their hard-earned money. Of course, no one would like to associate with these people because the damage they cause to vehicles, the time they waste, and the exorbitant charges are unbearable.

Today, this is still the case, as there is no measure to certify an intending automobile artisan before he starts operating. Against this backdrop, all hands must be on deck to see that we restructure the industry and normalize abnormalities. Another example is when we want to buy a vehicle: We quickly copy the chassis number so we can check its history while it was overseas. Now, we derive satisfaction from the information we found online about this vehicle because it guided our decisions. Unfortunately, this vehicle's history dies the moment we buy it, leaving the next owner in the dark. This leads me to ask: Why don't we have such a utility and standard here? To answer this question, we have devised a list of things you can do outside of buying and selling vehicles in the automotive industry. They are all poised to drive innovations that can bring significant change to the industry.

The ultimate goal of the MACEOS program is for you to choose one of the things listed below and build on it now or in the future. We set up the MACEOS platform with this objective because we have an unquenchable passion for revolutionizing the industry. Please read the following very carefully and choose anyone who motivates you. If you have one that is not on the list, let us know, and we will work closely with you to see that it is accomplished. This is the goal of MACEOS. We want to bring a change in the industry. We want to have structures like the Westerners and even out-develop them. Here is the list:

Education Of End Users

You can set up a school or platform where end-users can be educated on driving, pre-engineering technical know-how, vehicle maintenance, vehicle documentation, handling, and insurance. Knowledge of these things will reduce end-user dependence, prevent rapid vehicle depreciation, reduce vehicle repair costs, and improve

safety. These are the basic things that educate end-users to know as it is related to handling their vehicles and their utility:

Vehicle servicing

Yes! A vehicle's engine, transmission, and other components should be serviced as and when due. The engine is the most important part because it can affect many things. Lack of vehicle engine servicing can lead to engine wear and poor overall idling. In fact, a lack of regular engine servicing can lead to a shortage of oil, which can affect the camshaft, oil pump, and the engine itself. This includes other vehicle components, such as the transmission, brake, steering, washing the fuel tank, and so on. Also, ensuring that the lubricant cups are gauged.

Repairs

Vehicle end-users must understand that they must fix their vehicles whenever it's required. They don't have to wait until a car breaks down to fix the faulty parts. Ideally, vehicle owners should have their vehicles checked for mechanical/electrical issues at least every two weeks. This will keep their vehicle in check and reduce wear and tear.

Logbook

This is all about keeping records of your vehicle servicing dates and other relevant vehicle history, such as accidents, theft, usage (like moving from one hand to another), insurance, and so on. When these things are documented, they will give abstract information about the vehicle to anyone interested in buying it. Unfortunately, we don't have a database where all this information can be deposited and accessed. Nevertheless, we hope to achieve this in the future. A likely impediment is that vehicle owners and artisans will not be innocent enough to state the vehicle information exactly as it is. Against this backdrop, we are also challenged to filter the automobile artisans and train the qualified ones to perform effectively with zero tolerance.

Keeping the vehicle neat

All of you will agree with me that we often admire Westerners for keeping their vehicles neat and clean after years of use. Well, this is a

premeditated effort made by the owner to keep the vehicle tidy and undented. Imagine someone using a car for 10 years without a single scratch. We have to admire a careful life of this quality. Westerners even train their children at an early age not to scratch a parked vehicle or abuse the vehicle in any way.

The reverse is the case here, as children scratch vehicles at will and even abuse the interior in a horrible manner. I have seen a car where the owner's child used a pen to write on all the back seats, even perforating them. We must make conscious efforts to keep our vehicles neat. Mind what you put in the boot; avoid putting anything that contains liquid, as it can stain the boot or other interior parts. In one of the episodes, we discussed how best automobile artisans can handle vehicles in their possession and what you shouldn't allow them to do to your vehicle.

Sensitization

Vehicle owners should be sensitized to the fact that a vehicle is a necessity and not a luxury or a means of displaying affluence. Some car owners puff up because they have acquired more than one car. Some feel as though they are on top of the world and blend this feeling with arrogance.

Any car owner who becomes unbalanced because he manages to buy a car is initially poor and native. A car is only a necessary tool, just as shoes are to you. Thus, vehicle owners must humble themselves and use their vehicles unassumingly. They must learn how to respect social authorities and always do what is right. For instance, if you attended an event and were told to repair your vehicle, please do so without argument. Obey traffic rules. Avoid exchanging words with authorities when you are pulled over for any reason. Avoid over-speeding, and equip your vehicle with safety gadgets. Don't park your car in an area that can expose it to thieves. If possible, install effective trackers in the vehicle. This will save you a whole lot.

Documentation

End-users need to know that they need a complete document of their vehicle. They should ensure the vehicle's documents are complete and original. The original documents should be kept in a safe place, and only photocopies should be left in your car. Copy the custom C

number of your vehicles and save it. This will make it easier for you whenever you lose the custom papers.

Driving

Driving is a skill that no one should compromise. As soon as you have a hold of the steering, you are a different person! You become a person whose life is in his hands. Every vehicle owner must know how to drive well before hitting the road. He should attend a driving school and thoroughly learn everything required to drive, including traffic signs. He must learn to drive with a high level of concentration. He should also be expert enough to ghost-drive for other drivers. This simply means that he should be able to anticipate what the next driver, either ahead of or beside him, will do. By mastering this, many accidents are averted. Don't drive when drunk, smoked, or taken hard drugs. Don't drink when sleepy, stressed, emotional, angry, panicking, infirm, etc.

Insurance

You can train vehicle end-users on the importance of vehicle insurance. Teach them the types of insurance available and their benefits.

The following are the basic vehicle insurance policies that you should have knowledge about:

- Liability or Third-Party Coverage: Third-party coverage is mandatory in Nigeria and some countries. Drivers are legally required to purchase at least the minimum amount set by the **Government**.

There are two types of third-party vehicle insurance: Bodily injury and property damage.

Bodily injury to a human is a policy that helps you pay for the cost of another person's injuries when they occur as a result of an accident involving your insured vehicle.

The Damaged Property policy helps you pay for damage you caused to another person's property (vehicle inclusive) while driving.

- Uninsured/Underinsured Coverage: This type of vehicle insurance policy is uncommon in this country; however, it's a vehicle insurance coverage that is very helpful. This is how it works: If you're hit by a driver who doesn't have insurance coverage, uninsured motorist

coverage may help pay for your medical bills or, in some cases, repair your vehicle. If an underinsured driver hits you, that means they have vehicle insurance coverage, but their liability limits are not enough to cover your resulting medical bills. That's where underinsured motorist coverage may help, depending on the policy clauses of some insurance companies.

- **Comprehensive Coverage:** Comprehensive vehicle insurance covers your vehicle from theft, fire, hail, or vandalism. If a covered peril damages your vehicle, comprehensive coverage may help pay to repair or replace your vehicle (up to the vehicle's actual cash value). This coverage has a deductible clause, which is the amount you pay out of pocket before your insurer reimburses or indemnifies you for a covered claim.
- **Collision Coverage:** If you're involved in an accident with another vehicle or if you hit an object such as a fence, collision coverage will pay for the repair or replacement of your car (up to its actual cash value and minus your deductible). Collision coverage is typically optional. Although your vehicle's leaseholder or lender may require it.
- **Medical Coverage:** If you, your passengers, or family members who are driving the insured vehicle are injured in an accident, medical payment coverage may help pay for the costs associated with the injuries. Covered expenses may include hospital visits, surgery, X-rays, treatment, and more.
- **Personal Injury Protection:** Personal injury protection, or PIP, is only available in some insurance companies. Like medical coverage, PIP pays for your medical expenses after an accident. In addition, depending on the clause, PIP may cover other expenses incurred because of your injuries, for example, childcare expenses or lost income while receiving treatment.

Other types of vehicle insurance include Rental reimbursement coverage, transportation expense coverage, gap coverage, new-car replacement coverage, towing and labor coverage, ride-sharing coverage, and classic car insurance. Your insurance agent can help you understand what each policy covers so you can choose the right one.

Sell, Buy, and Swap

Vehicle end-users should know how to buy, sell, and swap vehicles. The best way to sell your vehicle and get its equivalent value is to know its current condition first. After which, you go for a market price survey. You can get this online by visiting automotive classified websites. Alternatively, you can ask an automobile dealer you know and trust. With the information you have gathered on the vehicle's current price, you won't be ignorant about selling it. Now, you can either advertise it online using a platform of your choice or contact an automobile dealer to do that on your behalf.

On the flip side, if you want to buy a vehicle, do some research. You can go online and read reviews about the vehicle. After deciding which vehicle to buy, do a price survey to get a price bracket for the vehicle. Having determined the price, look for the vehicle through a dealer or an individual. When you have seen the one you like, take an automobile mechanic you trust along with you for an inspection. While inspecting, look out for the following: the grade of the engine, the transmission, the AC, the body (if it has been repainted and if the body has eaten filler), the suspensions, rust, the brake system, accident history, overheating history, the catalyst, and the documents.

This also applies to you as an automotive CEO. If you want to buy a foreign-used vehicle, confirm the C number in the Nigeria Customs database to ensure that the vehicle's import duty has been paid. But this is not the point that I want to make. The point I want to make, which is very useful to both end users and automobile dealers, is to avoid buying a stolen vehicle at all costs. Buying a stolen vehicle can ruin your company as an automotive CEO and as an end user. I have experienced this and don't wish my enemy to fall into such a situation. As a matter of fact, buying a stolen vehicle has taken me to Ikoyi Correctional Centre, an experience I will never forget. I thank GOD, my innocence was proven.

Whether you want to buy a Nigerian or foreign used vehicle, carry out a comprehensive investigation before you pay. If you are not convinced, don't buy it. I have turned down many juicy deals because their documents were questionable. If you are buying a foreign used vehicle, make sure you pay into an account whose name is on the bill of lading. Pay only to an account number bearing the same name as written on the bill of lading. If the seller says the person whose name

is on the bill of lading is his agent, tell him to obtain an authority-to-sell letter from the agent stating that the money should be paid to the agent's account. It may not always be an agent, but whoever is named on the bill of lading should receive the money himself or send an authority-to-sell letter in favor of any other account presented. The reason for this is that, should the vehicle be reported to be stolen later, under the law, you would be justified only when you paid into an account after the name of the person on the bill of lading or the person whose name is on the bill of lading authorized you to pay into another account. These are the only conditions under which you will be justified and considered an innocent buyer when you are arraigned.

The candid advice I will give about Nigerian used vehicles, based on my experience, is to involve the police. Submit the documents to the police, who will conduct necessary investigations. This will not cost you much, but if it does, the benefits outweigh the cost. As an automotive CEO buying a Nigerian used vehicle, it's ideal to have a permanent documents verifier. This should be someone with experience and connections with all the relevant authorities for faster, more authentic verification. This will give you peace of mind and protect you from the cost of buying a stolen vehicle.

Back to our discussion, once you have verified the vehicle's documents, make payment, and collect the receipt and the change of ownership (if it's a Nigerian used vehicle). With your mechanic's help, check what needs to be done to the vehicle and fix it. The last is vehicle swapping. This function occurs when you have a vehicle and want to trade it in for another, usually at a dealer. The combination of the processes that apply to selling and Buying applies to swapping.

Feedback

End-users need to provide dealers and artisans with feedback on the vehicles they purchased, including the vehicle's functionality and any issues.

Training Of Artisans

You can choose to train automotive artisans in their respective specializations and equip them with the highest level of professionalism. This will promote professionalism in automobile

repair, and, all things being equal, dealers, the Government, and end-users will enjoy the excellence of service and the durability of vehicles. Training Artisans is not difficult. I did this when my company partnered with the Nigeria Automotive Technicians Association (NATA). At the head stage of the project that we forecasted, I had to train more successful Artisans after the screening process. I was able to achieve this because I have knowledge of vehicle mechanisms and repair. Nevertheless, you can conduct successful training for automotive artisans without having to train them yourself. All you have to do is hire experts in each field, and they will train them. For instance, when we screened NATA artisans, I didn't do it myself; I hired experts to do so, and they did a great job. What is prime is your passion for bringing a change in the industry. If this is your focus, you can achieve anything you desire in the industry.

Licensing Of Artisans

This aspect is very crude and unprecedented in this country, and any organization or company that succeeded in partnering with the Government to start licensing automotive artisans would be a record-breaker. Our system is against the norm, and this is why we are operating behind. The standard in the first and second worlds is that an automotive artisan must be licensed before operating, which is highly advantageous. The qualification of these artisans is based on technical know-how appraisal, and anyone who meets the required experience and certification requirements is licensed.

Licensing is very important, as it filters out quacks and allows only well-trained, experienced artisans to perform automobile repairs. This will save us from the damage caused by inexperienced artisans, keeping our vehicles in good condition. Partnering with the Government to establish a licensing platform for the automotive industry will revolutionize the industry. It will make vehicle servicing and repair in our country professional, as artisans will have to undergo comprehensive training before being licensed. Honing your interest in developing a platform of this nature will bring a drastic change in the industry. Note, before a government will accept your proposal to partner with you in licensing automotive artisans, you must have a good structure in the automotive industry, with evidence to show for it. Thus, if you choose this, you must work hard

to build your company so that the Government will recognize your company's name before you approach them.

Vehicle Logbook System

This is an area of development that requires immediate attention in our country. At the start of this topic, I illustrated the vehicle VIN check by saying that we get information about a vehicle we want to buy by running its VIN, but once it is brought into our country, its registration will stop until it goes out of use. A vehicle logbook system is a platform that records all information about a vehicle in use. This includes service history, accident history, mechanical repair history, mileage, body repair, theft, insurance, years of use, government taxes, etc.

These records are very important because they provide the intending new owner with summary information about the vehicle. In fact, the logbook is legal in the United Kingdom; the Government recognizes it. Vehicle logbooks will change significantly when implemented, and this will require little effort. They involve the artisans recording whatever was done in a given vehicle. Similarly, the people concerned should provide for other non-mechanical aspects, such as insurance. It will be phenomenal when we achieve this. So, you can leverage this and leave a footprint in the automotive industry in our country. You can build a systemic mobile App where people can logbook the history of a given vehicle. Of course, this would compel you to work with all automotive artisans and end-users.

Telematics

This is all about making a vehicle smart. It is a method of monitoring vehicles using GPS technology and onboard diagnostics on a computerized map. This technology is very inspiring because it makes a vehicle smart enough to save lives in an accident. It also records events while the vehicle is operational, can signal danger and report it, and, above all, is an anti-theft technology that can be used to monitor fleets of vehicles. You can study more about this technology, improve on it, and build one.

Augmented Reality Head-Up Displays

AR HUD technology is changing how we interact with our vehicles. This technology allows you to view your vehicle information, such as speed, navigation directions, and vehicle data, directly on the windshield. AR HUDs allow drivers to keep their eyes on the road while staying informed and connected. This technology differs from what is common today because it is smarter and futuristic. It has been theorized that this technology will serve as a mini-doctor, allowing you to view your health status right on the windshield while steering. This implies that if you are driving and anything goes wrong with your health, your vehicle will alert you, averting potential casualties that can lead to death or fatal accidents. You can make Augmented Reality your area of specialization. Gain knowledge about it and build one.

Vehicle Security

As vehicles become increasingly connected, biometric sensors will play an important role in ensuring that only authorized drivers can access and operate a given vehicle. This technology includes facial recognition, fingerprint scanners, and AI sensors that will identify and deny access to unauthorized drivers. This technology will undoubtedly change vehicle security systems and reduce the risk of theft and unauthorized access. With this technology in every vehicle, vehicle snatching and theft would become a thing of the past. You can leverage this technology to bring about change.

Carbon Capture

Personally, I like this field of technology, not just for its development and commercial aspects, but also for its benefits for healthy living and the security of the ecosystem. Almost all automotive brands are working hard to reduce vehicle carbon emissions. Carbon capture technology is set to play a critical role in achieving this goal. By capturing carbon emissions from vehicle exhaust and safely and sustainably storing them, we can create a greener environment and combat the adverse effects of climate change.

This technology will forever change the history of the automotive industry, and by specializing in it, you can become part of this positive change. In terms of space and global climate control, space-

based climate control is specifically recognized as one of the key strategies to achieving the 17 Sustainable Development Goals for 2030 set by the United Nations. A great example is the reflective materials originally developed to conserve heat in spacecraft, which are now commonly used to insulate buildings on Earth.

This means that world governments are increasingly investing in space innovation to tackle challenges caused by climate change on Earth. With growing awareness of the importance of decarbonization and limiting global warming among businesses, it's becoming a central focus of enterprise activity as well. One of these initiatives is MethaneSat. MethaneSat is a satellite project that detects and monitors methane emissions worldwide with high accuracy and precision. It is designed to identify and track sources of methane emissions on Earth. This is vital because, according to the Intergovernmental Panel on Climate Change (IPCC), methane emissions alone account for around half of the rise in global temperatures since the start of the industrial era.

The UK space agency has funded several ongoing projects, including one spearheaded by Global Satellite Vu. This project involves using satellite-borne infrared cameras to monitor thermal emissions from homes and businesses. Another project, named TreeView, established by the Open University and funded by the UK Space Agency, will use satellite imagery to map tree cover and track deforestation, with a focus on trees' role in carbon sequestration and storage. There are so many other decarbonization projects on Earth and in space, all poised to make the Earth and space more environmentally friendly. You can build on this research and develop a better solution, all for the safety of Earth, space, and the human race. For those who might invest in this, we can start by sensitizing motorists to the need to avoid driving vehicles with bad combustion. Every Government must discourage the use of smoking vehicles on the road. In like manner, they should regulate industrialists to control emissions.

Solid-State Battery

Everyone is eagerly awaiting the arrival of solid-state battery technology, which promises longer ranges and faster charging times than conventional lithium-ion batteries. Some automotive

manufacturing companies are already investing heavily in this technology. They plan to manufacture vehicles equipped with solid-state batteries and bring them to market within the next few years. You can help bring technology to fruition by researching and specializing in it. It will indubitably dwarf the battery technology that we have today.

Smart Road Construction

Smart road construction is not only the responsibility of civil engineers or the Government, but also a concern for the automotive industry. We need innovative road technologies that can keep pace with, or even surpass, the technological evolution of automotive products. Technologies like speed sensors, acoustic sensors (for noise), CCTV cameras, weather monitoring systems, digital signage, road-as-a-musical-instrument, energy harvest, and weighing instruments, such as electric vehicle battery chargers, digital traffic signs, traffic violation detection, V2V communication, wind-powered, smart streetlights, smart parking technology, glow-in-the-dark paint, etcetera. These technologies will become the norm tomorrow. Therefore, you have to study them thoroughly and invest in whoever interests you most.

Airless Tires

This technology has become the vision of tomorrow since the Michelin company presented it to the world in 2019. It is a game-changer! Imagine a world in the automotive industry where we don't have to worry about tire punctures or the need for tire vulcanizing. The benefits of this technology cannot be enumerated. Thus, I implore you to study it further and take advantage of it. If this technology is available at a good price, it will boom. Imagine an aircraft landing with airless tires. Its security and reliance will reveal ingenuity.

Robot

I have discussed robots in the automobile market and highlighted them well. Here, I will discuss only space robots, just to open your eyes to this aspect. There has been a surge in the production of space robots, and they're becoming increasingly advanced. The global market for space robots was estimated at \$8.8 billion in the

first quarter of 2024 and is projected to reach \$16 billion by 2030. Space robotic production is always special, as it requires materials that protect against space radiation and extreme temperatures. Also, sophisticated navigation and precision sensors.

Below are a few mind-blowing space robots:

Mori3

Number one on our list is Mori3, a modular robot inspired by origami. Mori3 consists of a series of triangular panels, each side of the module connecting to form almost any 3D shape, thereby making it a shape-shifting robot. Mori3 is a shape-shifting robot that can adapt quickly to traverse landscapes, carry cargo, and repair spacecraft. Production of Mori3 is still in progress, but it will be commercialized soon. The Swiss Federal Institute of Technology Lausanne manufactures Mori3 and believes that it can apply its shape-shifting technology to aircraft.

The benefits of having Mori3 in an interstellar body like the Moon or Mars are enormous, as Mori3 will provide services. It would be stored flat and vertically and could readily perform multiple roles, adapting to the known and unforeseen challenges of space exploration.

Swarm-bees

This new technology has captivated the imaginations of space robotic engineers. It is called swarm technology. It is made to function like bees in a colony: small and simple flying robots built to swarm through a new planet's atmosphere and record conditions using their cameras, sensors, and wireless communication devices. NASA had earlier built and tested a similar technology using bee-sized robots called Marsbees. The technology was designed to flap like a bee's wings. Marbees are robots engineered to connect to a Mars robot base. They are launched to communicate with each other and the base robot. The base robot sends them in different directions within a 1.5-mile radius to execute one function after another. The concept of swarm robots has opened up a new possibility for near-future space exploration.

Snake-like Robot

Space adventure is as unending as existence. Thus, humans face a challenging and inspiring task. We are faced with an uncountable number of galaxies and almost uncountable stars, planets, moons, and asteroids. Having been tested at NASA's Jet Propulsion Laboratory, a snake-like shapeshifter robot would be on its way to Saturn's moons by 2026. Methane lakes have been detected on Saturn's moon, raising speculation that there might be a living organism or that it once hosted life. Because of the moon's diverse terrain, a Snake-like robot was built for rolling, flying, floating, and swimming. The robot was built to change forms to perform different motions. However, in its standard state, it is a single modular vehicle. As a result, it transforms only when it travels to a unique site that needs to be explored. This robot's components consist of multiple smaller units called cobots. These cobots are simple, slightly rounded structures that resemble the pentagonal segments of a football. Depending on the topography of a given surface, these cobots can combine to form a rolling ball, a flat hovering drone, or a self-propelled swimming machine to achieve a given result.

A snake-like robot is a demi-doctor as it's trained to understand biological molecules. In other words, it understands the structure, function, and interactions of biological molecules, such as DNA (deoxyribonucleic acid), RNA (ribonucleic acid), Proteins, Carbohydrates, Lipids, and Metabolites. These molecules are the building blocks of life and perform various functions, including encoding genetic information (DNA), transferring genetic information (RNA), catalyzing biochemical reactions (enzymes), regulating metabolic pathways (hormones), maintaining cellular structure (proteins, carbohydrates, and lipids), and energy production and storage (metabolites).

In the future, the offspring of this robot will function as certified doctors, following a comprehensive understanding of Genetics, Genomics, Proteomics, Synthetic biology, Drug discovery, and Biotechnology. Apart from Saturn's moon mission of a Snake-like robot, understanding biological molecules by robots is crucial as it will help us achieve the following: developing new treatments for diseases, improving crop yields and agricultural practices, creating novel biomaterials and bio-products, advancing our understanding

of human health and disease, and exploring the origins of life and the possibility of extraterrestrial life. Biological molecular research is an interdisciplinary field that combines biology, chemistry, physics, and mathematics to understand the intricacies of life at the molecular level. Scientists believe that robot doctors will be the doctors of the future. They will be more intelligent and advanced in the medical field than human doctors. Robotic doctors will be able to cure complex diseases like HIV, brain tumors, cancer, and spinal cord injuries.

OSAM-1

As with Earth-bound technology, machines sent into space have a limited lifespan and are subject to other hazards. There are about 131,036,500 pieces of debris in space (fragments between 1mm and 1cm are 130 million, 1 – 10cm 1 million, and 10cm and above 36,500), and they pose a threat to many casualties. Aside from this number, there are other tinier objects in far space that cannot be observed. Space or cosmic debris are defunct human-made objects in space that no longer serve a useful function. These include derelict spacecraft, mission-related debris, and fragmentation debris from the breakup of derelict rocket bodies and satellites.

In addition to derelict human-made objects, space junks include fragments from disintegration or collisions, solidified liquids expelled from spacecraft, unburned particles from solid rocket motors, and even paint flecks. Numerous spacecraft, both crewed and uncrewed, have been damaged or destroyed by space junk. Because of this, space tech kingpins are working tirelessly on space robots that can clean up space.

The following are the circumstances that cause spacecraft to plummet and their debris to become space junk:

- Propulsion (36.64%): This is due to energy left on an undispersed onboard satellite or rocket, which usually leads to an accidental explosion.
- Deliberate (26.67%): This is for international breakup events, such as a satellite designed to explode when an atmospheric re-entry went wrong or detonated as a standard procedure.
- Unknown (15.56%): This is when there is insufficient evidence to determine what led to a spacecraft crash.

- Collision (8.84%): Collision is recorded when a spacecraft hits any object in space. It often occurs when an impactor is too small to detect or avoid. When the orientation and functioning of a communicating satellite or any spacecraft change, it indicates that a collision has occurred.
- Electrical (5.74%): This event is related to a failure in the electrical subsystem, most often caused by the explosion of an overcharged battery.
- Anomalous (5.40%): This is damage to a spacecraft caused by abnormal system functioning—performing serendipitous assignments that usually lead to its destruction.

Anomalous behavior could also occur when a spacecraft's sensitive, non-robotic components, such as insulation, solar panels, and others, degrade and shed.

- Accidental (0.74%): This is due to design flaws leading to the spacecraft's breakup.
- Aerodynamic (0.40%): This is recorded due to breakups, which often happen when atmospheric drag leads to overpressure.

Tech companies are working hard to ensure that the above spacecraft's catastrophes are averted. Of course, it's always a big blow after spending millions of dollars and manpower, only for the vehicle to end up a space junk. Some spacecraft remain in orbit for many years, others fall out of orbit and burn up in the atmosphere, and others are pulled back to Earth by the Earth's gravity. However, falling back to Earth is always an adventure, as it usually takes some of them thousands of years to return, depending on altitude.

These are the altitudes that spacecraft can get to and the years it will take them to return to Earth:

- 36,000 KM (geostationary): Satellites of this height are not impacted by the Earth's atmosphere and could stay in orbit indefinitely.
- 1,200 KM: Satellites of this altitude take about 2000 years to return to Earth. Because of their long journey, they are often de-orbited and burned up in the atmosphere.
- 800 KM: A Spacecraft of this height takes 1000 to 1,500 years to return to Earth.
- 500 KM: A satellite below this height takes 500 to 25 years to return to Earth.

Now, whether these spacecraft return to Earth or become space

garbage, they remain a huge loss to the world, especially to their manufacturers or sponsors. So, tech companies are devising means to fix a malfunctioning spacecraft in orbit, and the hope of achieving this depends on robots. This is where satellites or spacecraft in orbit servicing robots come in. NASA has proposed one called OSAM-1.

OSAM-1 is derived from NASA's On-orbit Servicing, Assembly, and Manufacturing (OSAM), which is poised to build robotic spacecraft capable of repairing malfunctioning satellites in orbit.

OSAM-1 can dictate a given spacecraft's fault and fix it. It can also refuel and reposition satellites, including those that were not built with this service in mind. The launch of OSAM-1 is scheduled for 2025, and it will be a milestone achievement, reducing satellites' limitations, keeping them in space for longer, increasing communication and data collection, and efficiently aiding further space exploration.

Taikobot

Taikobot is a new robotic technology designed to assist astronauts aboard the Chinese space station (Tiangong). Its usefulness and ability impress the world, so mass production is imminent.

Taikobot is a free-flying humanoid robot designed to assist astronauts in space stations and maintain spacecraft between human visits. It is 5 feet 7 inches tall and weighs 55 pounds. It is designed to operate in microgravity, reducing launch costs and improving safety during human-robot collaboration. Taikobot is equipped with a dual-arm system that allows it to perform multiple tasks simultaneously, such as using a hammer and electric screwdriver with one hand and transporting a large package with the other. It is also equipped with a pan-tilt unit in the head to facilitate environmental awareness.

Unlike humanoid robots on Earth, Taikobot can navigate the weightless environment of space by pushing off surfaces, taking flight, and parking by attaching to handrails or foot restraints on the space station. Its sensors can detect another movement in the space station and automatically adjust its path in mid-air to avoid collisions with other astronauts. Alongside engineering and manual tasks, Taikobot's advanced sensors can monitor the health of its human astronaut companions, such as recording their blood oxygen saturation levels. Although a human presence on space stations is

essential, assistance from a humanoid robot can increase efficiency. If robots replace astronauts in space, it would be a remarkable achievement for the human race. After all, robots don't need sleep, food, or bathroom facilities like humans.

Space Recycling

The global waste recycling industry was worth \$62.22 billion in the second quarter of 2024, which is a compound annual growth rate of 6.3%. Recycling is the assembly, reassembly, or transformation of used materials or junk into new products. Future colonies on Mars, the Moon, or any other installer body won't rely on gathering materials from Earth to build spacecraft; rather, robots would scavenge for debris in space and refurbish it for different uses. Or better still, you have the material to build space gadgets. So, space machine engineers are uncovering ways to use natural resources and repurpose obsolete and abandoned technologies from previous space missions for greater utility. A USA tech-based company, Lockheed Martin, is working to make these robots a reality by 2050.

Research

This sector in the automotive industry is vital. Researchers are always restless as they journey from one evolutionary discovery to another. In the automotive industry, research activities are endless. We recently celebrated the SpaceX Mechazilla chopstick arms' ability to catch the superheavy booster. Of course, this historic scientific breakthrough resulted from the tireless work of the SpaceX research team. You can specialize in automotive research and develop groundbreaking propositions that can further revolutionize the automotive industry. Indubitably, there are many things to research in the automotive industry.

We need to research space vehicles capable of traveling faster than the speed of light to survey and explore harsh interstellar environments such as stars, galaxies, black holes, and other energetic phenomena. We need to research more advanced telescopes capable of X-ray imaging the universe. We also need to study more about green energy, electric vehicles (aircraft, ships, and space machines inclusive), batteries (lithium, solid state, silicon anodes, LMFP, sodium-ion, salt water), land, sea, air, and space safety measures,

software coding, AI development, and other contemporary and futuristic discoveries that can grant human curiosities.

Automotive Magazine

Yes, you can make a fortune and build a career from this. It's just about having a little experience in automotive journalism and utilizing its expanse. This entails information on automotive news, exhibitions, social activities, etc., providing content and catalog opportunities. You can leverage this and build a career for yourself. Autohub Africa has debuted an annual African Automotive Magazine, and it has come to stay.

Smart Auto-Wash

This is a money-generating machine, especially in Lagos, Nigeria. Today, we have smart carwash robotic tools that make vehicle washing easier and more efficient. This sector of the industry is worth investing in. You can venture into it, rebrand it, and modernize it to deliver quality services.

Automotive Blogging

This is another field in the automotive industry that you can build on. Automotive blogging falls under the umbrella of automotive journalism, too. It's essential as it will allow you to educate the general public on anything automotive-related. It requires only that you have good knowledge of the automotive industry and auto mechanics, write a few educational articles about topics of your interest, and have them published. Personally, I have started blogging about automobiles, and I believe I will carve out a niche in it over time. You can also give it a try and build on it.

Vehicle Review Service

This is another field in the automotive industry that is still in its infant stage in this country. Vehicle review is a very useful service for end users. A vehicle review evaluates a vehicle's features, suitability, and performance, and sometimes compares it with other similar models from the same brand (e.g., a comparison review of the 2008 Toyota Highlander and 2008 Nissan Pathfinder). A vehicle review aims to inform potential end-users about a vehicle's advantages

and disadvantages and to provide an opinion, assessment, and recommendation based on experience and facts. This is always done in comparison to other vehicles. You can study more about vehicle reviews and build around it.

Online Automotive Service

This is a service that Autohub Africa has already started. It is a platform called OAS.

An online automotive service platform where automotive end-users can access services from automotive artisans. For example, if an end user's vehicle breaks down on the road, he/she can use the "spot" login on our website to find an artisan nearby. The artisans are already profiled and verified for security and efficiency. You can study more about this and even develop something more innovative.

Smart Tracking Services

This is very familiar to all of us. However, technological improvements have been ongoing.

For instance, a tracking system now works much more effectively. All you have to do is hide the chip in a sealed compartment in the car. This is unlike the conventional type, where you must make wiring connections in the car and the device before it can work. This tracking system is already becoming obsolete, and I envisage other ingenious systems springing up soon.

Thus, you can research tracking services further and develop something more innovative than what we have now.

Autonomous Vehicles

Also known as driverless vehicles, this technology allows vehicles to move without human control. This technology has come to stay, and it advances as the days go by; from ADAS (Advanced Driver Assistance System) to ADS (Advanced Driving System) to full automation, where the vehicle's ADS can perform all tasks under all conditions. This full automation is powered by 5G technology, which enables vehicles to communicate with one another, traffic lights, signage, and roads via ACC (Adaptive Cruise Control). Autonomous vehicles operate through a combination of sensors, artificial intelligence, advanced computing, and real-time decision

systems. They rely on technologies such as cameras, LiDAR, radar, ultrasonic sensors, GPS, and onboard AI algorithms to perceive their environment, detect obstacles, and navigate safely without human control. Autonomous cars use these systems to interpret road signs, track surrounding vehicles, plan routes, and make split-second driving decisions. Autonomous aircraft, including drones and emerging e-VTOL air taxis, use advanced flight-control systems, 3D mapping, and redundant sensor networks to maintain stable flight, avoid collisions, and execute automated takeoff and landing.

Autonomous ships rely on marine radar, sonar, satellite navigation, and AI-enabled route optimization to travel long distances, adjust to sea conditions, and prevent accidents. Autonomous robots combine perception, mobility, and machine learning to perform tasks such as delivery, manufacturing, and search-and-rescue operations with precision and adaptability. The future is even more transformative. Next-generation autonomy will include quantum-enhanced navigation, swarm robotics, self-healing AI systems, inter-vehicle communication, and hyper-accurate satellite positioning. Vehicles on land, sea, and air will collaborate as a connected global mobility network, sharing data instantly to prevent accidents, optimize traffic, and respond intelligently to changing environments. Advances in materials, energy storage, and neuromorphic computing will allow autonomous machines to think faster, operate longer, and make safer decisions, even in complex, unpredictable settings.

Autonomy is not just an improvement in transportation; it is a futuristic leap toward a world where intelligent machines enable faster travel, safer mobility, cleaner logistics, and entirely new industries across land, air, sea, and space. My belief is that every technology requires advancement, no matter how advanced it is currently, and autonomous vehicles are not an exception. You can take a daring step and join in advancing this technology.

Electric Vehicle

This is a vehicle powered by an electric motor, unlike a conventional gasoline internal combustion engine. This technology, of course, is of the now and the future. Electric mobility—whether on roads, in the air, or across the sea - is transforming global transportation with cleaner, smarter, and more efficient technologies. Today, electric

cars, motorcycles, aircraft, and ships are helping reduce carbon emissions, lower operating costs, and decrease reliance on fossil fuels. They offer quieter performance, advanced digital systems, and improved energy efficiency, making transportation more sustainable and technologically advanced.

Electric vehicles (EVs) are reshaping road mobility by enabling cleaner cities, smart charging networks, and AI-driven autonomous driving. Electric motorcycles provide affordable, low-maintenance, and eco-friendly transportation for urban centers. Electric ships contribute to greener maritime logistics, with battery and hydrogen-powered vessels reducing ocean pollution and supporting sustainable global trade. Electric aircraft, though still emerging, signal the next frontier of aviation, promising quieter flights, lower emissions, and short-haul air mobility supported by advanced batteries and hybrid systems.

In the future, electric mobility will become even more intelligent and interconnected. Vehicles, ships, and aircraft will operate with autonomous navigation, wireless energy transfer, and AI-powered fleet coordination. Renewable energy storage, space-grade lightweight materials, and quantum battery innovations will extend range and efficiency. Mobility hubs on land, sea, and air will integrate seamlessly, creating a unified, sustainable, and highly efficient global transport ecosystem. Electric mobility is not just an upgrade; it is a futuristic revolution that will redefine how humanity moves across the planet and eventually beyond it. Elon Musk has set the pace in EV manufacturing, and we are all challenged to join the race and improve on it.

Hybrid Vehicle

Hybrid! This is a technology that curiosity gave birth to. The world was apprehensive about human overreliance on natural gas and the threat of global warming. We needed an alternative to natural gas and to build green energy. This indubitably gave birth to hybrid vehicle technology. Hybrid technology propels a vehicle by combining an electric motor with a gasoline engine, allowing the vehicle system to recapture energy through regenerative braking. Occasionally, the electric motor does all the work; sometimes, it's the gas engine, and sometimes, they work together. The primary objective of this

technology is to reduce gasoline consumption, thereby improving fuel economy and, in turn, increasing green energy consumption. Although this technology will soon become obsolete as full-electric technology usurps it, it will still be used for decades. Therefore, you can research it more and even make it smarter.

Drone

Drones, also known as unmanned aerial vehicles (UAVs), are versatile flying machines used across industries for tasks that require precision, speed, and access to hard-to-reach areas. Today, drones play vital roles in aerial photography, surveillance, agriculture, disaster response, delivery services, construction monitoring, environmental research, and security operations. Their ability to capture real-time data from the sky makes them valuable tools for decision-making across both public and private sectors. Modern drones are equipped with GPS navigation, high-resolution cameras, thermal sensors, LiDAR scanners, autonomous flight systems, and obstacle-avoidance technology. These capabilities allow them to map large areas, inspect infrastructure, monitor farmland, deliver medical supplies, and even assist in search-and-rescue missions. With AI integration, many drones can analyze captured data in real time, recognize patterns, and make autonomous flight adjustments.

Looking ahead, drone technology is set to become even more transformative. Future drones will feature longer battery life using advanced materials, improved AI autonomy, enhanced swarm coordination, quantum navigation systems, and stronger environmental resilience. They will support smart cities, airborne logistics networks, autonomous inspections, and potentially integrate with air-traffic systems for large-scale cargo and passenger transport. In the future, drones will evolve from simple flying devices to intelligent aerial systems, reshaping how industries operate and how societies manage mobility, safety, and innovation.

As usual, the best of it is yet to come; we are just at the infant stage of drone production. Therefore, you can research more, venture into it, and improve its technology further. I foresee a future where the sky will be blanketed with various drones, just as I saw in space machines. Drones have come to stay, and they get smarter every day. Some sophisticated ones shall be as smart and intelligent as domestic

AI robots.

Highway Lighting

Highway lighting is an invaluable infrastructure in urban and semi-urban cities today. Its importance cannot be overemphasized, as it offers several advantages, particularly for drivers and pedestrians. Mind-blowing highway lighting technologies have undergone significant changes. Technologies like road glow and wind-powered lights that generate electricity using pinwheels, interactive lights, solar highway lighting, and electric priority lanes all feature embedded magnetic fields that can charge a moving vehicle.

This technology allows electric vehicles to charge while in motion, eliminating the need for charging stations. Other road lighting technologies will make the future much more beautiful, primarily by focusing on energy efficiency, reducing carbon emissions, and addressing global warming. We need dedicated individuals to advance our highway lighting technology and stay ahead of the competition. You can leverage this and build around it.

Auto-Designs

Without a doubt, some of the automotive industry's most influential designers, such as Walter de Silva, Giorgetto Giugiaro, Bill Mitchell, Harley Earl, and others, have built sterling reputations in the automotive industry and among automotive aficionados. Automotive design is a mind-blowing career, especially now that it has advanced so much. There are innovative designs in the automotive industry that improve not only the evolutionary structure but also the mechanisms. Apparently, we have seen this in vehicles, aircraft, drones, ships, etcetera. You can build a career in this and bring a change.

Vehicle Detailing

Auto detailing is an approach to keep a vehicle in its best possible condition, primarily cosmetic rather than mechanical. Vehicle detailing involves removing visible and invisible contaminants from the vehicle's interior and polishing the exterior to its original, blemish-free finish. The fundamental detailing options include an exterior wash and wax, interior vacuuming, window cleaning, and

surface polishing. This is an easy business for a potential CEO to enter and build upon. Depending on the services you want to offer, you will need various equipment and tools to get started. You may need the following:

Exterior detailing

Pressure washer, buffing, and polishing machines, high-quality microfiber towels, car wax, polish, sealant, tire and wheel cleaners, and clay bars for paint decontamination.

Interior Detailing

Vacuum cleaner (wet and dry), upholstery cleaners (for leather and fabric), steam cleaner, carpet, shampooer, dashboard, trim, and glass cleaners.

Mobile detailing equipment

Water tank and pump, portable power supply (generator or battery), and mobile van or truck for transporting equipment.

Vehicle detailing is highly lucrative and requires less capital to start. To attract customers who prefer eco-friendly cleaning solutions, make your service as eco-friendly as possible. You can build on this and turn it into a great business with patience and perseverance.

Automotive Academy

Automotive Academy offers students the opportunity to take automobile-related courses or receive practical training in vehicle mechanics. Depending on your level of industry experience, you can pass your knowledge on to the younger generation. You can research how to set up a world-class automotive academy and build a successful business. Examples are Autohub MACEOS Academy, Automedics Mechatronic Institute, Froshtech Academy, Autoclinic Academy, and so on.

Hot Air Balloon

The hot air balloon is the first successful human-carrying flight technology. It is a lighter-than-air aircraft that consists of a bag called an envelope containing heated air, and a gondola or wicker basket that carries passengers and, in most cases, a heat source, such as

an open flame from burning liquid propane. The heated air inside the envelope is buoyant because it is less dense than the colder air outside. As with all aircraft, hot air balloons cannot fly beyond the atmosphere.

Airship

An airship, also known as a dirigible or aerostat, is a type of lighter-than-air aircraft that uses buoyancy from a lifting gas to remain airborne and can navigate under its own power. Unlike balloons, airships have a propulsion system and rudders for steering.

Unique Features Of Airship

Structure: Airships can be non-rigid (blimps), semi-rigid, or rigid, depending on their construction and the means used to maintain their shape.

Lighter-than-air: Airships use a gas that is less dense than the surrounding air, such as helium or a helium-hydrogen mixture, to achieve lift.

Steering: Airships have rudders and other control surfaces for direction control.

Propulsion: Unlike balloons, airships are equipped with engines and propellers to move through the air.

Types of Airships

Non-rigid airships: The gasbag maintains its shape primarily through internal gas pressure.

Semi-rigid airships: These have a rigid keel or frame that provides some structural support in addition to the gasbag's internal pressure.

Rigid airships: These feature a rigid internal framework (often aluminum-alloy girders) that maintains the airship's shape, regardless of the gas pressure within. Examples are:

Zeppelins - a famous type of rigid airship, named after Count Ferdinand von Zeppelin. Airlander

10 - a modern hybrid airship that combines features of both airships and airplanes.

Blimps: Non-rigid airships are often used for advertising and other promotional purposes.

Modern applications

While airships are not as common as they once were, they are experiencing a resurgence in interest for various applications, including:

Cargo transport: Airships can carry large payloads and may be useful for transporting goods to remote areas.

Passenger transport: Some companies are exploring the use of airships for luxury travel and eco-friendly tourism.

Environmental Monitoring and Surveillance: Airships can provide a stable platform for atmospheric and environmental studies.

Airships can be used for surveillance, search and rescue, and other security applications.

An Artisan

An automotive artisan is a skilled worker who specializes in repairing, maintaining, and modifying vehicles. Automotive artisans possess various technical skills, including mechanical, electrical, body beating, upholstery, and others, all aimed at performing routine maintenance and repairing various vehicle systems. Below are good characteristics of an artisan:

Specializations

An artisan must specialize in one specific unit, such as engine repair, electrical systems, bodywork, or air-conditioner repair.

Tools and Equipment

An artisan must have basic tools and equipment for operation. These may include diagnostic scanners, hydraulic jacks, and various hand tools for effective operation.

Knowledge base

An artisan must comprehensively understand what they do. Also, give room for improvement by attending training. Being an automobile artisan is an interesting career that one can leverage to grow and, in some cases, have a vehicle manufacturing company. Remember, Kal Benz was an artisan before his inventions.

Modern Transportation Company

The harder I tried to ignore this topic, the more inclined I was to discuss it. The reason is that transportation is the real essence of the automotive industry. Undoubtedly, 90% of automotive products are for transportation. Therefore, transportation is a sector we can't do without, at least as long as the automotive industry is concerned. Unlike the other sectors that I briefly discussed, because of what this sector represents, we shall discuss in detail what it takes to build and manage a modern transportation company. Strategic planning, technology adoption, regulatory compliance, and efficient operations are key areas to focus on in order to build and manage a modern transportation company.

To run a modern transportation system, you need to integrate diverse modes of transport, utilize technology for efficiency, prioritize sustainability, and provide seamless user experiences through digital platforms. Other focuses include adhering to safety regulations and adapting to evolving people's needs; key aspects include fleet management with advanced vehicle tracking, route optimization, multimodal ticketing systems, real-time information sharing, and investment in electric vehicles and infrastructure to reduce environmental impact.

The following are abstract steps that you have to take to build and manage a modern transportation company:

Define business model

First, you have to determine the transportation sector to enter: land vehicles, rail, air, or maritime. Meanwhile, depending on your capacity, you may choose to enter all the sectors simultaneously. Regardless, starting small and then scaling up is always more professional.

Transportation is categorized into different types based on mode, purpose, and scope. Below are the types of transportation systems in the world today:

Road Transportation

This is a means of land transportation. It is classified into three categories: passenger, freight, and micromobility. Let's look into

them below:

Passenger

This transport system specializes in commuting people from one location to another. Vehicles for this type of transportation include cars, buses, motorcycles, taxis, and ride-sharing services (Uber, Lyft, Bolt).

Freight

This is a transportation system that specializes in transporting goods from one destination to another. The vehicles needed for this type of transportation include trucks, vans, trailers (LTL, FTL), tankers, and last-mile delivery services like Amazon and FedEx.

Micromobility

This is the future of short-distance urban transport. It refers to small, lightweight, and often electric vehicles designed for short trips, usually under 10 km. This means of transportation transforms urban transportation by reducing congestion, lowering emissions, and providing flexible “last-mile” connectivity. This type of transportation uses e-bikes, e-scooters, electric skateboards, electric mopeds, light electric vehicles (LEVs), and shared bikes (dockless and station-based).

Rail Transportation

This is also a land-vehicle transportation. The difference is that the vehicles used for this type of transportation run on rails instead of conventional roads. Below is the classification:

Passenger: Trains are built so people can commute from one destination to another. These vehicles include commuter trains, subways, and high-speed rail, such as bullet trains.

Freight: These are railway vehicles primarily built to transport goods from one location to another. These vehicles include cargo trains, intermodal containers, and tanker wagons.

Air Transportation

This is a means of transportation by air. It is the fastest and most futuristic means of transportation. Just like other means of

transportation, it also has categories as written below:

General aviation: This is an air transport system solely for the conveyance of people from one destination to another. Examples of vehicles are private jets, helicopters, and air taxis.

Commercial aviation: These commercial airlines could be passenger or cargo carriers. Commercial airlines are the commonest means of air transport. **Drones & UAVs:** Unmanned aerial vehicles are commonly used for deliveries and surveillance.

Maritime Transportation

It remains the oldest means of transportation after the donkey and the horse. It has connected the world in several ways, especially in the economic hemisphere. Maritime transportation remains relevant today and is worth exploring. Below are the categories of maritime transportation:

Passenger: This is a means of water transport that conveys people from one riverine area to another. Examples of vehicles used for this purpose are ferries, cruise ships, yachts, and boats.

Shipping: This type of water transportation focuses on moving goods from one location to another. Examples of vehicles used for this service are container ships, tankers, and bulk carriers.

Inland waterways: These are water routes, usually lakes, canals, rivers, watercourses, inlets, and bays within the territory of a state where barges and riverboats operate. Barges, for example, transport freight from one end to the other.

Pipeline Transportation

Pipeline transport is a system for conveying liquids, gases, or slurries through a network of pipes, commonly used for long-distance movement of bulk commodities such as oil, natural gas, and water. The two major pipeline transportation systems are:

Oil and gas pipelines: These pipelines transport crude oil, natural gas, and refined petroleum products and are known as safe, efficient, and economical means of long-distance transportation.

Water and sewage pipelines: Water pipelines deliver clean water to a given jurisdiction or over long distances, while sewage pipelines, also known as sewer pipes, transport wastewater and sewage from homes and industries to treatment facilities or to a distant location.

Space Transportation

Space transportation is the systems and technologies used to transport humans, machines, and cargo to and from space, including spacecraft, rockets, and other vehicles designed for space travel. We have two types of space transportation, and they are:

Commercial: This spaceflight is primarily for passenger conveyance for tourism or exploration. Examples are SpaceX and Blue Origin.

Research: This is a type of space exploration primarily for scientific research. Examples are satellite launches, probes, space telescopes (Webb, Hubble), rockets, robotics, and other space exploration machines.

Cable Transportation

This is a type of transport technology in which a vehicle runs overhead, fastened to cables. These types of vehicles are called cable cars or gondolas. They carry passengers from one point to another through cableways. Cable transportation offers a unique urban and inter-urban mobility mode, potentially alleviating traffic congestion and improving connectivity, especially in densely populated cities.

Below are the types of cable cars:

Funicular Railways: Funiculars use a rack-and-pinion system instead of a cable and are commonly found in urban areas with limited space. Examples are the Montmartre Funicular in Paris and the Fish Creek Funicular in San Francisco.

Aerial tramway: This uses a single track with two terminal points connected by a pylon, with the cabin suspended from the cable. Examples are the Portland Aerial Tram and the Roosevelt Island Tramway in New York City.

Gondola lifts: These are similar to aerial tramways, but with multiple cabins attached to a single cable, allowing more people to be carried at once. Examples are the Genting Skyway in Malaysia and the Aiguille du Midi cable car in France.

Traditional cable car systems: These are cable railways with vehicles running on rails or on a road, with manually operated cars operating in street traffic. Examples include the San Francisco cable car system and the cable-powered street-running systems on the Great Orme in North Wales and in Lisbon, Portugal.

Urban transit cable cars: These are used in urban areas to connect

districts, often traversing challenging geography such as rivers, mountains, or ground-level traffic. Examples are the K line of the Metrocable in Medellín, Colombia, and the Téléo in Toulouse, France.

Specialized Transportation

Specialized transportation is a distinct service tailored for individuals with disabilities, as well as for emergency, industrial, military, or specialized equipment needs involving the transport of oversized or hazardous materials. Below are the categories of specialized transportation:

Disabilities

These are specialized vehicles designed to transport people with disabilities. Examples are smart wheelchairs, exoskeletons, and cars.

Emergency

This is a transportation system for emergency responses. Examples are ambulances, fire trucks, and emergency response vehicles.

Military

These are specialized military vehicles, such as tanks, transport planes, and other vehicles.

Industrial

These are special vehicles for industrial purposes. Examples are mining trucks and conveyor belts.

Future Transportation

These proposed modes of transportation are modern and will be the future. The following is the proposed future means of transportation:

Autonomous vehicles

These are vehicles that can drive themselves without human assistance. We already have these vehicles today, though, in the infant stage. Examples are driverless cars, trucks, and aerial vehicles.

Hyperloop

This is a high-speed, vacuum-tube transport system resembling a train. Urban air mobility: an aerial means of transportation within a city. Examples are flying vehicles and eVTOLs.

Maglev trains

These are superconducting magnets that suspend a train or any vehicle above a U-shaped concrete guideway, thereby magnetically levitating the vehicle. The prime advantages of this technology are its speed and green environment. A good example of this technology is China's Shanghai Maglev. We also have Hydrogen trains, underground metro systems, and suspended sky trains or hanging trains.

Flying hotel pods

This is a technology in which self-contained drone-powered pods can detach from a central hub for customizable trips, carry people (guests) into the atmosphere, and fly or hover for months or years. In other words, it is a flying hotel.

Underground tunnels

Subterranean passageways are used for land transportation beneath cities, mountains, and the sea. Tunnels are crucial for highways, railroads, and urban rapid transit systems, providing efficient links and bypassing surface congestion.

Above are the types of transportation systems and their sub-functions. I took the time to discuss them because I want you to understand this elementary aspect. It will provide you with general information about the transportation business and help you choose which to start. Now that you know this, determine which means of transportation to use first and research it further.

Determine The Target Market

One factor that will guide you in choosing the type of transportation to enter is your market choice. Determine whether you will go for individual customers or business clients, and whether they are local, regional, national, or international. This also depends on your choice of payment system: Subscription-based, pay-per-use, dynamic

pricing, or contract-based.

These considerations will help you choose the type of transport to use. In one of the topics above, we discussed how to determine a target market. You can page back for refreshment.

Legal And Regulatory Compliance

Register your company and comply with all regulatory agencies' demands. After this, take out insurance policies as required; they may cover liability, cargo, vehicles, and employees. We discussed insurance in a previous chapter, so you can refer to it for a better understanding.

Understand and adhere to safety and environmental regulations, including emission standards, driver/pilot driving hours, and vehicle inspection standards.

Acquiring Vehicles And Infrastructure

This depends on the means of transportation you choose. Regardless of your choice, two principles apply: acquiring the necessary vehicles and the infrastructure required for the company's operation. So, make funds available and purchase the necessary vehicles, including land vehicles, trains, drones, aircraft, and rockets. In a previous chapter, we discussed how to raise funds and partner with other companies. Regarding transportation, it is advisable to collaborate with tech firms, governments, and other logistics providers. It will root you and give you the foundation to spread. Regardless, it all depends on the capacity that you want to operate. You may choose to manufacture these vehicles or buy or lease them. For example, SpaceX and Blue Origin manufacture rockets for their space transportation company. Other companies in maritime, aviation, land vehicles, and other fields are also involved. Therefore, it all depends on the capacity that you want to operate. The second approach is to acquire all the necessary infrastructure after deciding on your chosen means of transportation. I won't list which infrastructure to acquire here. You can research and develop them after you have chosen.

Technology Integration

I will try to generalize this subtopic as much as I can. Modern transportation cannot function effectively without software

technologies for day-to-day business operations. Modern transportation relies heavily on software technologies because of their efficiency, safety, scalability, and profitability. Below is a generalized breakdown of how software enables and optimizes transportation operations:

Fleet management: This is for real-time tracking, maintenance, and fuel optimization. Examples are Samsara, Geotab, and Fleetio.

Route optimization: This is an AI-driven path planning, traffic avoidance, and cost reduction. Examples are OptimoRoute, Routific, and Google Routes.

Dispatch and booking: This software automates job assignment, ride-hailing, and freight matching. Examples are CargoX, DiDI, and Uber Freight.

Telematics: This device is installed in vehicles to monitor location, fuel consumption, diagnostics, driver behavior, predictive maintenance, and other metrics for fleet management and optimization. Examples are Verizon Connect, and Zubie.

Autonomous systems: These software programs allow cars, trucks, drones, aircraft, rockets, and space machines to travel without human assistance. Examples are Nuro, Waymo, and Tesla Autopilot.

Supply chain/TMS: This software supports logistics coordination, warehouse management, freight brokerage, and related tasks. Examples include Oracle TMS, KeepTruckin, and MercuryGate.

Data analytics platforms: These tools analyze large datasets from transportation operations to identify trends, patterns, and areas for improvement. Examples are Tableau, Power BI, Qlik, Domo, Sisense, and Looker.

Passenger mobility: Software enables commuters and service providers to communicate effectively, such as with ride-hailing, public transit Apps, and mobility-as-a-service (MaaS). Examples are Uber, Bolt, Citymapper, and Moovit.

Sustainability tools: These are for managing electric vehicle charging and tracking carbon footprints. Examples are T&E Software, ChargePoint, and Geotab.

Importance of Software Technologies in Transportation

Below are the importance of software technology in transportation:

Automated scheduling/dispatching: This reduces human errors

and saves time.

Dynamic routing: It helps reduce traffic, lower fuel costs, and speed up deliveries.

Predictive maintenance: This software prevents breakdowns and extends the lifespan of vehicles.

Fuel management: This software allows you to track consumption and reduce waste.

Load optimization: This maximizes cargo space and minimizes empty trips.

Demand forecasting: This AI predicts peak times and dynamically adjusts pricing.

Driver/pilot/sailor monitoring system: This system detects fatigue, harsh braking, and overspeeding.

Electronic Logging Devices (ELDs): This ensures compliance with HOS (Hours of Service).

AI-based accident prevention: This technology uses cameras/sensors to warn drivers, sailors, and pilots.

Seamless payments: This is software for easy payment, such as digital wallets and contactless transactions.

Mobility-as-a-Service (MaaS): This system allows you to integrate multiple transport modes into one App.

Cloud-based logistics: This is the hallmark of everything I have been saying about this topic: this software technology is about operating productively without physical limits.

Big data analytics: This identifies trends, optimizes fleets, and cuts costs.

Blockchain in freight: This ensures transparent supply chain records and fraud prevention.

The software and systems listed above are essential for smart operations in modern transportation. You can research independently and understand them very well.

Follow the trend and ensure that you are not left to buy. Inquire into and understand emerging technologies, and stay abreast of them. Meanwhile, any future technology will be an improvement of all we have discussed above, except for the following:

Augmented reality

For AR navigation, heads-up displays are used for drivers, pilots,

and sailors, making routes easily accessible. Augmented Reality also provides remote maintenance support for technicians' guide repairs via AR glasses. The key players in this technology are Microsoft HoloLens, Google Glass Enterprise, and Bosch AR solutions.

Edge computing

This technology allows faster decision-making in real-time data processing, reducing cloud dependency. It is also effective in autonomous vehicle reactions and faster than cloud-based systems. AWS IoT Greengrass, Dell Edge Gateway, and Cisco Edge Intelligence are key players in this technology.

Quantum Computing

This is used for ultra-complex route optimization, enabling the solution of logistics problems in seconds. It is also used for unbreakable cybersecurity—quantum encryption for transport software systems. Key players are IBM Quantum, Google Quantum AI, and D-Wave Systems.

Digital transportation ecosystem

This is an environmentally safe transportation system. It includes smart cities, AI-managed traffic and public transit, hyper-automation, fully autonomous freight and passenger networks, green logistics, AI-optimized EV fleets, and carbon-neutral shipping.

Challenges in Software-Dependent Transportation

As you may know, whatever has the advantage also has a reactionary disadvantage. So is software-based transportation. Below are the challenges in software-dependent transportation.

Cybersecurity risk

The risk is from hackers who want to compromise the connected system to their advantage.

High cost

Software-based transportation is expensive to implement and maintain.

Regulatory hurdles

There are regulatory hurdles, such as data privacy, AI ethics, and cross-border compliance.

Technical know-how

Not all employees can work effectively with some of the software, thereby requiring trained personnel in AI, IoT, and analytics.

Conclusion

Transportation without software today is like a car without a wheel. Companies that leverage these advanced software solutions will dominate the transportation industry now and in the future. Meanwhile, those who pay no attention to digitization will suffer obsolescence. Therefore, you must persevere to stay technologically up to date and seek future opportunities.

Staffing

You must build an experienced and formidable team to survive in the transportation business. You must hire and train individuals such as drivers, pilots, sailors (depending on the type of transportation), logistics managers, dispatchers, mechanics, safety officers, and administrative managers across operations, finance, HR, maintenance, customer service, and so on, as required. Then, they must receive training specific to the department; examples include compliance, safety, engineering, software operations, handling fragile/hazardous materials, and so on.

Branding

Design a catchy logo based on your inspiration, website, social media accounts, customer support email, and helpline. We discussed branding in a previous chapter. You can refer to it for a better understanding.

Strategy for Customers' Loyalty

When starting a new business, you have competitors who are already influential to their respective customers. To break even on new customer acquisition, you may need to adopt customer incentive programs, such as discounts, referral bonuses, and promotional

giveaways, to grow your client base.

Feedback

One step is building a client base, and another is maintaining retainership. Use data analytics to track delays and complaints and optimize your services for maximum customer satisfaction.

Administration

Managing a modern transport company requires a combination of strategic planning, efficient processes, technology integration, compliance, structure, workforce management, and regulations. Below is a structured approach to effectively manage a modern transportation company:

Modern Transport Company Organogram

Below is a modern transportation organizational chart that reflects a streamlined, technology-driven structure poised for efficiency and scalability. This structure is adaptable for road freight, logistics, and multimodal transport companies.

Board of Directors

They oversee strategic decisions, governance, and long-term growth.

Chief Executive Officer (CEO)

This person oversees the overall leadership, vision, and stakeholder management. As it concerns the title of this book, this person is you. The CEO directly supervises the following: Chief Operating Officer (COO), Chief Technology Officer (CTO), Chief Financial Officer (CFO), and Chief Human Resources Officer (CHRO).

Operations

The Chief Operating Officer leads the operations department with the following sub-departments:

Fleet management: This comprises the Fleet Manager, Maintenance Supervisors, and Telematics Analysts. Their primary functions are vehicle tracking, maintenance scheduling, and fuel efficiency.

Logistics: This comprises the Logistics Manager, Dispatchers, and Route Planners. Their roles are real-time routing, load optimization,

and carrier coordination.

Warehousing: This group comprises the Warehouse Manager, Receiver, and Inventory Specialists. Their functions include cross-docking, last-mile delivery coordination, inventory management, and more.

Technology

The Chief Technology Officer leads this department with the following sub-departments:

IT/Software Development: This unit consists of the Transport Management System Manager, Developers, and Data Engineers. Their functions include managing TMS, API integrations, and automation tools.

Data Analytics/AI: This sub-department consists of Data Scientists and BI Analysts, and its operations include predictive maintenance, solutions, and demand forecasting.

Cybersecurity: This group consists of IT Security Specialists whose function is to protect operational data and prevent breaches.

Finance

This department is overseen by the Chief Finance Officer, and the department is made up of the following sub-departments:

Accounting: This department comprises the Financial Controller, Accountant, and Clerk. Their functions include maintaining sales records and expenditures, invoicing, cost analysis, and auditing.

Regulatory compliance: This unit is run by the Compliance Officer, whose functions are permits, safety audits, and accountability.

Procurement: This sub-department is overseen by the Procurement Manager, and his functions are vehicle acquisitions, operational tools acquisition, and gas purchases for vehicles.

Human Resources

A Human Resources Manager heads this department with the following sub-departments:

Recruitment/Training: This unit comprises HR Managers, Safety Trainers, and General Staff Trainers. Its functions include staff hiring, training, and upskilling programs.

Employee relations: This consists of the HR Manager and HR

Business Partners. Their functions are retention programs and conflict resolution.

Commercial

The Head of Sales and Marketing heads this department with the following sub-departments:

Sales/Marketing: This department consists of business development managers, digital marketers, field marketers, and sales managers. Their functions include business development, client acquisition, brand management, and sales and marketing.

Customer Service: This department consists of Support Agents and CRM Managers. Their functions include tracking updates, resolving complaints, analyzing feedback, and providing product information to clients.

Support Unit

This department is headed by the Quality Assurance Manager with the following sub-departments:

Legal Team: This unit consists of lawyers and other legal personnel. They handle the company's contracts, disputes, and legal advice.

Sustainability Office: The Compliance Manager oversees this department, which ensures the company maintains operational continuity and executes other relevant initiatives.

Innovation Lab: The Head Engineer leads this department and researches and develops new features and improvements to support the functions of aircraft, drones, autonomous vehicles, EVs, trains, and smart yachts and boats. The abstract modern transportation organogram above is the key chart. I couldn't list a few departments and sub-departments here.

Day-to-Day Operation

After registering the company, branding it, adhering to regulations, buying necessary vehicles and infrastructure, setting up the operational organogram, and hiring the right workforce, you are good to go. Below are the steps you will take to kick-start your company and stabilize operations.

Creation of awareness

Upon opening, start by building awareness; use your social media department to run aggressive online marketing through paid ads and engaging promotional influencers.

Engage in a few outdoor advertising formats, such as signage, vehicle branding, banners, and handouts. You can also employ the services of media companies like TV/radio stations, newspapers, magazines, and bloggers to write articles about your company. Brand your employees after the company; get them branded polos (or other attire), caps, complimentary cards, name tags if necessary, and identification cards.

Staff training

While you are creating awareness, concurrently train your staff according to your staff organogram. You can hire a specialist to do this for your department. Induct your staff and make sure they understand the company's code of conduct, also known as the employee handbook. Train them on safety, health, and emergency management.

Operation

Operational structure, standard, customer satisfaction, timing, delivery, and quality. We have discussed this in one of the chapters. The hallmark of operation is systematically linking activities, understanding what should be done at any given time, adopting a sense of urgency, and focusing tenaciously on the goal.

Growth

The true appraisal for any business is growth measurement. The key to determining a company's growth measurement is the rate of customer acceptance of the products and services. Kill the shortcomings of not being able to discover and fix them. Motivate your employees with reasonable remuneration. Then, bury your focus on the company's goal.

When a company grows, the CEO's eyes open, and their vision broadens. A company's growth comes with increased revenue, operational efficiency, technological adoption, and a customer-centric attitude among management and employees. Growth

validates goals!

Improvement

Continuous improvement is essential for a company's growth, as it enables it to stay competitive, efficient, and innovative. Below is a structured approach to implementing improvement initiatives in a company:

Adoption of an improvement culture

The company's CEO and other executives must champion improvement efforts by refusing to rest on past achievements and instead remaining hungry for everyday improvement.

They must adopt new systems that are more effective than traditional ones, such as systems for product evaluation, scaling up operational structures, implementing employee development programs, and responding to customer feedback. Performance metrics such as revenue growth ratio, customer satisfaction, operational efficiency, employee feedback, reviews, internal suggestions, and benchmarking against industry leaders must be adopted and incorporated into the everyday routine to identify gaps.

Improvement methodologies

Implement a structured approach using tested, workable methods. Examples are:

Lean: For a waste elimination approach. A good example of this methodology is the Toyota Production System.

Six Sigma: This is a data-driven methodology used for up-scaled improvement. It aims to minimize defects and variation. The DMAIC framework is a good example.

Kaizen: This is a methodology based on continuous slight improvement. It is a steady positive race with daily incremental change.

Agile: An iterative improvement approach, a management method used especially in software development. The division of tasks characterizes it into short phases: reassessment and adaptation.

Total Quality Management

TQM can be defined as a management system for a customer-focused

company that engages all employees in continual improvement. It is an integrative system that leverages strategy, data, and effective communication to embed quality and discipline across the company's operations, products, services, and culture.

Importance Of TQM

- Total quality management is a continual process of detecting and reducing or eliminating errors, thereby standardizing products and services.
- TQM improves a company's growth and effective service delivery.
- TQM improves the quality of an organization's outputs, including products and services, by continually improving internal practices.
- TQM is used to streamline supply-chain management, improve customer service, and ensure that employees are properly trained.
- Total quality management helps to hold all parties involved in the production processes accountable for the overall quality of the final product or services.

The Eight Principles of TQM

These are fundamental concepts that guide a company in its continuous pursuit of quality improvement. Total Quality Management is a holistic approach that compels all employees of a company to work together to standardize processes and improve the quality of products and services. Below are the eight principles:

Customer focus: The prime goal of TQM is to meet or exceed customers' expectations. A company must understand customers' needs and continuously improve products and services.

Leadership commitment: This principle states that department heads must demonstrate relentless commitment to service development and the company's growth, as well as to ensuring a clear vision, mission, quality objective, and employee grooming.

Employee involvement: All employees must contribute positively to quality improvement while receiving empowerment training and being integrated into the teamwork for essential success.

Process approach: Under this principle, quality is achieved by optimizing processes rather than outputs. This implies that sometimes a company's growth is not measured by its short-term results but by the operational structure it has achieved. For instance, there were

some men with whom I went into this business at the same time. These men focused on buying vehicles and reselling immediately without a structure, while I focused on building a company with structured operational processes. At that point, they had begun to make money, and I was slow to generate revenue because I paid more attention to structuring than to quick gains. This is a poor definition of the process approach.

Continuous improvement: An ongoing effort to enhance the quality of products, services, and processes. Tools such as Plan-Do-Check-Act and Six Sigma are commonly used to implement this principle. We have discussed Six Sigma, and the Plan-Do-Check-Act is a four-step model for carrying out changes. They are:

Plan: Identify an opportunity and plan towards it. Test the change experienced and carry out the study scales for improvement.

Check: Review the processes, analyze the results, and identify what you've learned. Act: Act based on what you learned in the study steps.

Fact-based decision-making: This principle implies that decisions should rely on fact-based data analysis, statistical analysis, benchmarking, performance metrics, and evidence rather than intuition.

Relationship management: Successful Total Quality Management requires managing relationships with all stakeholders, including suppliers, customers, and employees. This principle emphasizes building mutually beneficial relationships to improve quality and value.

Integrated system: This principle states that an organization or company must see quality management as a system of interrelated processes. It highlights the importance of understanding how different parts of the organization work together to achieve common goals and improve overall performance.

This is about integrating departments to work together toward common goals through a quality management system.

Summary

Total Quality Management requires a cultural shift where quality becomes everyone's responsibility. The eight principles align with ISO 9001 standards.

Financial Projection

Having operated for a short period, you need to create a comprehensive financial projection, which will guide you in your growth plan. Creating a financial forecast for business operations is essential for understanding how your business will perform over time and for budgeting and growth planning. This projection focuses on forecasting key financial metrics such as revenue, costs, profits, and cash flow for your business's operational side. Below are step-by-step guides on how to work on financial projections for your business operations:

Objective

Before you embark on this, define your goals and the project's scope. Suppose it is for long-term or short-term internal management, an investor presentation, or a loan application. In this case, it is for internal management. We discussed investors and loans in the previous chapter.

Gather data

Having been operational for a while now, gather historical financial data to build a foundation for your projections. Data like:

Past income statement: Determine your profit and loss statement to understand past revenues, costs, and profits.

Past cash flow statements: Examine the cash flows of the business.

Balance sheet: Review your assets, liabilities, and equity.

Define your assumption

Financial projection is based on assumptions. These assumptions determine the accuracy of your projection, so make sure they're realistic and based on sound reasoning. The following are the things you have to make projections and assumptions on:

Revenue growth: Estimate your revenue growth based on factors such as customer acquisition, product pricing, and market trends.

Sales volume: Project the number of turnovers and the services you plan to offer.

Pricing: Estimate how much you'll charge for your product or service.

Cost: Estimate your variable costs and fixed costs, which are constant regardless of sales. Examples are rent, salaries, and utilities.

Market conditions: Consider external factors like economic conditions, competition, and consumer demand.

Forecast revenue: Projecting revenue is one of the most critical parts of financial projections. Base your projection on: Sales volume, pricing, seasonality, and the income statement. A typical income statement for a projection might include:

Revenue

Total sales: The total amount realized from product sales.

COGS: Direct costs associated with production or service delivery.

Gross profit: Profit realized without subtracting expenses.

Operating expenses: Fixed and variable costs like rent, salaries, and marketing.

Operating income: Gross profit - operating expenses.

Net profit: Operating income - taxes, interest, or other non-operating costs.

Cash flow projection

A cash flow projection tracks cash inflows and outflows. Cash flow is crucial for understanding whether your business will have enough liquidity to pay bills and make necessary investments.

Cash inflows: Revenue from sales, loans, and investments.

Cash outflows: Operating expenses, cost of products sold, and capital expenditures.

Net cash flow: Cash inflows - cash outflows.

Balance sheet projection

A projection of your business's financial position, showing assets, liabilities, and equity. It consists of:

Assets: Current assets (cash, receivables) and long-term assets (equipment, property).

Liabilities: Current liabilities (accounts payable, short-term loans) and long-term liabilities (long-term debt).

Equity: The difference between assets and liabilities (owner's equity).

Factor in taxes: Include taxes in your projections. Estimate income taxes based on your projected net income. Consult a tax advisor to help you with the applicable tax rates for your business.

Review projections

Financial projections should be reviewed and updated regularly to reflect changes in market conditions, sales performance, and new investments. Set a schedule to update your projections and adjust assumptions based on actual performance.

Create scenario analysis: Develop financial projections for different scenarios, such as the BVC case (High sales and low costs) and the worst-case (Lower sales and higher costs).

Most likely scenario: A balanced approach with moderate growth. This allows you to prepare for various possible outcomes and take proactive steps to address challenges.

By following these steps, you can create a detailed financial projection for your business operations. These projections will help you make informed decisions, manage cash flow effectively, and plan for future growth.

Conclusion

To run a modern transport company, you must balance operational efficiency, regulatory compliance, technology adoption, and customer satisfaction. Integrating automation, data analytics, and sustainable practices will enable your company to withstand competition and thrive in a rapidly evolving industry.

Transportation Industry in Nigeria

The transportation industry in our country is still somewhat primitive. Yes! When I say 'primitive,' I mean compared to third-world countries like China, the USA, the UK, Germany, France, and others. There is a clarion call for us to act swiftly and modernize the country's transportation system, from air to land, water, loop, and cable. I must commend our aviation industry for its success so far. There has not been a commercial aircraft crash in more than a decade. We proudly report an almost 99% success rate.

Because of this, I want to express my special thanks to Osita Chidoka, Hadi Sirika, and Festus Keyamo. We indeed recorded excellent shuttles.

My profound thanks to the CEOs of airlines, including the Ibru family of Aero Contractors, AMCON of Arik Air and Aero Contractors, Allen Onyema of Air Peace, and other domestic and

international airline CEOs. I hereby express my unreserved gratitude for your efforts and sacrifices in ensuring that the aviation industry in Nigeria is what it is today.

Similarly, our land transportation companies haven't done poorly in the last two decades. However, we are still very local in our operations. We need to change the system and bring in what is modern. A good road and network are the foundation of every good land transportation. And to complement this, the vehicles that ply the road, be it trains, trucks, buses, saloons, and so on, should be in good condition and of safety standards.

Land transportation in our country is lagging, calling for urgent attention. Our road system is poor. There is no security on the road, thanks to rampaging thieves, bandits, and kidnappers. The Federal government must do everything possible to construct good roads and combat insecurity. Also, the government needs a railway system with a good network and, if possible, tunnels. Transportation is a major automotive industry sector that requires attention from the government and committed individuals. Meanwhile, I want to thank the great individuals who have contributed immensely to the transportation sector. Before then, I want to acknowledge the Nigeria Railway Corporation for the recent railway networks it has laid nationwide, many of which are currently under construction.

Equally, I want to acknowledge some state Governors who have supported the transportation sector, especially those who injected electricity into the system.

I want to give special recognition to Chief Vincent Obianodo, the CEO of Young Shall Grow Motors; Frank Nneji of ABC Transport; Godwin Ubaka Okeke of GUO Motors; Dr. Chidi Anyaegbu of Chisco Transport; Aliko Dangote of Dangote Transport; Alhaji Adamu Iddrisu of Global Haulage Resources; and many others. You people deployed spirited efforts to make this significant contribution to the growth of the automobile industry's transportation sector. The new generation is grateful and challenged to continue from this foundation and revolutionize the sector. Thank you.

Special thanks to the companies that revolutionized Taxi services in Nigeria. Thank you to Dara Khosrowshahi, CEO of Uber; Marcus Villig, CEO of Bolt; Arsen Tomsky, CEO of inDrive; and other budding ones I can't mention here.

Sea transport in Nigeria is a sector that concerns me due to its primitive nature and the underutilized sea routes. If our government had created alternative interstate routes through sea transportation, it would have saved us from road congestion, which leads to road damage and deterioration. A state like Lagos, with so many sea routes, still cries foul for traffic congestion. This is as if I had sight and utility. If Lagos successfully en-routes its sea route, it would be surprised at the cost of underutilizing resources. Alternative routes will be available once Lagos State cleans up the canals, establishes directories, and installs adequate speed bumps. As a result, the land shuttle will be reduced, and traffic congestion will be drastically reduced.

Sea transportation is broad, as it's more international than domestic. I recognize companies that have contributed positively to the growth of sea transportation in Nigeria and across Africa. Special thanks to Grimaldi Lines, Five Star Shipping, Green West Africa, Azimut Yachts, Tuwasco Marine Services, and many others for their unquantified contributions.

Transportation is a vast sector, and in Nigeria, it's still a budding one. Thus, we need to step in and jointly transform it to the first-world standard and beyond.

The Mobility Industry

The mobility industry includes all types of human and machine movement: Land vehicles, aviation, maritime transport, robotics, and space exploration. It's more than just a collection of technologies; it's the living infrastructure of human progress. From the invention of the wheel to interplanetary travel, mobility has continually shaped civilizations, economies, and the very rhythm of human life.

Land transport has progressed from animal-drawn carts to autonomous electric vehicles and hyperloop systems. Modern automotive technology now combines artificial intelligence, clean energy, and smart connectivity, transforming cars into intelligent companions rather than mere machines. Over the next century, vehicles will be self-navigating, self-repairing, and energy self-sustaining, powered by fusion-based batteries or solar nanogrids. Urban design will evolve around smart mobility ecosystems, where traffic lights, roads, and vehicles communicate effortlessly to reduce

congestion and prevent accidents.

The aviation industry revolutionized our perception of distance and time. From the fragile planes of the Wright brothers to today's supersonic jets and electric vertical takeoff and landing aircraft (eVTOLs), air travel continues to expand the boundaries of engineering.

In the coming century, we will see hydrogen-powered planes, quiet propulsion systems, and autonomous flight networks managed by AI air-traffic control. Flying taxis, intercontinental suborbital journeys, and atmospheric drones will transform logistics, tourism, and defense. The sky will no longer be a limit but an extension of ground-based mobility.

Maritime transport continues to be the backbone of global trade, moving over 80% of the world's goods. Future ships will transition to autonomous, carbon-neutral vessels powered by biofuels, hydrogen, and wind-assisted propulsion. Over the next 100 years, smart ocean routes will be managed by AI to reduce congestion and environmental impact. Underwater exploration vehicles will responsibly map and utilize deep-sea resources, turning oceans into both highways and laboratories for sustainable discovery.

The rise of robotic mobility signals a new industrial revolution. Robots now build, explore, and even drive vehicles. In the future, adaptable robots will operate across all terrains - land, air, sea, and space, capable of self-learning and working alongside humans. Personal robotic assistants and autonomous delivery systems will combine mobility with convenience, creating a society where efficiency and creativity thrive. Robots will also lead planetary exploration and extraterrestrial construction, becoming humanity's partners in expansion.

Space exploration stands as the height of human curiosity and mobility. In the next century, space mobility will shift from mere exploration to colonization. Reusable rockets, orbital shuttles, and asteroid mining vessels will build an interplanetary economy. Human colonies on the Moon and Mars will rely on interplanetary transport routes; fleets of AI-controlled spacecraft using plasma or quantum propulsion. Space travel will become as common as air travel today, linking planets and supporting the next phase of civilization.

A century from now, mobility will be fully integrated, autonomous,

and sustainable. Boundaries between land, air, sea, and space will blur, forming a “Continuum of Motion,” where all systems connect through quantum networks and shared intelligence. Mobility will no longer just move bodies but transfer consciousness, data, and energy. Cities will be living entities — adaptive, self-regulating, and responsive to the flow of mobility.

Mobility has always sparked human progress, driving trade, culture, innovation, and survival. It turns isolation into connection and ideas into global movements. As humanity advances, the mobility industry stands as a symbol of freedom and continuity, linking Earth with space, humans with machines, and the present with the unimaginable future. The mobility industry is not just about transportation; it is about transformation, the continual redefinition of how humanity interacts with distance, energy, and possibility. In the next 100 years, it will shape a world where travel is instantaneous, energy is clean, and frontiers are limitless, reaffirming mobility as the very engine of human evolution and the vessel of our shared future.

CHAPTER TEN

AUTOMOTIVE MANUFACTURING

Vehicle manufacturing sounds like a white elephant project, but it can be effortlessly achieved with willpower and determination. Of course, the prime dream of most automobile CEOs is to have a vehicle manufacturing plant. Some even envision aircraft manufacturing. Well, whichever way, they are worth striving for when compared with the gain thereof. Beyond the significant financial commitment, this requires basic knowledge of the following: Raw materials, engineering mechanisms, prototype design, production blueprint, branding, body welding, painting, engine, trim, inspection, quality review, feedback, regulation compliance, and more.

We shall have a sparky discussion on these processes to better understand this topic. Of course, vehicle manufacturing is the hub and the string that holds the automobile industry together. So, it is important that you take this topic seriously and learn as much as you can.

Raw Material

Just as you prepare food ingredients before you start cooking food, you are required to make automobile raw materials ready before you can proceed with vehicle manufacturing. To build a vehicle from a mere concept to reality, you must prepare all the necessary materials before you start out. In fact, vehicle manufacturing materials have become choosy following the climate change campaign. For this reason, the needed materials now are lightweight, sustainable, cost-effective, and reusable. This is geared toward meeting the demand

for “greener” vehicle production. The following are the top primary materials needed for vehicle manufacturing. Although these materials might differ slightly from those used for other vehicle manufacturing, such as aircraft, space machines, ships/boats, and other vehicles, they are used 60% of the time for other productions:

Copper

Copper is used to produce electrical systems for vehicles, including power distribution and complex electronics. Its outputs include radios, navigational systems, rearview cameras, electronics, computer systems across all vehicle types, electrical wiring, and starters for ICE, PHEVs, and FECVs. Coppers can be found in Chile, Peru, China, and the United States of America.

Cobalt

Cobalt is widely used in lithium-ion batteries for BEVs and PHEVs. Electric vehicles mostly need it since it's a key material in their cathodes. Outside batteries, Cobalt is an alloy element for several car parts, especially those that withstand extreme conditions. Among other countries, the Democratic Republic of Congo has a large amount of Cobalt, accounting for up to 73% of global supply, second only to Indonesia, Australia, and the Philippines.

Aluminum

Over the years, aluminum has become the dominant metal used in automobile manufacturing. Bauxite, the primary ore for aluminum, and alumina are used to produce aluminum. Aluminum is the preferred choice among automobile manufacturers thanks to its malleability and lightweight nature, which improve fuel efficiency and extend the EV battery range. Aluminum has replaced steel and iron in the construction of many automotive parts, including engine blocks, cylinders, transmission housings, and wheels. Rich countries in aluminum include Guinea, Australia, Vietnam, and Jamaica.

Fiberglass

Fiberglass is a composite material made from wonderful glass fibers. It's light, non-corrosive, and used instead of metals in some production applications. When combined with resin, it creates

a lightweight, corrosion-resistant material, making it a suitable replacement for metals in the manufacturing of bumpers, doors, wheels, hoods, fenders, and spoilers. The raw fiberglass material is silica sand, which is abundant worldwide. China, the US, Australia, Brazil, India, the Middle East, and some parts of North Africa are countries where silica sand can be sourced.

Glass

Glass is standard on all vehicles and is essential for building them, from windshields and windows to rearview and side-view mirrors. As a widely used material, its demand is consistently high. China, France, the US, Japan, Mexico, England, and others are the world's leading glass manufacturing countries.

Lead

Lead is a heavy metal usually used to ensure that vehicles are firm and balanced. It is also used more on wheels and batteries, strengthening the wheels and helping batteries retain a low temperature. China, Australia, Mexico, Peru, and the United States of America are the leading countries in terms of lead supply.

Lithium

Lithium is a key component in electric car batteries. It provides a high energy capacity and is rechargeable. Lithium-ion batteries have a greater capacity than batteries made with other metals that can be used in mass production, and they can be recharged many times before experiencing degradation. Lithium is a rich deposit in Chile, Bolivia, the USA, Australia, Zimbabwe, China, the DR Congo, and other countries.

Magnesium

The main sources of magnesium are seawater and underground deposits of minerals such as magnesite (magnesium carbonate) and dolomite (magnesium calcium carbonate). Additionally, magnesium can be extracted from brines containing significant amounts of magnesium chloride.

Magnesium is lighter than steel and aluminum, making it ideal for applications where weight reduction is necessary without sacrificing

strength. It is also used to produce parts of a vehicle's body, engine, and other components. Magnesium can be sourced in China, Brazil, Russia, Turkey, Australia, Austria, Slovakia, Greece, Spain, Saudi Arabia, and other countries.

Nickel

Nickel is added to other metals to create alloys with enhanced properties, such as high-temperature strength, corrosion resistance, and toughness. These alloys ensure durability and reliability in many automotive parts (a good example is the cathode material used in lithium-ion batteries for BEVs and PHEVs). Australia, Indonesia, Brazil, Russia, and the Philippines are the major suppliers of nickel.

Petroleum

Petroleum is the raw material used to produce many plastic components in vehicles, and chemical companies transform petroleum byproducts into plastic.

Plastics are challenging steel for prominence in automotive manufacturing component materials. For example, a typical vehicle today is made with 151 kilograms of plastics and composite materials, accounting for about 8% of the vehicle's weight and 50% of the volume of materials used. Countless car parts, including door handles, air vents, the dashboard, airbags, a console, and other accessories, are made from plastic. Plastics' versatility, durability, and lightweight character make them a sought-after material for vehicle parts. Of course, petroleum products are very familiar to us. However, leading countries, in no particular order, are Saudi Arabia, Venezuela, Kuwait, the USA, Iran, Nigeria, Russia, the UAE, Canada, and others.

Platinum/Palladium

Platinum and palladium, often found alongside nickel and copper ores, are extracted from ore deposits. They are crucial materials in catalytic converters (ICE, HEVs, and PHEVs), devices that reduce harmful emissions from vehicle exhaust systems. Catalysts facilitate the conversion of toxic gases from the engine, such as nitrogen oxides, carbon monoxide, and hydrocarbons, into less harmful substances, such as carbon dioxide, nitrogen, and water vapor. These

materials can be found in South Africa, Canada, the United States, and Zimbabwe.

Rare earth elements

Rare earth elements are important in the automotive industry, particularly in electric and hybrid vehicles, due to their unique magnetic and electrical properties. They are generally extracted from bastnaesite, monazite, and xenotime ores using acids and radioactive byproducts. Rare earth elements like neodymium can be sourced from China, Australia, and the United States. They are preferred for their strength and high-temperature efficiency. Thanks to their unique chemical properties, other rare-earth elements, such as lanthanum and cerium, can be used in battery electrodes and electronic components.

Rubber

I believe you are familiar with this. Rubber is very important in vehicle manufacturing, and the demand is high. Rubber is used to produce tires, hoses, seals (critical for the functioning of the vehicle's engine in ICE, HEVs, and PHEVs), belts, cable covers, and other vehicle components.

Rubber is durable and easily molded into different shapes, making it sought after, just like plastic. Vietnam, Thailand, and Indonesia are the leading countries in terms of rubber supply. We also have synthetic rubber derived from petroleum products.

Steel (iron ore)

Made from iron ore, steel is widely used in vehicle manufacturing. On average, 90% of vehicles use kilograms of steel. Steel is used to construct a vehicle's chassis and other body parts, such as the roof, door panels, beams, mufflers, exhaust pipes, and many other components. As discussed above, technological advances have compelled some vehicle manufacturers

to move away from less dense materials like KJN Aluminium, magnesium, and carbon fiber. The leading steel sources are India, the USA, China, and Japan.

Production Processes

Raw material acquisition

As I said earlier, all required raw materials must be made available to develop a vehicle from a concept to a reality. Depending on the type of vehicle to be manufactured, more than 90% of the raw materials we discussed earlier are required for production. Providing raw materials is one of the early steps in vehicle production, and a substantial budget must be allocated for this purpose. Also, there should be a provision for storing and preserving all available raw materials.

Engineering prototype and design

As in every production preparation, the engineering concept for the proposed vehicle's production is sketched in prototype form. This also includes the overall vehicle design, as well as the interior and exterior design. Of course, you may have to hire vehicle design specialists to provide what you need. After that, your engineers will make small-scale models of the design in 2D and 3D to test and preview the vehicle's end product. This will include considerations of the vehicle's special features, such as aerodynamics, safety, temperature, fuel economy, emissions, electrical functions, AI features, and cost analysis. Production can start after these exercises are satisfactorily tested and approved. Vehicle design is unique to each manufacturer, but there are some standards everyone must follow. We have many automotive design firms, including Venturi, Gordon Murray, UNTLD MOTO, MUdesignworks, Luso Design, and My Car Expo.

Stamping

Stamping is the conversion of steel metal sheets into specific shapes. It is a complex process that includes metal-forming techniques like blanking, punching, bending, and piercing, to name a few. Stamping allows automobile manufacturers to achieve any desired geometry through pressed steel sheets. Pressed steel sheets are used to construct or mold vehicle structures, such as door panels, roofs, bonnets, boots, and other components beneath the floor.

Below are three primary stamping machines:

Mechanical Presses: These machines are typically used for high-volume production. They are fast, efficient, and consistent. These types of presses operate using a motor and a flywheel mechanism. Stable speed and precision make mechanical presses the top choice among automobile manufacturers.

Hydraulic Presses: Hydraulic presses are not as fast as mechanical presses but offer more flexibility in stroke lengths. They use fluid to generate force and are versatile in terms of size and component complexity. This uniquely makes hydraulic presses ideal solutions for parts with more complex geometries.

Mechanical Servo Presses: Mechanical servo presses are similar to mechanical presses but use high-capacity motors rather than flywheels. Thanks to their efficiency and precision, they offer flexibility but are faster than hydraulic presses, allowing them to manufacture complex components quickly.

Body welding

Axiomatically, the automobile mechanism is born with numerous weddings. Typically, monocoque-designed vehicles take shape by joining several vehicle parts after the pressing process. There are many mind-blowing welding robots, including ABB, KUKA, EVS, Lincoln, Comau, Miller, Panasonic, FANUC, IGM, and Yaskawa.

Painting

Vehicle painting is highly demanding and requires complex processes.

The following is the basic standard in vehicle painting procedures:

Pretreatment: The process of cleaning and preparing the vehicle's body shell for painting.

Priming: After pretreatment, a primer coat is applied to the vehicle's body shell to improve paint adhesion.

Base coat: A base coat is applied, usually in the vehicle's main color.

Clear coat: A clear coat is applied over the base coat to protect it and give the vehicle a glossy finish.

Oven: After painting, oven-baking is recommended for optimal results.

Waxing: The wax is applied in delicate layers.

Polishing: This is one of the most time-consuming and labor-

intensive processes. Polishing gives each vehicle a sparkle and shine. Polishing processes are more elaborate; the longer they take, the better. As a result, the more expensive a vehicle is, the longer it takes to polish.

The following are the types of robots used for vehicle painting and their respective functions:

Collaborative robots: Sophisticated, equipped with sensors and safety features, Cobots, as they are popularly called, are ideal for human-robot interaction. Good examples of collaborative robots are Techman Robot TM5 and Universal Robot.

SCARA robots: SCARA provides horizontal motion for fast and precise operation, especially for the Yamaha YK Series and Epson.

Articulated Robots: Articulated robots are versatile and highly industrious. Because of their rotary joints and unlimited degrees of freedom, articulated robots are the most commonly used industrial painting robots. The ABB IRB 5500 and the FANUC P-350iA are good examples of articulated robots.

Spray-painting robots: Built with integrated vision systems, these special robots are equipped with advanced vision systems for real-time adjustments and high-quality finishes. Yaskawa Motoman MPX Series and Kawasaki KJ Series are good examples of spray-painting robots.

Cartesian Robots: Cartesian robots are usually used to paint large, flat surfaces. They function on three linear axes and are primarily used for linear movements. Examples are Dürr EcoRP and KUKA LBR iiwa.

Transaxle/engine/other components mounting

This procedure is also known as elementary assembling. Of course, before this stage, the vehicle has been painted and is shining. It is now suitable for mounting the transaxle, engine, and other components. This process requires a careful approach, whether manual or robotic. During the mounting process, the engine is given detailed attention. The engine's identity is crested on the block, and the Engine Identification Number (EIN) is punched. Various coupling stages occur during engine assembly, including installing pistons, piston rings, and other essential components. After the engine is assembled correctly and mounted, it undergoes tests. Oil/water leakages and

pressure sustenance tests are usually considered. Some engines are pre-run stationarily before mating the engines to the transaxles. Assembling the transaxle, which contains the gearbox, is typically essential at this stage. After this, other varieties of components are assembled, followed by the tertiary assembly.

Final Fitment

This is the tertiary stage of automobile production. At this point, everything that makes a vehicle what it is has been done; you can drive the vehicle out of the manufacturing plant. Trim is usually done manually; human hands perform most of the trim during this production stage.

Final detailing of components such as windshields, trims, steering columns, electronics, engines, and other components is done here.

Final inspection and quality Test

This procedure entails a 360-degree inspection and a general quality test of the vehicle to ensure no defects. These inspections and tests include performing serial starts and stops on the engine, conducting an adjustment of steering alignment, testing the headlights for brightness, conducting a brake performance and safety test, testing for leakages with heavy water pressure, conducting testing exercises that decode car programming, conducting an airbag response test, conducting a seatbelt test, and checking all electrical units for safety and functionality. When the vehicle passes all tests and quality checks, it will be considered a finished product. The inventory department will take over production recording, after which the marketing department will take over sales and eventual distribution to automobile dealers.

Feedback

After testing, quality checking, and corrections, you can call a team of automobile professionals to review the vehicle's model. In addition to the mechanical and physical design, this review covers market surveys (such as competitors and demand), safety, proposed longevity, pricing, and public acceptance. Whatever feedback you receive from this team of professionals will guide you in what comes next and in what decisions to make.

Conclusion

Above were abstract vehicle manufacturing procedures and applications. The automotive industry is a cutting-edge and fascinating technology. It has changed our world today in ramifications beyond our prediction. Out of curiosity, man has devised engineering feats that have revolutionized our transportation system and enabled us to travel long distances in a short time. Yet, this is just the scratching stage, as the automotive industry's aspirations and evolution are at a high point.

To understand vehicle manufacturing in detail, you must build a passion for the automotive industry and, more so, aspire to own a brand of your own. As I said earlier, vehicle manufacturing is not as impossible an adventure as you think. All you need to do is understand the vehicle mechanism, the raw materials needed for manufacturing and where they can be obtained, the types of robots and manpower to be employed, the prototype design, manufacturing processes, production affiliation, and marketing. When you know these things and know exactly what to do, you can seek funds through investors or banks. It might surprise you how much you can pull through – exponentially!

An average vehicle has about 30,000 different components. Each component is often manufactured at different facilities and sent to a final production plant, where the vehicle is assembled. Depending on the complexity of a vehicle in production, it could take between two and three days for the assembly department to assemble a vehicle from start to finish.

Meanwhile, you have to know that the common trend in the automotive industry is what I call 'ascending innovation'. In other words, a particular vehicle manufactured today must not be manufactured the same way tomorrow. There must always be a new innovation incorporated. This has to do with the body design, electrical system, eco-friendliness, autonomous (AI), and other features that are much more contemporary than those of the predecessor.

Today's trend is replacing heavier materials with lighter ones, such as fiberglass and magnesium. Of course, reducing a vehicle's weight can improve or maintain safety and reduce gas consumption. For every 20% reduction in a vehicle's weight, an end-user of such

a vehicle saves 15% to 20% off the petrol budget. In fact, the United States of America has proposed saving more than \$5 billion per annum through reduced vehicle weight. This became even more interesting when California said that all petrol-powered vehicles would be road-off by 2030. This is a proposal to use only electric vehicles. Informatively, this is an early warning to automotive manufacturers that fuel-powered vehicles will go extinct in the near future. This is why I said that vehicle manufacturing must evolve. All intending car manufacturers should focus on electric vehicles because they are the demand for tomorrow, especially from first-world countries. Unless you target only third-world countries, this will also have its hatchback, as brand-new sales to third-world countries will be difficult. Secondly, in light of the “globalization” ambition, third-world countries might oppose it to ensure zero global emissions, thereby curtailing global warming threats. Thus, electric vehicles will usurp today’s conventional vehicles. Regardless, if you are going with fuel-powered vehicles, make sure you adopt lightweight materials like aluminum, fiber, rubber, and plastics.

Technologies Used In Vehicle Manufacturing

Standard technologies used in vehicle manufacturing include robotics, computer-aided design (CAD), computer-aided manufacturing (CAM), and 3D printing. We will discuss these technologies briefly.

Robot

Robots do almost 80% of the jobs in automobile manufacturing plants. As time passes, automobile manufacturers are exploring and advancing to complete automation in production with brilliant robots. In this type of production line, robots are more efficient, accurate, flexible, and dependable. This technology has allowed the automotive industry to remain one of the most automated supply chains globally and one of the largest users of robots. With thousands of wires and parts in every vehicle, it takes a complex manufacturing process to achieve a finished job. The following are the types of robots used in the automotive manufacturing plant and their functions:

Vision robot

This robot is a testament to the limitless power of technology. This

light industrial robotic arm with eyes (camera) works precisely because it can see what it's doing. Its wrist carries the laser and camera array that gives the machine instant feedback, thereby instructing it on what to do.

With the invention of vision robots, these machines can now accurately position and install parts because they precisely know where each part belongs and what actions to take. Installing door panels, windshields, and fenders is more precise with vision robots than with standard robotic arms.

Spot and arc welding

Large industrial robots equipped with long arms and high payload capacities perform spot welding on heavy body panels, while smaller robots are used for welding lighter components such as mounts and brackets. Robotic tungsten inert gas (TIG) and metal inert gas (MIG) welders can maintain the torch in the same orientation for every cycle. As a result of this repeatable arc and consistent speed, high welding standards can be maintained in all fabrication processes.

Collaborative robots work together with other large industrial robots on massive assembly lines. Robotic welders and handlers must collaborate to keep the assembly line moving. Robot handlers need to place panels at the precise location so the welding robot can perform all the programmed welds. In most automotive manufacturing plants, light robotic arms assemble smaller parts, such as motors and pumps, at high speed. Robot arms also perform other tasks, such as screw driving, wheel mounting, and windshield installation. These are done neatly and efficiently, even better than humans. Examples of these robots are articulated, UR, cartesian, FANUC, and others.

Painting robot

Auto manufacturers often decry the shortage and lack of skilled laborers, especially in painting, which demands professional touches. Robotic arms can fill this void because the job entails consistency for each coat of paint. Painting robots can follow a programmed path, consistently covering large areas and limiting waste. Machines are also useful for spraying adhesives, sealants, and primers.

Machine tending/part transfer robot

Transferring metal stamps, loading and unloading CNC machines, and pouring molten metal in a foundry are dangerous for human workers. This is why this type of work is perfect for large industrial robots. However, smaller cobots can also perform light machine tending and loading/unloading tasks for smaller manufacturing operations.

Materials removal robots

This robot can follow a complex task multiple times without failing, making it the perfect tool for cutting and trimming jobs. Light robots with force-sensing technology are better suited to this type of work. Tasks include trimming flash from plastic moldings, polishing molds, and cutting fabric.

Internal logistics robot

Autonomous mobile robots (AMRs) are used in a factory to move raw materials and other parts from storage areas to the factory floor, replacing traditional forklifts. For example, currently in Spain, Ford Motor Corporation has recently adopted AMRs from Mobile Industrial Robots (MiR) to carry and deliver industrial and welding materials to various robot stations on the factory floor, usurping the manual process. These are but a few of the many robotic applications used in automobile manufacturing plants today. Numerous projects are in the pipeline to enhance these robots' reliability, security, and productivity. When they reach fruition, these projects will push humans out of automobile factories, and robots will take over, handling everything from vehicle design to production.

Computer-aided design (CAD)

Computer-aided design (CAD) software is used to design 3D and 2D graphics. While CAD is beneficial across industries, the automotive industry needs it more because it serves as the foundation of vehicle manufacturing. The evolution of CAD software has been transcendental and very impressive. Today, we have CAD software that can create automobile designs as real as reality itself. Examples of CAD software include SolidWorks, Autodesk Fusion, FreeCAD, Autodesk Inventor, Siemens NX, CATIA, and many others.

Computer-Aided Manufacturing

Computer-aided manufacturing (CAM) is an automobile manufacturing process in which computer software controls and stimulates vehicle manufacturing procedures. This is just as it concerns the automobile industry. Of course, CAM is also used for other production processes.

Computer-aided manufacturing, among many other functions, creates a digital version of a product under process using CAD or directly on a system. The digital stimulation is then used to control equipment during manufacturing processes.

CAM is an invaluable part of computer numerical control (CNC) machining and is used to produce complex automotive parts and components. CAM is highly advantageous in manufacturing processes because of its speed, accuracy, sophistication, and efficiency. On the flip side, CAM has disadvantages: it is expensive to set up, requires a skilled engineering workforce, and incurs high maintenance costs during downtime. Examples of CAM are laser cutters, 3D printers, Fusion 360, RhinoCAM, CAMworks, and others.

3D printing

3D printing, or additive manufacturing, is the construction of a three-dimensional object from a CAD model. This technology adds layers and materials to build up a desired object. To execute 3D printing, first define what you want to build, design a prototype, convert it to STL format, and slice it into layers so the 3D printer can understand the project to be printed. 3D printing is used at different stages of vehicle manufacturing, from design and prototyping to parts production to end-part production. This technology is incredible and highly futuristic. I envision a world where automobile manufacturing will deploy 3D printing from stage one to the tertiary. This will bring precision, excellent finishing, and enhanced production. Examples of 3D printing machines for automobiles include Creality Ender 3 V2, Artillery Sidewinder X1 V4, Anycubic Mega X, Creality CR-10 Max, and Creality Ender 5 Plus.

Safety Regulation

The automobile industry is vast, with complex manufacturing

processes that involve intricate operations, from electrical management to assembly lines and materials handling.

Every stage of production presents peculiar challenges and risks. The importance of safety in the automobile industry cannot be overemphasized, as it directly impacts employees' health, product quality, and the overall efficiency of manufacturing processes. A robust safety program mitigates the risk of accidents and fosters a culture of responsibility and awareness among workers. Understanding the potential hazards in vehicle manufacturing is the first step toward effective safety management. The environment is rife with risks that can lead to severe injuries or even fatalities if the safety measure is not properly organized. The following are some of the most common hazards in the automotive manufacturing plant:

Physical Hazard

This is hazardous exposure to machinery and equipment while in operation. For instance, employees of heavy machinery face dangers such as crushing, pinching, or entanglement.

Additionally, slips, trips, and falls are prevalent, often caused by cluttered workspaces or wet surfaces. According to a report from the National Safety Council, an average of 25,000 workplace slip-and-fall injuries occur annually in the vehicle manufacturing sector.

Fire outbreak

A fire outbreak in an automobile manufacturing plant is highly probable given the number of machines and their high voltages. Employees are at risk of fire, so all appropriate fire safety measures must be implemented. Fire outbreaks can occur in automotive manufacturing plants due to a number of factors, including electrical hazards, flammable materials, welding operations, and inadequate fire prevention measures, such as protocols, fire extinguishers, and emergency response training. To prevent fires in automotive manufacturing plants, the following measures must be adopted: conducting regular inspections, providing electrical safety training, adhering to relevant codes and standards, implementing fire prevention protocols, providing industrial fire extinguishers, and conducting regular fire drills.

Chemical Hazard

Vehicle manufacturing uses various chemicals, such as paints, solvents, and adhesives, which present significant risks. Exposure can lead to respiratory issues, skin irritations, or long-term health complications. Employees must be educated on how to properly handle and store these substances to avoid accidents.

Ergonomic Hazard

Repetitive motions, awkward postures, and manual handling contribute to musculoskeletal disorders (MSDs). A Bureau of Labor Statistics study indicates that MSDs account for over 30% of workplace injuries in the vehicle manufacturing industry. Implementing ergonomic solutions, such as adjustable workstations and mechanical aids, can significantly reduce these hazards.

Noise Hazard

High noise levels are common in automotive manufacturing environments due to machinery and equipment operations. Prolonged exposure to loud environments can lead to hearing loss, which calls for implementing noise control measures, such as personal protective equipment (PPE), such as earplugs or earmuffs.

Electrical Hazard

Electrical risks are prevalent in vehicle manufacturing processes, especially when dealing with high-voltage equipment. Improper wiring, malfunctioning machinery, or failure to properly train employees can result in severe injuries or fatalities. Regular inspections and adherence to electrical safety standards are necessary to mitigate these risks.

Safety Management

With a good understanding of potential daily hazards in a manufacturing plant, the best approach is to adopt adequate safety precautions and best practices. Below are practicable strategies to enhance safety in the automotive manufacturing environment:

Risk assessment

Conducting a thorough risk assessment is essential to identifying

potential hazards and developing mitigation strategies. This process involves evaluating each work area, understanding the tasks performed, and determining the associated risks. Engaging employees in this process empowers them and provides insights into potential hazards that management might have overlooked.

Engineering Control

Engineering control involves redesigning workspaces or machinery to reduce exposure to hazards. For example, installing machine guards will prevent workers from accessing dangerous moving parts. Additionally, investing in automated equipment can minimize manual handling tasks, thereby reducing ergonomic risks.

Maintenance and inspection

Adopting a proactive maintenance approach ensures machinery and equipment function safely. Regular inspections help identify potential issues before they lead to accidents. Establishing a checklist for routine checks can streamline the process and ensure compliance with safety standards.

Establishing a safety culture

Creating a safety culture requires the commitment of all employees, from management to frontline workers. Open communication regarding safety concerns must be adopted, and individuals who prioritize safe practices must be recognized. When employees feel responsible for their own safety, their colleagues, and the company's safety, the likelihood of accidents will decrease.

Regulatory Bodies Governing Safety Standards In The Automotive Manufacturing:

Adhering to regulations and standards is critical for ensuring safety in automotive manufacturing. Although, depending on the country, various organizations and government agencies provide guidelines and frameworks for compliance, some of which are:

Occupational safety and health administration

OSHA enforces standards to ensure safe working conditions across

industries, including automotive manufacturing. Employers must comply with OSHA regulations covering everything from machinery safety to chemical handling and employee training. Regular OSHA inspections can lead to penalties for noncompliance, underscoring the need for vigilance.

ISO standards

The International Organization for Standardization (ISO) provides various standards relevant to automotive manufacturing, including ISO 45001, which focuses on occupational health and safety management systems. Implementing ISO standards can help organizations systematically manage safety risks and improve overall safety performance.

National Fire Protection Association

The NFPA offers guidelines for fire safety in manufacturing settings. Given the potential for fire hazards posed by flammable materials, adherence to NFPA standards is crucial to ensuring employee and facility safety. As I said, it all depends on the country. There are other automotive manufacturing safety regulatory organizations. Safety is key, and it must be given prime attention.

Staff Training

Like in every organization, the importance of staff training in automotive manufacturing cannot be overstated. Employees must be guided on what to do and equipped with the requisite skills and knowledge needed to stay safe in a work environment. The following are basic staff training in an automotive manufacturing plant:

Ergonomics

Employees in vehicle manufacturing plants frequently perform repetitive tasks like lifting, assembling, pulling, bending, twisting, and hunching. If performed continuously without proper ergonomics, these tasks can become highly strenuous, ultimately damaging their physical health. With ergonomics training, workers would understand the benefits of ergonomics, common risk factors, and possible injuries caused by the lack of ergonomic knowledge, including muscle sprains, carpal tunnel syndrome, tendonitis, spine

disorders, and other musculoskeletal problems. This training will provide workers with the best ergonomic practices, such as stretching and proper lifting techniques, to prevent injuries before they occur, as well as other risk-management technical know-how.

Warehouse safety

During this training, workers will learn about the different types of personal protective equipment (PPE) to help keep them safe, from head to toe, including hard hats, eyewear, ear protection, and protective footwear.

Plastic molding

This is a process in which plastic raw materials are processed to mold vehicle components, such as lubricant containers, chrome, consoles, spoilers, clips, hoses, and more. During this process, workers are exposed to different types of plastics, including PVCs, ABSs, PPs, and LDPEs, which can be hazardous when mishandled. Here, workers are trained on the types of mechanical and non-mechanical hazards and injuries, such as plastic burns, crushed limbs, and machine electrocution. They will also learn control measures to reduce exposure to molten plastic chemicals.

Automation safety

In an automotive manufacturing plant, employees handle many automated machines and robots at every stage of the process. Workers must be trained to operate machines and robots safely and to take appropriate safety measures to avoid hazards. They have to be educated on the types of accidents, manufacturing hazards, the differences between industrial and collaborative robots, and how to handle them. Similarly, they must be extensively trained on risk control and safeguarding methods such as barriers, emergency stop buttons, and the buddy system.

Electrical Hazard

An electrical hazard is any potential danger that can cause injury, damage, or death from contact with electrical energy. Common electrical hazards include exposed wiring, faulty equipment, overloaded circuits, wet conditions near electrical sources, and

improper grounding. Such hazards can cause electric shock, burns, fires, or explosions. To avoid these risks, it's crucial to follow safety measures like using insulated tools, regularly maintaining equipment, staying away from water near electricity, and wearing proper protective gear. Proper awareness and adherence to electrical safety standards protect both people and property from serious accidents.

Control Measures For Common Electrical Hazards.

Quality Control

Quality control training for electrical hazards aims to ensure that all electrical systems, equipment, and operations meet established safety and performance standards. The purpose is to reduce the risk of electrical accidents such as shocks, fires, and equipment failures through proper inspection, testing, and compliance procedures. This training focuses on key areas such as:

- Hazard Identification: Recognizing potential electrical risks in the workplace, including faulty wiring, poor insulation, or overloaded circuits.
- Safety Standards and Compliance: Understanding national and international electrical safety regulations (e.g., ISO, IEC, OSHA standards).
- Preventive Maintenance: Implementing inspection routines, equipment testing, and documentation to ensure consistent system reliability.
- Use of Protective Equipment: Emphasizing the correct use of insulated tools, PPE, and safety devices to prevent electrical injuries.
- Incident Response and Reporting: Training employees on proper emergency procedures and how to report hazards promptly.

Through continuous quality control training, organizations can enhance workplace safety, reduce downtime caused by electrical faults, and promote a culture of compliance and accountability. Quality control training is the best type of employee training because it benefits the company significantly.

Electrical Safety Awareness

Because of its hazardous nature, technical employees must be very

well trained in this area. They must be trained on electrical work standards and regulations, common electrical hazards and their controls, Ohm's law, and the definitions of amps, volts, and ohms. They should be made to understand best practices for safe electrical use and common electrical accidents, and to identify different quality control processes, quality assurance, and inspections. They must also understand the eight dimensions of quality, which are: Performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality. David Garvin originally conceptualized these dimensions, which can serve as a framework for your employees' strategic analysis and product performance.

Lockout tagout

Lockout/tagout is a safety procedure used to ensure that dangerous equipment is properly shut down and inoperable until maintenance or repair work is carried out. Also known as LOTO, lockout/tagout training educates workers on their responsibilities for equipment lockout and tagout. This delves into topics such as control procedures, lockout and inspection requirements, device removal, group lockout/tagout, and proper startup and shutdown procedures.

This training program should also address the regulatory requirements of various organizations to ensure employees don't compromise compliance. They should also be trained in the approach to machine servicing and in controlling potential hazards posed by the release of stored energy.

Robot safety awareness

I have talked a bit about this under automation safety. Still, it is worth emphasizing this more here, since the robotic setup in an automotive manufacturing plant is robust. As a result, employees must be well-trained in operating robots and safety measures.

This includes software applications, primary assignment definition and application, handling, robot safety guidelines, systems controls, machine malfunction, and other specific training elements.

Conveyor safety

Conveyor belts are frequently used in automotive manufacturing plants, especially for warehousing, distribution, and logistics.

Employees must be trained to operate these machines professionally because if they are not handled properly, they can be extremely dangerous and might result in severe injuries like arm amputations, lacerations, burns, scrapes, and broken bones. Apart from technical know-how training on conveyors, what is more important is training employees to understand common conveyor hazards, conveyor ergonomics, and physical safeguarding methods such as barriers, enclosures, and fences. They also have to understand the difference between powered conveyors, such as belts and live rollers, and gravity conveyors, like aerials and buckets.

Slips, trips, and falls

This training, as insignificant as it appears, is highly invaluable. Work environment injuries, trips, and falls happen very often, and most are fatal. Training measures must be conducted to prevent such accidents. Some preventive measures, such as good housekeeping, hazard signs, and safe equipment storage, must be implemented as precautionary measures. Employees must be guided on how to perform their jobs to avoid these hazards.

Vehicle Manufacturing Management

Automotive manufacturing processes are extensive, and as a result, their management is complex and demanding. We cannot exhaust them here, but I will give a sparky summary. I recommend you read Operation Management in the Automotive Industry by Marco Gobetto. Marco did a good job, and you will extract as much knowledge as your curiosity allows.

Below is a vehicle manufacturing operation management:

The company's goal

Management ensures they understand the company's goal and blueprint, guiding their daily decisions and forecasts. Management is responsible for communicating the company's objective to other employees, who will, in turn, streamline their operations in line with it.

Employees

Sourcing the right employees for an automotive manufacturing plant can be demanding. More often, management hires recruiting agencies to do this for them, whereas some manage the employment process themselves through the human resources department. Engaging the right employees on merit is key to having efficient workers. Because of the touch of professionalism and sophisticated engineering systems in automobiles, specialization is also a cogent consideration while absorbing employees. In other words, employees must be assigned tasks they know best. For this reason, interdepartmental reshuffling of any kind should be discouraged, and if at all, it should be done with absolute care.

Equipment

The management is responsible for adopting a system for equipment maintenance and safety. Equipment such as robots and large machines is very expensive and requires meticulous handling. Thus, employees must be trained in the best way to handle equipment, including its operation, maintenance, and storage.

Raw material

Management is responsible for ensuring that all necessary raw materials are available and meet the required standards. Some raw materials, such as chemicals, rhodium, and lithium, are very expensive and can be damaged if improperly handled. So, raw material handling and preservation require close attention by the manager to avoid waste, spoilage, and hazards.

Assembly

Assembling is a major department in an automotive plant and should receive close attention from management. This attention should cover the assembly of floors, sides, roofs, doors, hoods, trunks, and other components, as well as the assembly of parts. Management must ensure that all assembly standards are maintained, employees' skills are improved, and safety standards are followed.

Quality control

It is the duty of management to set up quality control measures

and ensure maximum delivery. Quality control plays a crucial role in ensuring the acceptance and authentication of automobile brands. Quality control measures such as statistical process control (SPC), visual inspection, failure mode and effects analysis, quality management system, regulatory compliance, product traceability, regular audits, and reviews are essential for automotive managerial up-scaling. Other quality control measures include design verification and validation, inspection, testing, and customer feedback. Meanwhile, some common quality control challenges in automotive manufacturing are customer expectations, supplier quality, process variability, and technological innovation.

Painting

The painting department is very sensitive in the industry because of what it represents. For instance, if a vehicle's mechanical and electrical systems are in excellent condition but the painting is bad, it will not pass a quality check. Therefore, management must work hard to ensure the painting department is well-equipped and appropriately trained. Close supervision must be provided from preparation to finishing. Material qualities must not be compromised, and procedural standards must be followed. It is management's responsibility to ensure all of these.

Supply chain

The automotive supply chain is vast, with complex processes working together to produce results. This touches every aspect, from the raw material supply to components, assembly plants, and car dealerships, as well as managing relationships among the sales channel, distribution, warehousing, manufacturing, transportation, suppliers, services, and information.

Every automotive manufacturing management team must prioritize the supply chain network, as disruptions in any part of the system can ripple across the entire industry.

Management Systems

Management systems in automotive manufacturing help companies develop and manage systems like quality management systems (QMS), enterprise resource planning (ERP), Integrated systems,

manufacturing execution systems (MES), supply chain management systems, computerized maintenance management systems (CMMS), and world-class manufacturing (WCM), which is an integrated management system that ensures the absence of failures, defects, and accidents. The implementation of management systems in the automobile industry requires the following:

- Technical, organizational, and mental preparations among employees.
- Demonstrating positive behavior towards the customer and for the quality of the product.
- Adjusting the current functioning state of individual areas to the desired state.

You can study these management systems in your free time to better understand them.

Inventory management

Inventory is the backbone of every business, and the automobile industry is no exception, especially when it comes to vehicle manufacturing, which is quite elaborate. The management must adopt workable means to monitor inventory with utmost transparency. The following are inventory management systems:

- Just-in-time management (JIT): This system of inventory management says that rather than maintaining large stockpiles of components or finished products, the management should rely on timely production and delivery. Thanks to Japan's manufacturing prowess, JIT emphasizes reducing in-process inventory and the associated carrying costs. Rather than maintaining large stockpiles of components or finished products, JIT relies on timely production and delivery.
- Materials requirement planning (MRP): Given the vast, interconnected network in automotive manufacturing, coordinating multiple parts and processes requires a meticulous, sophisticated system. MRP works by determining the right quantity and timing in production. It considers several variables like lead times, stock levels, lost sales, and sales forecasts.
- Economic order quantity (EOQ): a mathematical model that helps companies balance having sufficient stock to meet demand with minimizing the cost of holding that stock. By determining the

optimal order quantity and order status, management can ensure that orders are just enough to meet demand while minimizing storage costs and the risk of stockouts.

EOQ prevents costly overstocking or understocking.

- Day sales inventory (DSI): In a fast-paced industry like automotive, timing is everything. DSI is the metric measuring inventory-to-sales turnaround time. This metric is crucial because it provides insights into operational efficiency and cash flow. A lower DSI indicates faster stock turnover, suggesting efficient operations, while a higher DSI may indicate overstocking or reduced demand.

Vehicle Management Systems

Vehicle management systems (VMS) are applications that help with vehicle procurement, sales, and distribution. They can also help with archiving vehicle data, supporting production and delivery, reducing warehouse stock and sales/distribution costs, securing vehicles with features such as theft detection, geofencing, and vehicle immobilization, and maintaining stock information.

Digital Transformation

Digital transformation in automotive manufacturing is the integration of digital technologies across every aspect of operations, including design, forecasting, manufacturing, and customer experience.

Design: Using AI and machine learning to analyze historical data from previous models and create new designs, primarily the pathway to innovation.

Forecasting: Using AI to predict how production output will be and customer acceptance.

Manufacturing: Using technologies like robotics, computer vision, and machine learning to produce safer and more efficient vehicles.

Customer experience: Give customers a personal experience in service delivery and product satisfaction. Digital transformation can help vehicle manufacturers seize new growth opportunities faster and leverage other future innovations, such as autonomous and robotic transformers, which stand out in the industry.

Human Resource

Employment

Recruiting employees in an organization, such as an automotive manufacturing plant, can be highly sensitive and demanding. This is because the quality of employees determines the company's effectiveness and growth. The Deskera application facilitates recruitment processes by making them simple, transparent, intuitive, and interactive. This is achieved by streamlining the entire hiring process, adopting the most appropriate interviewing methods, and inducting and verifying employees' referees.

Time tracking

This Deskera software lets you create a timesheet management module to monitor and generate timesheets for each employee, tracking regular working hours, overtime, time off, and amounts.

Payroll processing

Deskera HRMS addresses the entire spectrum of the company's payroll requirements, thereby ensuring accurate, faster, and more efficient payroll processing through its flexible configuration.

Staff supervision

This application helps you align your workforce with organizational goals by tracking relevant milestones and key employee performance indicators throughout their engagement.

Employees' dashboard

This application provides a host of personalized services through an employee dashboard. In the application interface, employees can view their information and manage their daily tasks from a single, secure, web-based platform. This dashboard, in addition to assigned activities, provides a platform for social interaction among co-employees and management.

Employee database

This application allows the HR department to manage employee details and keep track of all employee activities. It sources and

documents employees' databases, keeping them handy for quick assessment.

Leave Updates

This application allows one to monitor an employee's off-duty, absence, and leave right from the employee's dashboard. This makes documentation and tracking very easy. The software facilitates paperless interaction between the human resources department and employees by facilitating leave processes such as application, review, approval/rejection, leave policy, and resumption date tracking. This software also allows you to track holiday calendars and create a duty roster.

Employee's claims

This is when an employee presents an entitlement claim for one thing or the other. For example, an employee who sustained an injury while on duty can present the claim to the company, thereby standing a chance of being compensated in accordance with the company's policy.

This application allows you to track, monitor, and evaluate employee claims with intuitive reports on identified, approved, or rejected claims, along with the compensation allocated to them.

Operation

Product Data

This application allows you to predict material requirements for work orders and future production, and to define product features such as multi-level BOMs, inventory integration, discrete and process manufacturing, quality, and backflush.

Machine tracking

Deskera equipment management software will allow you to identify active, substituted, and tagged machines across multiple processes, map machines to various asset groups and subgroups, manage machine leases and depreciation, monitor machine maintenance schedules, track machine breakdowns, and more. This application is essential in every vehicle manufacturing plant due to its usefulness.

In addition to the above-listed functions, it can also be used for inventory tracking. Machine management in the automotive plant is very robust and depends on management's plans and decisions.

Labour resources

This software allows you to determine employees' core strengths and work performance, assign and remotely supervise assignments, track outputs, resolve resource conflicts, and monitor resource costs, among many other things.

Routing

This guide will help you optimize manufacturing routing by defining the product and work-order routing sequences. You can create routing templates and codes and assign different tasks or sub-tasks under them.

Work orders

This allows you to manage make-to-stock and make-to-order work orders, link work orders to sales orders and sales contracts, define routing templates, codes, and tasks for each work order, and track the real-time status of components' availability and work progress.

Quality checks

This app lets you track quality testing parameters, helping you identify issues from material selection to final product testing. It also tracks inspection, verification, and testing of vehicles and their components to ensure quality conformance.

Product delivery

This allows you to keep records of shipping and billing addresses for all customers and franchisees. The application also helps a user define internal and external packaging methods for shipment and delivery.

Monitor cost

This software helps you track manufacturing costs and view the real-time difference between standard and actual costs while managing various machines, materials, and labor overhead.

Demand forecast

This application guides you in determining a demand forecast based on sales, work orders, and seasonal trends and then drafts it into different templates for follow-up.

Customer Relation

Leads: This software helps you convert leads, define lead activities, and capture leads.

After-sales support: This application helps you track your customers and provide after-sales service. It allows you to access your customers' data, analyze their purchases, gather their feedback, and address their requests or demands.

Communication: Deskera communication software provides all-around communication for all your correspondence. It is a simple messaging system for each CP; an efficient, easy way to send messages with prompt responses. This application is invaluable, considering the importance of communication.

Accounting

Order and cash processes

When this application is integrated into your sales processes, finance, and orders will be processed faster and more professionally. It also eliminates billing errors, improves quotation accuracy, and strengthens revenue.

Accounting

This software lets you record your journal entries with a smart accounting system and effortlessly manage your accounts with a comprehensive, flexible chart of accounts.

Inventory compliance

This software helps you optimize inventory by tracking what is in stock, forecasting demand, and receiving order alerts in advance, thereby preempting shortages and overstocking.

This also allows you to have a full history of all inventory movements and track down any problems. It comes with customizable, intuitive reports to monitor and manage the organization's entire inventory

cycle.

Manage the end-of-day operations checklist.

This software allows you to determine end-of-day operations for your employees and monitor day-to-day business activities. The end-of-day checklist provides detailed information on production, sales, cycle count, feedback, equipment condition, incoming transactions, and vehicle shipment.

Conclusion

There are many other automotive manufacturing management applications that I can't list here. Meanwhile, the above-listed Deskera applications, with their respective functions, serve as day-to-day tools for the smooth and effective management of operations in an automobile plant.

Vehicle Manufacturing Certification

This refers to the set of legal, technical, and quality-related certifications a company must obtain to manufacture and sell vehicles in a specific market. The requirements can vary depending on the region and type of vehicle. The following are key certifications and approvals for vehicle manufacturing

Homologation

This is a process by which a vehicle is certified as meeting regulatory standards and requirements to be legally sold and operated in a particular country or region. This may include components.

It involves extensive testing and documentation to ensure the vehicle complies with safety, emissions, environmental, and technical standards set by the regulatory authority of the target market. Examples are:

- Whole Vehicle Type Approval (WVTA) under EU regulations.
- Federal Motor Vehicle Safety Standards (FMVSS) under NHTSA, EPA certification for emissions USA.
- AIS/BIS certification under CMVR, India.
- Emission and safety testing by MIIT-authorized labs - China Compulsory Certification (CCC) for vehicles.

ISO certifications

- ISO 9001: General quality management systems.
- IATF 16949: Specific to automotive quality management.
- ISO 14001: Environmental management.
- ISO 26262: Functional safety of electrical/electronic systems in vehicles.

Environmental certifications

- EPA certification – USA.
- CARB certification – USA.
- BS-VI / Euro 6 Certification for India and Europe, respectively.

Safety testing

- NCAP crash testing and ratings, pedestrian safety, airbag compliance, etc. - Global NCAP.

EV-specific certifications

- Battery certifications: United Nations 38.3, International Electrotechnical Commission 62133, Automotive Industry Standards-156 – India.
- Charging infrastructure compliance: CCS, CHAdeMO, Bharat DC standards.
- Functional safety: ISO 26262, ISO/SAE 21434 (cybersecurity).

Conclusion

Vehicle certification falls into two categories: global and domestic. These certifications are very important as one cannot go without the other. Therefore, you must study them thoroughly and have them readily available before starting. Some will come in the form of a license.

Summary Of Vehicle Manufacturing

I chose to go this far because I want you to have extensive knowledge about automotive manufacturing. Although the above is not as elaborate as it should be, we have touched on about 80% of what it takes to manufacture a vehicle, manage it, and make sales. This also covers aerospace and maritime because they are perpendicularly related. Against this backdrop, we shall briefly discuss aircraft and maritime manufacturing. Of course, we have different vehicle variants, but we may not have the resources to cover them as separate subjects. However, an understanding of one spec makes another possible. For example, once you understand everything we discussed above about vehicle manufacturing, you should be able to manufacture petrol,

diesel, hybrid, and electric vehicles. The same applies to maritime, where we have boats, yachts, and various ships. And to aircraft, including helicopters, jets, various types of aircraft such as gliders, cargo, and military aircraft, Airbus, and so on. Regardless of type or model, close technology guides all, just as it guides maritime, vehicle, and aircraft manufacturing.

Aircraft Manufacturing

Whenever we hear about aircraft manufacturing, our hearts race because we all know it is a huge project. Well, it is not a big project that is far from land-vehicle manufacturing. As I said earlier, they are related and require similar processes, such as design, production, testing, certification, and sales.

Certification

Before entering aircraft manufacturing, the first step is to obtain certifications and licenses from all relevant authorities, though this depends on the country and its government. Your legal team will ensure this, and it must be carefully followed up on. I want us to discuss international certification briefly here. These certifications are compulsory, and you can never start any project without them. Below are international aircraft manufacturing certifications and the concerned authorities.

Type Certification

A certificate is one you receive from relevant authorities, such as the Federal Aviation Administration (FAA) and the International Civil Aviation Organization (ICAO). This approval covers the aircraft design and all its components, including engines, propellers, control systems, avionics, and related systems. The blueprint must be evaluated or inspected before this certification, followed by detailed engineering analysis, testing, and demonstration of compliance with airworthiness regulations.

Production certification

This certificate is issued after the aircraft's blueprint manufacturing processes meet the approved design specifications. The requirement extends to quality control procedures, inspection checklists, and

documentation of manufacturing processes. A few administrative agencies issue production certificates, including the Federal Aviation Administration (FAA), the European Union Aviation Safety Agency (EASA), and, of course, the International Civil Aviation Organization (ICAO). It all depends on the continent and global affiliation.

Airworthiness certification

This certificate is issued to an individual aircraft after it has passed all required inspections and is deemed airworthy to operate. The agency responsible for issuing an airworthiness certificate to an aircraft manufacturer is the relevant civil aviation authority in the country where the aircraft is designed and produced, such as the Federal Aviation Administration (FAA) in the United States, the European Union Aviation Safety Agency (EASA), the Civil Aviation Administration of China (CAAC), and other countries' Civil Aviation Authorities (CAAs), such as the Nigerian Civil Aviation Authority (NCAA). These regulatory bodies oversee the design and production processes to ensure the aircraft meets airworthiness standards before issuing the certificate. Without the certificates mentioned above, a prospective manufacturer would never commence operation.

Aside from these certifications, 'continuing worthiness' is an erratic certification that ascertains the ongoing maintenance of an aircraft's airworthiness throughout its lifespan.

Project type

The second step in manufacturing an aircraft is to determine the type of aircraft you want to build. For example, commercial, private, military, jet, helicopter, etc. This will guide you in your project analysis, budgeting, and preparation.

Design

This outlines the project blueprint, calculations, and equations. Many factors are considered when designing, including aircraft type, size, specifications, safety, environmental impact, and operations. Although this may sound simple, the truth is that aircraft design is robust and involves several stages: conceptual design, preliminary design, detailed design, manufacturing process design, and safety design. Each stage of these designs is critically analyzed

and cumulatively run. Apart from the overall design outlook, key components such as the wings, tail, fuselage, propulsion system, landing gear, equipment and subsystems, and control surfaces receive detailed attention. This is different from mechanical (engine, transmission), electrical, and sensory systems, such as navigation, among others.

A known feature of aircraft manufacturing is that no company can complete production processes in-house without outsourcing to specialized companies. Different companies specialize in one component over another. For example, just as Boeing, Comac, and Airbus are at the forefront of commercial aircraft manufacturing, so are Rolls-Royce, Pratt & Whitney, CFM, and others in aircraft engine manufacturing. Similarly, Liebherr, Sumitomo, Heroux-devtek, Revima, and others specialize in aircraft gear, while other companies specialize in components such as raw materials, landing systems, interiors, electrical systems, sensory systems, design, stimulation, brakes, and so on. Thus, you can hire the services of aircraft design companies like Green Point, DesignQ, M&R Associates, Bombardier, Collins Aerospace, and so on. They will interpret your blueprint and provide forensic designs that incorporate key considerations, including safety, environmental impact, longevity, luxury, and other specifications.

Anyway, the following are aircraft components that are the key focus during design: the fuselage, landing gear, wings, cockpit, engines, flight deck, power station, aileron, propeller, airframe, auxiliary power unit, pressure information intakes, tailplane, empennage, Nose, cabinet, and others. The designs of the above components are robust, as most of them include layers of subcomponents. These components are either sketched out from scratch or modified from previously existing models for the new project, as long as they are compatible.

Stimulation

This is a process in which a computer simulates the performance of an aircraft's prototype using equations. In this procedure, the software is used to analyze the behavior of a prototype. The software helps predict an aircraft's overall flight behavior. Good examples of this software include the Finite Element Method (FEM), Multi-body

Dynamics (MBD), and Computational Fluid Dynamics (CFD), among others. This is a broad topic; you can research it further.

Model Testing

Model testing is a crucial aspect of aircraft manufacturing processes. It uses a scaled-down prototype to evaluate the aircraft's intended end product. Model testing is typically used to evaluate key areas, such as wind tunnel testing, landing technique, flight, and sensory testing. Model testing is very useful because it saves unnecessary costs arising from trial-and-error and ensures safety, accuracy, and efficiency, as well as sub-scale flight testing, and so on.

Production

As I said earlier, land-vehicle manufacturing processes are as extensive as those of other automobiles. Regardless, we shall discuss key aircraft manufacturing processes for better assimilation. As you may know, all the designed components described above are manufactured during production. As earlier stated, all aircraft components are typically manufactured by different companies. Even large companies such as Boeing and Airbus often outsource some aircraft components to specialized suppliers. Aircraft manufacturing is a huge undertaking, as the required parts number in the hundreds of thousands, sometimes millions. Of course, the number of parts in an aircraft depends on the model and the choice of design. For instance, the Boeing 737 MAX has more than 500,000 parts, the Airbus A320 has over 340,000 parts, and the Boeing 777 has over 3 million parts, including fasteners like bolts and rivets, and so many other aircraft.

Indubitably, it is very slim for a company, no matter how large, to manufacture these parts independently. Well, I will summarize the processes involved in component production. They are:

Milling

Milling is the process of cutting materials into different lines and shapes to create more complex designs and layers. It creates precise cuts and shapes within the aircraft's desired components. Milling is often used to form complex features on fuselage skins, wing parts, and other structural elements. It is usually done with CNC machines

for high accuracy and intricate designs.

The most common milling processes include vertical, horizontal, side, form, and face milling. The type of milling process to be applied depends on the material and the purpose of the finished component. Milling processes are very useful because, apart from the cutting and shaping of materials, they play other key roles like precise cutting, handling of complex geometries, removal of material from the workpiece by rotating the cutter against the surface, creating cavities, pockets, and channels, creation of complex contours on wing components, machining of internal features in engine parts, production of precise slots and grooves on landing gear components, and so on.

One of the best parts of milling utility is its ability to create lightweight components, such as ribs and lightning holes, in fuselage skins, and to optimize the overall aircraft's structural weight. Turning is a machining technique in which a workpiece, like a metal rod or billet, is mounted on a lathe and rotated at high speed while a cutting tool moves along its surface. The tool precisely removes material to create cylindrical components with specific dimensions and surface quality. This technique often produces parts like engine components, landing gear components, and various structural components. Turning processes are crucial in aircraft manufacturing because they provide precision and smooth finishing amid extremely tight demand. Similarly, complex geometries and precise cutting processes are achieved effectively using computer numerical control (CNC) lathes.

Below are the everyday turning operations:

- Parting: This is the cutting off of a section of material from the workpiece.
- Chamfering: This process involves the beveling of the edge of a part to reduce stress points and facilitate assembly.
- Grooving: This is the creation of shallow cuts or grooves on the workpiece, often used to separate components or create features.
- Boring: This process involves machining the inside diameter of a hole to achieve specific dimensions.
- Facing: Facing has to do with the machining of the flat end of a

workpiece to create a smooth surface perpendicular to the axis of rotation.

- **Threading:** This is the cutting of the helical grooves on the external surface of a part to create threads for attaching components.

Common materials used in aircraft turning include aluminum alloys, favored by manufacturers for their lightweight properties, and titanium alloys, highly regarded for their high-temperature resistance. Turning in aircraft production offers many benefits, including high accuracy, efficient material removal, and a good surface finish.

Grinding

Grinding is a stage in the production process in which a component material is smoothed out, and irregularities are removed. Due to its ability to work on a wide range of shapes and sizes, grinding is often used as a finishing step to achieve high accuracy and smooth surfaces on various aircraft parts, including those with complex geometries. This process provides the workpiece with smooth finishing and uniform detailing, among other benefits. As stated above, grinding is versatile in operation. It can precisely grind almost all types of workpieces, regardless of their shape and size. Grinding is highly valuable for its precision, versatility, surface finish, common grinding methods (cylindrical, surface, centreless, creep feed), reduced material waste, improved component life, dimensional accuracy, and so on.

In summary, the aircraft production stage involves component manufacturing, which is the fabrication of individual parts using methods such as CNC machining, sheet metal forming, composite layup, additive manufacturing (3D printing), and others we discussed above.

Assembly

This is a stage at which all the components manufactured are assembled to form the actual aircraft. The assembly process is extensive, but I will outline some general procedures. There are three stages in assembly: Pre-assembly, structural, and final assembly. The pre-assembly involves sub-assemblies of key components with denominational parts attached, such as when a fan blade is installed

in an engine. On the other hand, structural assembly concerns the aircraft's main body, including the fuselage, landing gear, wings, cockpit, engines, flight deck, power station, aileron, propeller, airframe, auxiliary power unit, and other structural components. These components are adhesively joined in accordance with the prototype standard.

Finally, there is the final assembly, considered the tertiary stage of production. At this stage, efforts are made to ensure that everything is installed, from the largest components to the smallest. This also includes pre-testing checks to ensure that all components are neatly fitted and screwed. After this, the aircraft is rolled out of the assembly plant for a production flight test.

Inspection/Testing

This stage is characterized by a convivial atmosphere and apprehensive sobriety. It brings the joy of building an aircraft to the testing stage, but at the same time, the fear of probable malfunctions. Whatever the case, testing and inspection are highly sensitive production stages that must be conducted with the utmost care and professionalism, recognizing the significance of an aircraft. Inspection and testing are essential for an aircraft's performance and safety. They allow a manufacturer to identify potential malfunctions or wear and tear that could compromise the aircraft's performance. These inspections and tests involve thoroughly examining the aircraft's structure, systems, and components to ensure they meet the required airworthiness standards.

Types Of Aircraft Inspection

There are numerous types of aircraft inspections and testing, but I will talk about the popular ones here, and they are:

Visual inspection: The first type of inspection on our list is visual inspection, which is the most common. It detects defects like cracks, corrosion, and loose fasteners.

Engine inspection: The second stage involves inspecting the engine and checking its components for damage, corrosion, or leaks.

Landing gear inspection: Here, the wheels, brakes, and tires are inspected for damage that could affect the aircraft's ability to land smoothly.

Avionics inspection: The electronic systems that the pilot uses to navigate, communicate, and control the aircraft are to be checked for optimal function.

Flight control inspection: The ailerons, elevators, and rudder must be inspected carefully to ensure they are working properly.

Special inspections: In addition to the regular inspections mentioned above, special inspections may be required in specific circumstances or following certain events. These inspections are typically carried out in response to incidents, modifications, or changes in operating conditions.

Special inspections may involve a more focused examination of certain components or systems to ensure their integrity and compliance with regulations.

Systems inspection: This involves inspecting the engine(s) and propulsion system for leakages, damage, or abnormal wear. The fuel system, including fuel quantity, filters, and fuel lines, is also inspected for proper operation. The integrity of electrical systems, including batteries, wiring, and circuit breakers, is verified. Communication and navigation systems are tested, including radios, transponders, and GPS.

General exterior inspection

This inspection category is essential, as it allows one to assess for any signs of component damage, cracks, or corrosion on the airframe, wings, control surfaces, and empennage. The inspection of the landing gear to ensure that there are no defects or leaks. Also, to check the condition of tires, brakes, and lights. And determine the firmness of the fuel caps and drain any water or contaminants from fuel tanks.

General interior inspection

This inspection exercise includes determining the condition and functionality of seats, seat belts, and emergency exits, inspecting the cockpit instruments, controls, and avionics for proper operation, ensuring that fire extinguishers and emergency equipment are present and in working order, and verifying the condition and security of the cabin furnishings, toilets, and storage compartments.

Transponder inspection

The transponder is to be inspected to ensure it functions well. It is checked every 24 months, and any modifications or installations are duly inspected to ensure there are no data errors.

Documentation review

At this point, you must reexamine all the necessary certifications and documentation, such as the airworthiness certificate, aircraft maintenance manual, illustrated parts catalog, aircraft schematic manual, aircraft wiring manual, aircraft flight manual, pilot operating handbook, minimum equipment list, and others. Above all, the inspection and maintenance logbook is used to document all inspection results and repair history, which would be signed off by authorized personnel.

Conclusion

There are many other inspections and tests in an aircraft that I can't list here. An inspection checklist can help thoroughly assess all components, subcomponents, and units to ensure optimal function. After these inspections are completed with good reports, the aircraft has been successfully manufactured. However, some "final touch-ups," including internal configuration, painting, or cosmetic work, may be required.

Post-Production Inspection

This is a minor deviation from the production processes, but we must discuss it here now, as it will save us the monotony of having to return to it. Post-production inspection is as important as pre-launch inspection because, without it, such an aircraft will be short-lived, and some attainted certificates might be withdrawn from issuers (relevant authorities). Thus, we will be discussing a few post-production inspections, and they are:

Periodic inspection

This traditional inspection practice is conducted upon an aircraft becoming operational. It is usually thorough and detailed, with great attention to detail from the nose to the tail.

Pre-flight inspection

This is a general surveillance of an aircraft, including the engine, propeller, tires, covers, and other relevant components, conducted before an aircraft takes off.

Phase inspection: An inspection of certain components, usually performed every 25 to 50 hours.

100-hour Inspection

This is a very special type of post-production inspection mandated for commercial aircraft. It is similar to an annual inspection, but must be performed every 100 hours of flight time.

During this inspection, the aircraft is thoroughly examined, and any noted component requiring maintenance is repaired without compromise.

Teardown inspection

This is a complete dismounting of an engine or any mechanical or supplicated part to check for any impending issues.

Aircraft Sales

It is a huge responsibility to manufacture an aircraft, yet it is still necessary to ensure that it is sold to the end user. As a CEO, sales is a routine that you will face throughout your business career. I discussed marketing in the previous chapter, but I will give a brief lecture on aircraft sales procedures and documentation.

Selling an aircraft is often complex, challenging, and time-consuming. While some manufacturers may want to market their aircraft themselves, the best approach is to hire accredited aircraft brokers, aviation attorneys, pre-buy specialists, and other related professionals and organizations. In addition to properly performing all the requisite sales steps, such as cleaning the aircraft, taking high-quality photos/videos, and developing a detailed aircraft specification sheet, it is imperative that the aircraft be in the best possible condition—spotless and impeccable—and have up-to-date inspections.

Aside from engaging sales specialists, you can leverage the growth of digital logbooks and share 360-degree information about your aircraft through a cloud-based platform. Interested buyers will view

your sales proposal right from their home or office, or on the go, and then contact you. Regardless of this, engaging specialists remains the best option because they will shoulder the processes and curtail post-sale pitfalls. You would make compulsory documents like the “bill of sale,” airworthiness certificate (which is usually transferred to the aircraft buyer), purchase agreement, and others available; it all depends on the regulatory body of a given country.

Delivery

After a sales deal is closed unanimously, the next stage is to deliver the aircraft to the now “new owner.” It depends on the company and the agreement with the buyer; traditionally, the seller is responsible for delivering the aircraft to the buyer. The seller often factors the total delivery cost into the actual aircraft price. Below are the delivery plan steps to ensure a safe and timely delivery:

Delivery timeline

Agree on the delivery time with the client; this will guide your preparation.

Institute delivery team

Build a capable delivery team and ensure that they are trained and experienced individuals who have done similar jobs in the past. Schedule meetings with them and provide them with all the necessary resources, tools, and information for effective performance. Also, assign them roles individually and ensure all protocols are duly observed.

Logistics

This is a very important aspect of delivery preparation as it involves money and time. You must consider factors such as distance, fuel requirements, crew fees, and other contingencies.

Insurance coverage

Of course, you can't risk delivering such an expensive product without taking an insurance policy. A comprehensive policy is always the best option, covering both the aircraft and crew members.

Documentation review

Review all the documents and ensure they are complete and valid. Any discrepancy or missing documents must be rectified before proceeding with the delivery.

Pre-delivery inspection

A comprehensive pre-delivery inspection is crucial to ensure that the aircraft's mechanical integrity and safety standards are in check. This inspection includes checking the aircraft's structure, systems, avionics, cockpit, empennage, landing gear, engine, actuators, fuselage, installed modifications, and other components and subcomponents.

Any malfunction during this inspection must be addressed and resolved before the delivery.

Export /import requirements

If the buyer wants the aircraft delivered across international borders, it is essential to comply with export and import requirements. This may include obtaining export licenses, fulfilling customs procedures, and adhering to international trade regulations. This must be followed up with intent and professionalism, as failure to comply with these requirements can result in delays, fines, or even the seizure of the aircraft.

Communication/information sharing

Open and clear communication is important to ensure that all team members are informed of the progress made in the delivery preparation. This is backed up by regular updates, meetings, and documentation sharing to maintain a clear understanding and ensure that all parties are aware of all activities.

Security measures

Implementing security measures during delivery is essential to prevent unauthorized access, tampering, and theft. In addition to the security measures adopted on the selling ground, security measures must also be implemented on the buyer's ground to ensure the aircraft lands safely and remains protected.

Contingency

Despite meticulous planning, unforeseen circumstances can arise during an aircraft delivery. Therefore, it is important to have contingency plans in place to address potential issues or emergencies. This includes having alternative transport options, backup documentation, and communication protocols. Other unavoidable impediments, such as natural phenomena (e.g., weather-related disasters), epidemics, and government curfews, can interrupt this process.

Handover

This is a very sensitive stage; you must be careful at this point and ensure that the buyer has satisfactorily cross-checked all documents, certifications, the aircraft's recent inspection report, and the maintenance/operation manual. Also, ensure that the buyer acknowledges all the relevant documents, including the delivery note. Ensuring that the new owner understands the aircraft's capabilities, limitations, and maintenance requirements is essential.

Support

During an aircraft's service life or utilization stage, it needs to be maintained and repaired to keep it flying safely. The support stage involves many different tasks, such as regular inspections, repairs, and upgrades, to keep the aircraft in top condition. To use an aircraft's services, you must hire a credible company that maintains it. Companies such as Delta TechOps, GE Aviation, AAR Corporation, Lufthansa Technik, StandardAero, ExpressJet Airlines, and others offer maintenance, repair, and overhaul (MRO) services for commercial and private aircraft across various countries.

Retirement

Like the popular saying, "whatever has a beginning, has an end", the same thing applies to an aircraft. After many years of service, an aircraft eventually reaches the end of its useful life and enters retirement. During this stage, the aircraft may be sold, scrapped, or donated to a museum for display. Aside from aging, factors such as high fuel prices, global climate change, a global pandemic, and a need for newer technology and a cleaner environment may lead

to aircraft retirement. The civil aviation of a given country is the regulatory body responsible for declaring an aircraft retired.

Conclusion On Aircraft Manufacturing

Aircraft manufacturing is indeed a white elephant project. Today, however, the manufacturing industry is evolving thanks to modern technologies. Technologies like additive manufacturing, machine learning, and AI are making aircraft manufacturing easier and more efficient. To reduce weight, lighter materials like composites and alloys replace traditional materials like cast iron and steel. These materials have enabled manufacturers to develop structurally sound aircraft with monitoring systems, reducing maintenance costs and increasing availability.

As an automobile CEO, I dare to embark on this project. Do not be afraid of how luxurious it appears. Just apply all you have learned in this book, and you will succeed. Of course, you will not necessarily have to make the startup money available; investors will. We have already educated you on how to source funds to start any automobile business of your choice. All that is required of you is your experience in setting up and managing an aircraft manufacturing company. Your prospective investors will invest if they are convinced of your experience. Thus, it is now up to you to dream big and acquire all the necessary skills and experience.

Robot Manufacturing

Robots are highly robust and evolutionarily fast. Venturing into robot manufacturing is post-rocket science. In fact, it took me more than six months of research just to understand the bolt and nut the robot manufacturing. You can imagine how thankful I was just to read through it and how much more goes into it practically. Notwithstanding, robot manufacturing is just as procedural as other manufacturing processes. Robot manufacturing is an interdisciplinary branch of engineering and science that deals with the design, construction, operation, and application of software. Its component fields include mechanical engineering, electrical engineering, computer science, and mathematics. These fields enable the design and development of robotic systems capable of performing automated, complex, and repetitive tasks with perfect

precision.

From this simple collaboration and origin, robotics has grown to become an essential technology woven into many aspects of modern life and industry. Thus, the field of robotics touches on key subjects such as mathematics, algorithms, control systems, artificial intelligence, materials science, structural analysis, manufacturing, and more, depending on its evolution and age.

Mechanical and structural components, such as frames, motors, wheels, and grippers, provide structure, movement, and capabilities. On the other hand, the sensory component is for data collection and environmental sensitivity. Examples of these sensors are temperature, proximity, sound, light, acceleration, ultrasonic, navigation, gyroscope, force, pressure, tactile, tilt, voltage, accelerometers, distance, infrared, touch, contact, vision, current, laser range, proximity sensor, encoders, GPS, camera, and so on.

Controllers, including microcontrollers and computers, process sensor data and issue primary commands to control these sensors. Actuators such as motors, pneumatics, and hydraulics execute these commands by moving mechanical components. Thus, these processes gave birth to the artificial autonomous system we have today, known as a robot, which can perform activities in industrial, domestic, commercial, military, and many other applications. Robots are relatively new to our generation, so I will be a bit detailed about them. Unlike land vehicles, ships, and aircraft, which share similar mechanisms, robots are different. Although they are still machines with mechanical systems, just like their sister automobiles, robots differ because of their micro-mechanisms, sophisticated chips, and algorithms.

Robot manufacturing is highly demanding and requires prerequisite experience. Of course, as the CEO of a robotic company, you don't necessarily have to handle all the production processes yourself, but you do need knowledge of most of them, and we shall discuss them below.

I will start by giving you a brief history of robots, as it will help you get a feel for the sector.

The idea of the robot originates in ancient ideologies, myths, and stories, but the modern robot started to manifest in the 20th century. Below is a brief overview of the robot's origin and evolution.

It all started with the idea of artificial beings in ancient civilizations, though it was a myth. For example, Hephaestus, believed to be the Greek God of craftsmanship, created mechanical servants and automatons. In Jewish folklore, a Golem was a clay figure brought to life through mystical means. Similarly, ancient Chinese legends record that craftsmen created mechanical automatons. These myths, among other things, were subconscious conceptions of man, indicating that he would one day be able to create artificial life through an automated mechanism.

This myth traveled through the generations to the Renaissance and Enlightenment, when inventors like Al-Jazari and Leonardo da Vinci designed mechanical devices that could perform simple tasks. Gears, springs, and hydraulics powered the devices.

In 1206, Ismail Al-Jazari invented the elephant clock. The clock is considered one of the earliest examples of programmable machines and a precursor to modern robotics. It is a large, ornate water clock shaped like an elephant. It features a complex hydraulic, gear, and automata system to keep time and perform various mechanical actions. The clock features elements of artistry, mechanics, and cultural symbolism. On the other hand, Leonardo da Vinci invented the mechanical knight in 1495. Also known as Leonardo's robot, the mechanical knight is one of the most fascinating and iconic humanoid automata and is considered one of the earliest known robot designs in human history. The knight was powered by a system of pulleys, cables, and gears, which were presumably operated by an external hand crank or water wheel. It was believed to perform motion actions like standing, sitting, moving its arms, raising its visor to reveal its face, moving its head and jaw to simulate speech or gestures, and other features.

In 2002, Mark Rosheim reconstructed the mechanical knight, further showcasing Leonardo's engineering ingenuity. The replica demonstrated that Leonardo's design was feasible and inconceivably advanced for its time. Karel Čapek, a Czech writer, introduced the word "robot" in the 1920 play Rossum's Universal Robots (R.U.R.). The term came from the Czech word "roboťa," meaning "forced labour" or "drudgery". In the play, robots were artificial beings created to serve humans, but eventually they rebelled. This tale has persisted in science fiction to this day. A good example of this tale is

the “Terminator”.

In the 20th century, with the development of computers and programmable machines in the 1940s and 1950s, the field of robotics began to take shape. Its success became more glaring when, in 1954, inventor and entrepreneur George Devol filed a patent describing an autonomous machine that could store step-by-step digital commands to move parts in a factory. He called this invention a “programmed article transfer” device. Devol teamed up with another entrepreneur, Joseph Engelbeger, who jointly built a prototype in 1958. Later, they founded the first robotics company, Animation. With an unprecedented breakthrough, in 1961, they put the first Unimate into service at a General Motors plant, where the robot extracted hot metal parts from a casting machine. Thus, Unimate was industrial; it was used in manufacturing, particularly in the automotive industry. In line with this new invention, the science fiction writer Isaac Asimov coined the term “robotics” and introduced it in his story “Three Laws of Robotics.” This word has influenced both fiction and real-world robotics ethics to this day.

In the 21st century, robots have become progressively sophisticated, driven by advances in artificial intelligence, machine learning, and sensor technology. Robot technology has grown beyond early conception. Robots are now used in various fields, such as manufacturing, healthcare, space exploration, households, and other services. As recorded, the key milestones in robotics began with Ismail Al-Jazari in 1206, who invented the elephant clock, and Leonardo da Vinci in 1495, who invented the mechanical knight. Four centuries later, Nikola Tesla demonstrated the first radio-controlled vessels, which laid the groundwork for remote-controlled robotics in 1898.

In 1921, the Czech Republic writer Karel Čapek introduced the term “robot” in his play Rossum’s Universal Robots (R.U.R.), which featured artificial beings created to serve humans. Traveling to 1942, Isaac Asimov formulated the three laws of robotics in his short story “Runaround,” which variably influenced the evolution and development of robotics.

In 1954, George Devol filed a patent for the first digitally operated programmable robot arm, proposing a machine that could store digital commands to move parts. He finally built a prototype with

Joseph Engelberger in 1958, and in 1960, he sold the first Unimate to General Motors, which was installed in the company's factory in 1961.

In 1966, the Stanford Research Institute built Shakey, the first general-purpose mobile robot to use vision and navigation and to solve problems. In 1969, SRI International developed Shakey, capable of logical reasoning for navigation and planning.

The 1970s saw the birth of robotic assembly lines, and programmable robot arms became widely adopted to automate factory mass production. In 1997, NASA's Pathfinder mission launched the first wheeled robot, a Mars rover known as Sojourner, which marked a landmark in autonomous robots in space exploration. So, in the 2000s, the rise of humanoid robots like Honda's ASIMO and other AI-driven robots began. In 2002, iRobot launched the Roomba, which could change direction when it encountered an obstacle, detect dirty spots on the floor, and identify steep drops to keep it from falling down stairs. The Roomba is said to be the first commercially successful home robot product. To the present day, robots continue to accelerate as AI, machine learning, computer vision, sensors, actuators, and other components expand their applications. The origin of robots started as a mere imagination. Then, it evolved into engineering and complex technologies, turning what was a mythical tale into real-world applications that continue to shape our moment and future.

Building a Robot

As I said earlier, venturing into robot production is rocket science. However, it is an adventure we must pursue unrelentingly because of its relevance to our world today and in the future. Building a robot involves several tactical steps, from conceptualization to final assembly and testing. The following are the step-by-step processes for building a robot. Before I proceed, I would like to bring to your understanding that a robot is an Artificial intelligence in a structural frame. In other words, the robot is in the same family as chatbots like DeepSeek, ChatGPT, OpenAI, Meta, and others; it uses the same programming, algorithms, coding, and training. So, the robot is simply an anatomized algorithm. For this reason, we shall discuss concurrently as it concerns coding (programming),

machine learning, and robotic hardware. I would like us to discuss a robot's software aspect before proceeding to hardware, like joints, links, sensors, actuators, and the overall anatomical design. Just like a human being, a robot's software is like the blood, brain, lymphatic system, etc., to a human. A robot's software can also be said to be what electrolytes and entrails are to a human.

Coding

Coding, also known as programming, is the process of writing instructions for a computer to perform specific tasks. These instructions are written in programming languages, which are then translated into machine code, which the computer executes. Coding is used to create software, websites, apps, games, and more. Below are the basic steps to coding:

Programming Language

We will start with programming languages because they are the foundation of coding. There are two types of programming languages: High-level and low-level. High-level languages are easier to read and write because they are closer to human language. High-level programming languages include Python, Java, JavaScript, C#, Ruby, PHP, Swift, Kotlin, R, Scala, etcetera. Low-level languages, on the other hand, are languages closer to machine code. They are harder to read but more efficient. Examples of low-level languages are Assembly, C, C++, Rust, Fortran, LISP, Verilog, Ada, Erlang, Forth, BASIC, COBOL, Objective-C, etcetera.

Popular Languages

Among the programming languages discussed above, some are everyday languages that programmers use. These languages can give you every result that you need in your project. They are:

Python

Python is ideal for beginners. It is a versatile, high-level programming language known for its simplicity, readability, and extensive libraries. Due to its flexibility and ease of learning, it is widely used across various domains. The following is what Python can be used for: Web development, data science and analytics, machine learning and

Artificial Intelligence, automation and scripting, scientific computing, game development, desktop GUI Applications, networking, and cybersecurity. Internet of Things (IoT), web scraping and crawling, DevOps and cloud computing, education, finance and trading, Natural Language Processing (NLP), blockchain and cryptocurrency, multimedia Applications, and others.

Python is a great programming language, but what impresses me most about it is its prowess in AI, cloud computing, blockchain applications, and working with cryptocurrencies. Python's library and third-party packages have made it a powerful tool for many applications. Similarly, its simplicity and readability contributed to its popularity and the right choice among developers.

JavaScript

This is essential for web development, and I am proficient in both front-end and back-end with Node.js. JavaScript is a versatile programming language that enables interactive and dynamic features on websites and web applications. Below is an overview of JavaScript's main uses:

JavaScript is used for front-end web development, Document Object Model (DOM) manipulation, event handling, animations and effects, and back-end web development. It can work with Node.js to build scalable and efficient back-end systems, APIs, database interaction, and mobile App development. Others are React Native, Ionic, desktop App development, electron, game development, web servers and networking, data visualization, automation and scripting, Internet of Things (IoT), machine learning and AI, browser extensions, Progressive Web Apps (PWAs), real-time applications, testing and debugging, and command-line tools.

Whether you want to build a simple website or a complex application, JavaScript is a powerful tool you must have in your toolkit! JavaScript's good output and flexibility have earned it widespread adoption among the programming community.

HTML

HyperText Markup Language (HTML) is the standard markup language for creating and structuring content on the web. It is the backbone of web pages and is used with Cascading Style Sheets

(CSS) and JavaScript to build visually responsive and interactive websites. Below are the elementary uses of HTML: To create web pages, structure content, embed multimedia, create forms, link pages and tables, ensure accessibility, Search Engine Optimization (SEO), integration with CSS and JavaScript, email templates, Progressive Web Apps (PWAs), documentation, embedding external content, offline web applications, cross-platform compatibility, and other productive uses.

HTML is the foundation of the web and is essential for creating and structuring content on the Internet. It is widely used across websites and web applications, often combined with CSS for styling and JavaScript for interactivity. HTML's simplicity, flexibility, and broad adoption have made it an essential tool for web development.

Java

Java is a multi-purpose, high-level, object-oriented programming language that is widely used across various domains. Its WORA (Write Once, Run Anywhere) capability, powered by Java Virtual Machine (JVM), makes it platform-independent and highly useful. The following are the primary uses of Java: For web development, mobile App development, enterprise applications, Jakarta EE, formally known as Java EE (Enterprise Edition), desktop applications, big data technologies, cloud-based applications, scientific applications, game development, Internet of Things (IoT), financial applications, software tools, embedded systems, Artificial Intelligence (AI), machine learning, networking, blockchain development, education, testing frameworks, robotics, server-side technologies, and cross-platform development.

Java has remained irreplaceable for years because of its unique features, such as its capabilities, versatility, and widespread use across domains, including web development, mobile apps, enterprise software, big data, cloud computing, and more. Its unique platform, independence, strong community support, and extensive libraries and frameworks have made it a top choice among developers worldwide.

C

This language has multifunctional features and is widely used for

several purposes, especially in software development. Below are the uses of C: System programming, application development, game development, networking, scientific computing, compiler development, IoT (Internet of Things), interpreter development, libraries and frameworks, database systems, cross-platform development, educational purposes, utilities and tools, and so on. Commendably, C is a great programming language. Many system utilities, such as file managers, text editors, and other tools, are written in C. Its simplicity, efficiency, and close-to-hardware capabilities make it a powerful language for many applications, especially where performance and control over system resources are critical.

C++

C++ is a powerful, high-performance programming language that builds on the foundations of C while adding object-oriented features and other enhancements. It is widely used in various domains due to its flexibility, efficiency, and scalability. Here are some common uses of C++:

Game Development, System Software, GUI Applications, Real-Time Systems, High-Performance Applications, Web Browsers, Database Systems, Machine Learning and AI, Graphics and Visualization, Networking, Robotics, Audio/Video Processing, Cross-Platform Development, Educational Purposes, Blockchain and Cryptocurrency, Cloud and Distributed Systems, Virtual Reality (VR) and Augmented Reality (AR), Object-Oriented Programming (OOP), Standard Template Library (STL), Backward Compatibility. C++ is a multi-purpose programming language that remains relevant in modern software development, especially where performance, efficiency, and control are crucial.

Ruby

This programming language is known for its dynamism, object orientation, and multi-functionality. All admire it for its simplicity, readability, and developer-friendly syntax. Ruby is commonly used for web development (e.g., GitHub, Shopify, Airbnb, Basecamp), scripting, and automation. Below are common uses of Ruby:

Web development, scripting and automation, prototyping, DevOps and deployment tools, data processing, testing and test

Automation, API development, desktop applications, educational purposes, Content Management Systems (CMS), e-commerce platforms, startups, and Minimum Viable Products (MVPs), game development, networking and web scraping, chatbots and automation, and open-source projects. Due to its rapid development capabilities and scalability, Ruby remains a popular choice for web development, scripting, and automation, particularly among startups and developers who value productivity and simplicity. Ruby on Rails is irresistible among software developers worldwide.

Swift

Developed by Apple, Swift is a contemporary, powerful, and intuitive programming language that is currently receiving applause from developers worldwide. Swift was designed to build high-performance, safe, and reliable software, primarily for Apple's ecosystem. The following are the elementary uses of Swift: iOS App development (used for building iPhones, iPads, and other iOS devices, with popular Apps like Uber and LinkedIn), macOS App development, watchOS App development, tvOS App development, cross-platform development (enabling cross-platform development for iOS, macOS, watchOS, and tvOS with a single codebase), and server-side development. Other uses include game development, machine learning, AI (especially with Apple's Core ML framework), Augmented Reality (AR), command-line tools, open-source projects, educational purposes, IoT and embedded systems, data analysis/visualization, and prototyping.

Swift is praised for its simple syntax and interoperability. It has become the go-to language for Apple platform development, offering a modern, safe, and efficient alternative to Objective-C. Its growing ecosystem and versatility make it a strong choice for developers building apps and services for Apple devices.

Node.Js

One of my favorites, Node.js, is unique and has been discovered to be developers' choice because of its interoperability, making it compatible with some programming languages. It allows developers to run JavaScript on the server side. Node.js is built on Chrome's V8 JavaScript engine and is known for its speed, scalability,

and event-driven architecture. Below are the key uses of Node.js: Web development, real-time applications, API development, microservices architecture, streaming applications, single-page applications (SPAs), serverless computing, DevOps and automation, command-line Tools, IoT (Internet of Things), data-intensive Applications, social media platforms, e-commerce platforms, proxy servers, cross-platform desktop applications, machine learning and AI, and open-source projects. Known for its vast ecosystem of libraries, Node.js is a versatile and powerful runtime environment that has revolutionized server-side development. Its speed, scalability, and JavaScript-based ecosystem make it popular for contemporary web and real-time applications.

PHP

Hypertext Preprocessor, popularly known as PHP, is a widely used server-side scripting language designed for dynamic web development and applications. It is well-suited for creating dynamic, interactive web pages. Here are the common uses of PHP: Web development (Facebook, WordPress, and Wikipedia are popular websites built with PHP), Content Management Systems (CMS), e-commerce platforms, web frameworks, server-side scripting, database interaction, API development, command-line scripting, web scraping, authentication and security, social networking platforms, blogging platforms, prototyping, open-source projects, and legacy systems. One of PHP's core strengths is its cross-platform support, which allows it to run on Windows, Linux, macOS, and many databases. PHP remains one of the most sought-after languages for web development, particularly for building dynamic websites, CMS platforms, and e-commerce solutions. Its simplicity, broad adoption, and extensive ecosystem make it a reliable choice for developers worldwide.

Concepts In Coding

Coding, or programming, involves writing instructions for computers to execute tasks. To become proficient in coding, it's essential to understand key concepts that form the foundation of programming. Below are some of the most critical ideas.

Variables

Variables are used to store data values. They act as containers for information that can be used and manipulated throughout a program. Example: int age = 45; (in C++) or let name = "Tony"; (in JavaScript).

Data types

Data types define the kind of data a variable can hold. There are two common data types: primitive types (integers, floats, booleans, characters, and strings) and Composite types (Arrays, lists, dictionaries, and objects). Examples: int (integer), float (floating-point number), and string (text).

Control structures

Control structures determine the flow of a program. The main control structures are Conditionals (if, else, switch) for decision-making and Loops (for, while, do-while) for repeating tasks.

Functions

Functions are reusable blocks of code that perform a specific task. They help organize code and avoid repetition.

Object-Oriented Programming (OOP)

This is a programming paradigm based on the concept of “objects.” The common OOP concepts are:

- i Classes and Objects: Serves as a blueprint for creating objects.
- ii Encapsulation: Bundling data and methods that operate on the data.
- iii Inheritance: Creating new classes from existing ones.
- iv Polymorphism: Using a single interface to represent different types.

Algorithms

Algorithms are step-by-step procedures for solving problems. They are the backbone of programming and are used to perform tasks like sorting, searching, and data processing. Examples include binary search and quicksort.

Data structures

Data structures are ways of organizing and storing data. The common data structures are:

- Arrays: Fixed-size collections of elements.
- Linked Lists: Dynamic collections of nodes.
- Stacks: Last-In-First-Out (LIFO) structures.
- Queues: First-In-First-Out (FIFO) structures.
- Trees: Hierarchical structures (e.g., binary trees).
- Graphs: Networks of nodes connected by edges, like using a stack to implement ‘undo’ functionality in a text editor.

Error handling

Error handling involves managing and responding to errors during program execution. The two effective techniques in error handling are Try-catch blocks (this is for catching and handling exceptions) and Logging (which is for recording errors for debugging)

Debugging

This is a way to identify and fix code errors. Tools like debuggers, print statements, and logging are used to trace and resolve issues.

APIs

Application Programming Interfaces allow different software systems to communicate. They define how requests and responses should be structured, like using a weather API to fetch real-time weather data.

Version control

A version control system tracks code changes and enables collaboration. Common version control concepts are:

- Repositories: Storage locations for code.
- Branches: Parallel versions of the codebase.
- Commits: Snapshots of changes, like using Git to manage a team project.

Testing

Testing ensures that code works as expected and is free of bugs. Key types of testing are:

- Unit testing: Testing individual components.

- Integration testing: Testing how components work together.
- End-to-end testing: Testing the entire application, for example, writing unit tests with a framework like JUnit (Java) or PyTest (Python).

Database

Databases store and manage data for applications. Key concepts are:

- SQL: Structured Query Language for relational databases.
- NoSQL: Non-relational databases like MongoDB.
- CRUD Operations: Create, Read, Update, and Delete. A good example is using SQL to query a database for user information.

Security

Security involves protecting applications from vulnerabilities and attacks. Standard practices are Input validation, Encryption, Authentication, and authorization. A good example is using HTTPS to secure data transmission.

Optimization

Optimization improves code performance and efficiency. The techniques are reducing time complexity, minimizing memory usage, profiling, and benchmarking. A good example of optimization is a sorting algorithm that runs faster.

Deployment

Deployment involves releasing an application for use. Common steps for deployment are building the application, hosting it on a server or cloud platform, and configuring domains and SSL certificates. An example is deploying a web app to Heroku or AWS.

Frameworks and libraries

Frameworks and libraries provide pre-built functionality to speed up development. Examples include: Front-end frameworks (React, Angular, Vue.js), Back-end frameworks (Express.js and Node.js, Django and Python, Spring and Java), and libraries (NumPy and Python, Lodash and JavaScript).

Documentation

Documentation provides explanations and instructions for using code. It includes code comments, README files, and API documentation. A good example is writing a README file for a GitHub project.

Continuous integration/continuous deployment (CI/CD)

CI/CD automates the testing and deployment of code. Examples of tools are Jenkins, GitHub Actions, and CircleCI.

Concurrency and parallelism

Concurrency involves managing multiple tasks simultaneously, while parallelism involves executing multiple tasks simultaneously. Techniques include Threads for lightweight processes and Async/Await for asynchronous programming. A good example is using threads to handle multiple user requests in a web server.

Conclusion

Coding concepts are the foundation of coding, with each having a distinct function. Coding concepts are essential for building efficient, scalable, and maintainable software. Mastering these concepts will help you become a proficient programmer.

Tools For Coding

Well, I cannot say that you must know how to code as an automotive CEO, and I cannot say that you should ignore it when you can. The bolt and nut of everything is that you must have abstract knowledge. The reason is that, with your limited knowledge of them, you can assign employees and pass instructions on what to do. Of course, even those who can code and are CEOs no longer do it themselves but pass instructions to their employees. For example, Elon Musk can no longer sit at his PC coding, even though he is good at it.

On the contrary, he takes to delegation; he conceives what he wants and gets hungrier young folks to code for him. He can no longer sit at the PC due to exigencies, especially now that he has begun to show an interest in politics, having been appointed by the United States government.

This applies only to an average CEO. However, you need to have

the required knowledge. For instance, if Elon doesn't know how to code, he wouldn't be able to think about what should be done, because coding is the foundation of all artificial intelligence and software. Although Elon may not know all the coding languages or AI capabilities, the little knowledge he has gathered helps him supervise and even learn faster in other areas. For instance, knowing about modern computing will help you understand future computing, such as quantum computing.

In computing categorization, we are currently at the interface of "Fifth and sixth generation" computing. Fifth-generation computing is primarily characterized by the widespread use of Artificial Intelligence (AI) technologies, whereas sixth-generation computing ushers in Quantum Computing. Who knows, we might encounter something higher as we evolve. Just as we've been evolving: from the first generation of vacuum tubes to the second generation of transistors, to the third generation of integrated circuits, to the fourth generation of microprocessors, to the fifth generation of Artificial Intelligence, and today, the ushering in of the sixth generation, which is quantum computing. All indications are that we are entering the "dawn of quantum computing," which will bring unimaginable advancement in computing power and the propensity to achieve great breakthroughs in fields like medicine, materials science, cryptography, and many others. In fact, the United Nations has designated 2025 as the "International Year of Quantum Science and Technology," highlighting the focus on quantum development. This development is expected to give birth to the following:

Spatial computing

Through spatial computing, augmented and virtual reality will become more integrated into our everyday lives, thereby enhancing human-computer interaction.

Edge computing

For example, processing data closer to its source will become more prevalent, improving efficiency and speed.

AI integration across industries

Artificial intelligence and machine learning will be deeply embedded

in various applications, driving breathtaking innovation in different areas of endeavor. The above is not the limit to what the introduction of quantum computing can achieve for us. The possibilities are unbelievable, and who knows, we might discover the undiscoverable, like another dimension and its reality beyond what we have today.

Quantum computing requires sustained research and rapt attention, given its microscopic nature. The tiny nature of the quantum mechanism is like traveling from an atom to nuclei, quarks, gluons, and down to the Planck length, which is 10^{-35} metres. Quantum is infinitesimally small! The distance to the Quantum dimension is farther than the distance from Earth to the galaxy, the local cluster, and the edge of the universe. This distance is beyond 90 billion light-years, yet it is farther to reach the Quantum realm. The Quantum world is vast, requiring unwavering human commitment to unearth its potential.

The quantum world operates at the smallest scales of nature, where particles behave in ways that defy ordinary logic: They can be in multiple states at once, teleport information, and interact instantly across vast distances. It is a realm so deep and complex that even today's strongest computers cannot fully simulate it. Quantum physics reveals that, at its core, reality is governed by probabilities, entanglement, and wave-like behavior, offering a profound shift in how we understand the universe. The potential of the quantum world is extraordinary. Quantum computing promises processing speeds millions of times faster than classical computers for certain tasks, enabling breakthroughs in medicine, climate modeling, artificial intelligence, cryptography, and materials science.

Quantum communication could deliver unhackable networks, while quantum sensors will detect the smallest changes in gravity, time, and electromagnetic fields with unmatched precision.

Looking to the future, quantum technology may unlock new energy sources, revolutionize national security, accelerate space exploration, and reshape entire industries. As we continue to explore this mysterious realm, the quantum world stands as one of humanity's most futuristic frontiers, opening doors to technological possibilities beyond anything we have imagined.

Back to our discussion, if you understand what is available today, tomorrow will be very familiar to you – J-ib. So, you have to pay

attention to programming and grasp as much knowledge as you can about it because it will guide you in your operations and help you understand what comes of it. Anyway, let's move on to our topic: Coding tools. Several tools help developers write, test, debug, and deploy software efficiently. We shall examine these important tools and categorize them by purpose.

Integrated development environments (IDEs)

These comprehensive tools provide a code editor, debugger, and other features in a single interface. Examples of IDEs are:

- Visual Studio Code (VS Code) is known for being lightweight, highly customizable, and supporting many languages.
- IntelliJ IDEA: Great for Java, Kotlin, and other JVM languages.
- PyCharm: Primarily optimized for Python development.
- Eclipse: Popular for Java and enterprise development.
- Xcode: For iOS/macOS development (Swift, Objective-C).

Code editors

Code editors are lightweight tools for writing and editing code.

Popular Code Editors are:

- Sublime Text: Known for its fast and highly customizable.
- Atom: This is an open-source editor by GitHub.
- Notepad++: Good and efficient lightweight editor for Windows.
- Vim/Neovim: This is a terminal-based editor with powerful customization.
- Emacs: Emacs is a highly extensible editor for advanced users.

Version Control Systems

Version control systems help track code changes and enable collaboration. Common VCS are:

- Git: This is the most widely used version control system.
- GitHub: A popular platform for hosting and collaborating on Git repositories.
- GitLab: This is similar to GitHub and has additional DevOps features.
- Bitbucket: Bitbucket is a Git repository hosting service by Atlassian.

Package managers

Package managers help install, update, and manage libraries and dependencies. Popular package managers:

- Npm: For JavaScript/Node.js.
- Yarn: This is an alternative to npm for JavaScript.
- Pip: Is for Python.
- Maven/Gradle: For Java.
- Homebrew: This is for installing software packages on macOS/Linux.

Debugging tools

Debugging tools help identify and fix errors in code. Popular Debugging Tools are:

- Chrome DevTools: This is used to debug JavaScript in browsers.
- GDB: For debugging C/C++ programs.
- PDB: This is Python's built-in debugger.
- Xcode Debugger: For iOS/macOS apps.

Testing tools

Testing tools help to ensure that code quality and functionality perform very well. Standard testing tools are:

- JUnit: This is for unit testing in Java.
- PyTest: This is for testing Python code.
- Mocha/Jest: This is for testing JavaScript applications.
- Selenium: For automated browser testing.

Database Tools

Database tools are used to manage and interact with databases. Common database tools are:

- MySQL Workbench: This is used for MySQL database management.
- pgAdmin: For PostgreSQL.
- MongoDB Compass: Used for MongoDB.
- SQLite Browser: Used for SQLite databases.

Collaboration tools

Collaboration tools help teams work together on code. Popular collaboration tools are:

- Slack: For team communication.
- Microsoft Teams: Is used for collaboration and meetings.
- Trello: This is a good tool for project management.
- Jira: Jira is practical for issue tracking and agile project management.

Containerization tools

Containerization tools help package applications and their dependencies. Common containerization tools are:

- Docker: This is for creating and managing containers.
- Kubernetes: For orchestrating containerized applications.

Cloud platforms

Cloud platforms provide hosting and services for deploying applications. Popular Cloud Platforms:

- AWS (Amazon Web Services): For comprehensive cloud services.
- Google Cloud Platform (GCP): This is a cloud service by Google.
- Microsoft Azure: This is a cloud service by Microsoft.
- Heroku: Is a Platform-as-a-Service (PaaS) for easy deployment.

Others include Continuous Integration/Continuous Deployment (CI/CD) Tools, Documentation Tools, Code Quality and Linting Tools, Terminal and Shell Tools, API Testing Tools, Performance Monitoring Tools, Virtualization Tools, Code Search and Navigation Tools, Security Tools, Task Runners, and Build Tools. You can research them and learn more.

The above tools are essential for modern software development and can significantly improve productivity, code quality, and collaboration. Depending on your project and programming language, you may use a combination of these tools to streamline your workflow and get the most out of your job.

Applications Of Coding

These projects require coding or things that can be achieved through coding. They are:

Web development

Coding is used to build websites and web apps; examples include HTML, CSS, JavaScript (front-end), Node.js, Django, and Flask (back-end).

Mobile development

To create apps for both iOS (Swift) and Android (Java/Kotlin).

Game development

Coding is used in game design with Unity (C#) or Unreal Engine (C++).

Data science

Coding is used for analyzing data and building machine learning models; examples include Python and R.

Artificial intelligence

Coding is used for analyzing data and building machine learning models; examples include Python and R.

Automation

Coding is applied as scripts to automate repetitive tasks; examples are Python and Bash.

System programming

Coding is used to develop operating systems and low-level software; examples are C and C++.

Software development

Coding is used to create all kinds of software. Examples are Python, Java, C#, PHP, Swift, SQL, Ruby, Go, Kotlin, TypeScript, C++, and Rust.

CAD applications

Coding is used in computer-aided design, for example, C++.

Business applications

Coding is used to create business applications, such as Java.

Audio and visual applications

Coding is used to create audio and visual applications, for example, C++.

Steps To Learn Coding

This is for those who know nothing about coding. I mean those who cannot code but are willing to learn and start coding. Well, I don't

know how old you are or what your area of interest is, but the fact remains that following the trends makes you relevant and useful. We are in the computer age, and learning on the fly is the only way to keep up. Without knowledge, you will be relegated, thereby providing irrelevant or no value to society. Thus, you must fight to keep up with innovation and learn as much as possible. The following are the steps to take if you want to learn coding:

Get a teacher

You can get a private teacher or enroll in a coding school. However, as a CEO, you should hire a private teacher to control your time.

Choose a language

Choose a beginner-friendly programming language, such as Python or JavaScript. It all depends on the area of interest. The fact is that when you learn about one programming language, others will be familiar and easy for you.

Learn the basics

Understand variables, data types, loops, conditionals, and functions. Learn sequentially, from basic to advanced aspects.

Practice

One attitude to adopt while learning to code is to practice as often as possible. You can solve some coding challenges on platforms like LeetCode, HackerRank, or Codewars.

The following are guidelines for practicing coding:

- Write clean code: Use meaningful variable names, proper indentation, and comments.
- Test your code: Use unit tests and debugging tools to ensure your code works as expected.
- Follow the DRY principle: Don't repeat yourself—reuse code with functions and modules.
- Use version control: Track changes and collaborate effectively with Git.
- Document your code: Write clear documentation for yourself and others.

Build projects

You can challenge yourself by creating small projects to improve your skills. You can take on projects like a calculator, a to-do list app, or even a website.

Explore advanced topics

When you realize that you have improved in coding, challenge yourself by taking on a more advanced project, such as algorithms, data structures, and frameworks.

Research

Research online as often as you can. When you are coding and encountering bugs, you can go online and learn the appropriate way to fix them.

Collaborate

Collaborate with online coding enthusiasts and share ideas. You can work with online programming communities like GitHub, Stack Overflow, Reddit, and Discord groups and join open-source projects. Coding is not as difficult as you may think or have thought. What is difficult about coding is the will to start. As I said earlier, you don't necessarily have to code by yourself as a CEO. Knowing will guide you in delegating tasks to others and help you keep up with technological growth. Outside of hiring a teacher or enrolling in a school, you can learn coding online independently without appearing physically. You can use platforms like Coursera, Udemy, and freeCodeCamp. Automate the Boring Stuff with Python, Eloquent JavaScript, and Clean Code: Traversy Media, The Net Ninja, Programming with Mosh.

Common Coding Terminologies And Meaning

The following are everyday coding terms commonly used in programming and software development. Knowing these terms is very important, as it helps you understand coding concepts and communicate effectively in the tech world. By the time you have understood these terms and their functions, you will be 40% ready for coding:

Algorithm: A step-by-step procedure for solving a problem or

performing a task. Algorithms are the foundation of coding.

Bug: An error or flaw in coding that causes it to behave unexpectedly. Debugging is the process of finding and fixing bugs.

Data type: This is data classification, such as integers, strings, or booleans.

Conditional statement: A statement that executes code based on a condition; examples are if, else, and switch.

Array: A collection of elements stored in a single variable.

Object: An instance of a class in object-oriented programming (OOP).

Class: A blueprint for creating objects in OOP.

Library: A collection of pre-written code that can be reused.

Framework: A structured platform for developing software applications.

Repository: Popularly known as Repo, it is a storage location for code and its version history.

API: This means an application programming interface, a set of rules for interacting with a software application or service.

Interpreter: A program that executes code directly without compiling it into machine code.

Version control: A system for managing changes in coding.

Binary: The language of computers consists of 0s and 1s. All code is automatically translated into binary for the computer to execute.

Closed source: Proprietary software with restricted access to source code.

Containerization: Packaging software with its dependencies. Event-driven programming is a paradigm where events control the program's flow. Examples include user actions and sensor inputs.

Game engine: A framework for developing games; examples are Unity and Unreal Engine.

Sprite: A 2D image or animation is used in game development.

Physics engine: A software component that simulates physical systems.

Collision Detection: This tool detects when objects in a game intersect.

AI (Artificial Intelligence): Programming non-player characters to behave intelligently, often mimicking the abilities of their creator.

Compiler: A tool that translates code written in a high-level

programming language like C++ or Java into machine code that a computer can execute.

Data structures: This is a way to organize and store data for efficient access and modification.

IDE: An Integrated Development Environment is a software application that provides tools for coding, debugging, and testing. Examples are Visual Studio, PyCharm, and Eclipse.

Function: A block of reusable code that performs a specific task and helps modularize and organize code.

Git: A version control system that tracks code changes and collaborates with others. Platforms like GitHub and GitLab are built on Git.

Iteration: Repeating instructions, often using loops to perform repetitive tasks.

Open source: Software with publicly accessible source code.

JSON: Which stands for JavaScript Object Notation, is a lightweight data format for storing and exchanging data, commonly used in web development.

Kernel: This is the core part of an operating system that manages system resources and communication between hardware and software.

Loop: A programming construct that repeats a code block until a condition is met.

Machine learning: A subset of artificial intelligence (AI) that involves training algorithms to learn patterns from data and make predictions.

Tensor: A multi-dimensional array is used in machine learning.

Cloud storage: Storing data on remote servers accessed through the Internet.

Virtual machine: A software-based emulation of a physical computer.

Node.js: A runtime environment that allows developers to run JavaScript on the server side, enabling full-stack JavaScript development.

CI/CD: This stands for continuous integration/continuous deployment and is a process for automating code deployment.

Microservices: An architectural style for building applications as a collection of small services.

Monolithic architecture: A traditional software architecture where all components are interconnected.

API endpoint: A specific URL where an API can be accessed.

Middleware: Software that connects different applications or services.

HTTP/HTTPS: Protocols for transferring data over the web.

OOP: Stands for Object-Oriented Programming, a programming paradigm based on objects, which are instances of classes. The key concepts of OOP are inheritance, encapsulation, and polymorphism.

Python: A versatile, beginner-friendly programming language widely used in web development, data science, and automation.

Pseudocode: A simplified version of code written in plain language.

Query: Query requests data from a database. Structured Query Language (SQL) is commonly used to write queries.

Recursion: A technique where a function calls itself to solve a problem. This is often used in algorithms like sorting and tree traversal.

Refactoring: Restructuring existing code without changing its behavior.

Syntax: The set of rules defining a programming language's structure. Syntax errors occur when code doesn't follow these rules.

Stack Overflow: A popular question-and-answer website for programmers.

Serverless computing: A coding tool for running code without managing servers; examples include AWS Lambda.

Testing: This is the process of evaluating a program to ensure it works as intended. Types of testing include unit, integration, and end-to-end testing.

IP Address: A unique identifier for devices on a network.

Firewall: A security system that monitors and controls network traffic.

NoSQL: A type of database that doesn't use tables; an example is MongoDB.

ORM: An acronym for object-relational mapping, which is a tool for interacting with databases using OOP.

Big data: Huge datasets that require specialized tools for processing.

Data mining: The process of discovering patterns in large datasets, a method for moving data between systems.

Encryption: The process of converting data into a secure format.

Authentication: Verifying the identity of a user or system.

Authorization: Granting or denying access to resources.

Technical debt: The cost of additional work stems from choosing quick solutions over better ones.

UI/UX: Stands for User Interface/User Experience. UI refers to an application's visual elements, while UX focuses on the user's overall experience.

Variable: A container for storing data values. Variables are fundamental to programming and can hold different data types; good examples include integers and strings.

Web development: This is the process of building websites and web applications, which includes front-end (client-side) and back-end (server-side) development.

XML: Which stands for eXtensible Markup Language, is a markup language used to store and transport data. It is similar to HTML but focuses on data representation.

Neural network: A system of algorithms modeled after the human brain.

Training data: Data used to teach a machine learning model.

Comment: Text in the code that is ignored by the compiler/interpreter used for documentation.

Supervised learning: A type of machine learning where the model is trained on labeled data.

Unsupervised learning: A type of machine learning where the model finds patterns in unlabelled data.

Overfitting: When a model performs well on training data but poorly on new data.

YAML: Which stands for Yet Another Markup Language, is a human-readable data format often used for configuration files and data serialization.

Zero-based indexing: A numbering system where the first element in an array or list is indexed as 0 and not 1. This is common in languages like Python and JavaScript.

CSS: Which means Cascading Style Sheets is a language used to style HTML elements.

JavaScript: A programming language for adding interactivity to websites.

Front-end: The part of a website that users interact with (client-side).

Back-end: The server-side part of a website that handles data processing.

Full stack: Development involving both front-end and back-end.

Responsive design: Designing websites for all devices, such as desktop and mobile.

DOM: Document Object Model is a programming interface for web documents.

AJAX: Asynchronous JavaScript and XML (AJAX) is a technique for updating web pages without reloading.

CMS: This means that a content management system is a platform for managing website content.

Agile: A project management methodology focused on iterative development.

Scrum: A framework for implementing Agile.

DevOps: A set of practices combining software development and IT operations.

Above are the coding terms, and, as I said, understanding these terms is paramount to understanding coding by 40%. Coding is a powerful skill that opens up endless possibilities.

Whether you're learning it as a CEO, for its knowledge, or to work on coding projects, coding empowers you to bring ideas to life. Start small, stay consistent, and enjoy the process. You need to have knowledge in this; without it, you won't understand the technology of automotive automation or artificial intelligence.

Robot Building

Building a robot involves procedures similar to those for building a car or an aircraft. The difference is that robots require programming and machine training. Robot building can be fun because you will be curious about the outcome. Robot building encompasses mechanical engineering, electronics, and programming. Below is a detailed step-by-step guide to building a robot.

Determine the type of robot

The first step in building a robot is determining its type. Of course, there are different types of robots for different purposes. Robots are designed to perform specific tasks in various shapes, sizes, and

functionalities. Here is a comprehensive list of robot types, organized by application and design:

Industrial robot: Robots are built for industrial use, just like the ones we discussed for land-vehicle and aircraft manufacturing. Examples of industrial robots are Articulated, SCARA, Delta, Cartesian, and Collaborative Robots.

Domestic robot: Robots for household tasks that can execute tasks like cooking, cleaning, vacuuming, etcetera. A good example is Roomba.

Educational robot: This robot category is designed to teach coding and robotics. A good example of this robot is LEGO Mindstorms.

Retail robot: This is a type of robot that can assist stores with tasks such as inventory management, customer service, and accounting.

Mobile robot: This type of robot moves from one place to another while executing a particular task. Examples are wheeled robots, tracked robots, legged robots, flying robots, and swimming robots.

Autonomous robot: This is a type of robot that can operate independently. Examples are self-driving cars, delivery robots, agricultural robots, and exploration robots.

Humanoid robot: This type of robot is designed to resemble and mimic humans. Examples are androids and social robots (Sophia by Hanson Robotics and Pepper by SoftBank Robotics).

Military robot: These are robots created for war and defense. Examples include bomb-disposal robots, surveillance robots, and combat robots.

Entertainment robot: These are robots created to entertain humans or animals. Examples are toy robots, robotic pets, and robotic performers (Aibo by Sony, Cozmo).

Medical and healthcare robot: These are robots used in the medical field for patient care and professional healthcare services. Examples are surgical robots, rehabilitation robots, and telepresence robots.

Agricultural robot: This is a type of robot used for farming services. Examples are harvesting robots, weeding robots, and monitoring robots.

Space robot: These are robots used in space for exploration and other scientific purposes. Examples are rovers, satellites, and robotic arms.

Swarm robot: A Swarm robot is multiple small robots working together to achieve a given assignment.

Soft robot: This type of robot is specifically made from soft materials to perform delicate tasks, such as handling fragile objects.

Competition robot: These are robots designed to compete in indoor and outdoor sports such as chess, tennis, and football.

Exoskeletons: These wearable robots assist humans in performing extra-human tasks, such as lifting heavy objects or walking at the same speed as a runner.

Lobbying robot: This robot is used to influence government or organizational decision-making, often by advocating for specific policies, regulations, or interests. It analyses data, generates advocacy materials, engages with decision-makers, monitors policy changes, and predicts outcomes.

Nanorobot: These are microscopic robots used in medical applications, such as intravenous drug delivery, surgical procedures, and the insertion of robotic cameras.

Construction robot: There are robots used for construction. Examples are 3D Printing robots and Bricklaying robots.

Inspection robot: This type of robot is used to inspect special infrastructural projects. Examples are pipeline inspection robots and bridge inspection robots.

Rescue robot: This is a type of robot specifically created to carry out rescue exercises when needed. Examples are search-and-rescue robots and firefighting robots.

Environmental robot: These are robots created to monitor and maintain the human environment. Examples are pollution-cleaning robots and forest-monitoring robots.

Knowing the different types of robots therein will help you decide which to build or specialize in. This will also determine your prototype design and everything you need to build the robot.

Summary: There are many types of robots, beyond those listed above; others may emerge. The choice of a robot to venture into lies in the goal and aspiration.

Sketch The Design

Based on the type of robot you have chosen to build, get a specialist company to design the robot you choose. You can get this service

from companies like FANUC, Boston Dynamics, KUKA, ABB, Yaskawa, Liquid Robotics, Real-time Robotics, GrayMatter Robotics, and Mitsubishi Electric.

Gather Components

After you have made your prototype design, make the necessary materials available. The necessary materials are microcontrollers, motors, wheels, motor drivers, sensors, chassis, batteries, wires and connectors, work tools, and other materials, just as required.

Build The Mechanical Structure

The next step to take after you have made the materials available is to build the mechanical structure according to the designed prototype. Below are the steps to building a robot's mechanical structure:

Chassis assembling

Attach the motors and wheels to the chassis and ensure the robot is balanced and stable.

Mount the sensors

Earlier, we discussed the type of sensors used in robot building. Sensor mounting depends on the robot's prototype design. This determines your goal with the robot and the necessary sensors. For instance, in a line-following robot, the IR sensors are placed at the front, close to the ground. For an obstacle-avoidance robot, the ultrasonic sensor is mounted at the front, and so on.

Attach the microcontroller

Attaching a microcontroller to a robot is a critical step in the building process because it acts as the robot's "brain," controlling all its functions. First, you must determine the right microcontroller to secure effective attachment.

For example, if it will be:

- Arduino Uno/Nano: This is great for beginners because of its simplicity.
- Raspberry Pi: For more advanced projects requiring higher computing power.
- ESP32: For projects needing Wi-Fi/Bluetooth connectivity.

Microcontrollers are complex devices that you must understand very well. You can research this more for a better understanding.

Set Up The Electronics

This stage is critical because it brings the robot to life and enables everything to function. These are the steps to take in setting up robot electronics:

Connect the motors: Connect the motors to the motor driver, and then connect the motor driver to the microcontroller.

Connect the sensors: The next step is to wire the IR or ultrasonic sensors to the microcontroller.

Power the robot: Having connected the sensors to the microcontroller, connect the battery to the microcontroller and motor driver.

Double-check connections: At this stage, ensure all wires are correctly connected and secured.

Write Code

This is where it matters most, and we have actually discussed programming extensively. At this point, you have to write code to create prompts and make the robot responsive.

Programming language

Start by choosing a programming language that remains tied to the robot's designed prototype. For example, you will choose C and C++ for the Arduino microcontroller and Python for the Raspberry Pi, and so on.

Write the logic

Write code instructing the robot on what to do at any given time. For example, in a line-following robot, read the data from the IR sensors; if the left sensor detects the line, turn left. If the right sensor detects the line, turn right. If both sensors detect the line, move forward. The other instruction is for an obstacle-avoidance robot. Here, you will use the ultrasonic sensor to measure distance. If an obstacle is detected, the robot will turn left or right, depending on the direction.

Upload your code

Finally, upload the code you have run so far to the microcontroller

using a USB cable for deployment.

Test And Debug

Test the robot

Of course, you would test-run the robot as often as it takes to achieve perfection. Start by placing the robot on a surface and observing its behavior. For a line-following robot, test it on a black line on a white surface. There are many ways to test a robot's functionality; you can research this further.

Debug Issues

This is all about detecting a malfunction, determining what has gone wrong, and fixing it appropriately. If the robot doesn't move, check the motor connections, and if the sensors don't work, check the wiring and code, and so on.

Optimize Performance

Optimize the robot's functionality as desired by you or as specified in the designed prototype, such as adjusting motor speeds and fine-tuning sensor sensitivity.

Advanced Feature

You can add advanced features to the robot; it all depends on what you want to achieve. You can incorporate features like:

Wireless control: Add a Bluetooth or Wi-Fi module to control the robot remotely.

Autonomous navigation: Use more sensors and advanced algorithms for self-driving capabilities.

Camera and vision: Add a camera for object detection or facial recognition.

Others: You can add many other advanced features to your robot to upgrade its intelligence. Of course, you can always upgrade and achieve the desired result.

Refine The Design

Make the robot appealing and innovative. Beautify the overall appearance and work on the following:

Aesthetics: Add a cover and paint the robot to make it look more beautiful.

Durability: Use stronger materials and protective coatings.

Weight: Optimize the design for better performance and keep the weight as light as possible.

Document The Production Processes

Document the process by writing down the steps, components, and code for future use. You can post your work online and allow people to give feedback.

You also take it to an open event so people can see it in person and give you feedback.

Tips For Success

If you have decided to build a robot, start small. Build a simple robot before attempting complex designs. Use beginner-friendly robot kits to learn the basics. Be patient; building a robot takes time and numerous experiments. Learn from your failures. Keep debugging bugs because it is the key to creating artificial intelligence.

Building A Robotic Manufacturing Company

The title of this book is Modern Automotive CEO, and we know what a CEO is identified with—business! So, whatever this book discusses can be centered on the business aspect. Thus, Artificial Intelligence is a sector in the automotive industry that committed CEOs must invest in. On this note, we shall discuss briefly how to start and run a robot manufacturing company.

Establishing a robot manufacturing company is an ambitious and exciting venture that combines engineering, entrepreneurship, and innovation. The success of every adventure depends on interest and determination, and this is true when establishing a robot manufacturing company. It requires conducting forensic research and understanding what is needed to set up and run.

Without suspense, the nuts and bolts of what it takes to run a robot manufacturing company are as follows: First, you must identify a niche market for the type of robot you want to build. Then, develop a strong technical team with excellent robotics engineering and software skills. After this, design a prototype, raise funds, build

a production facility, get all the legal and regulatory requirements for robot manufacturing and sales, and then market your robot to potential customers. We shall discuss these things briefly.

Research

You can't afford to start a sensitive business without understanding the sector. You must understand comprehensively how robots are being built, the market scope, services, and future evolution. You also have to know the key players in the industry that are already making waves.

Study the type of robots already existing and their functionality. Once you have gathered this information, you will be equipped to set out.

Planning

Having understood all it takes to establish and manage a robot manufacturing company, plan the project intentionally. Plan from micro to macro; start with the little things and work up to the advanced ones. Ensure your team understands your goal and that everyone has what they need to contribute effectively to achieving it. Draw a blueprint of the project and pattern your approaches after a timetable.

Raise Funds

Getting into robot manufacturing is not an internship; it is a serious venture that requires substantial capital to get started. In a previous chapter, we discussed raising capital to start a business. You can page back to understand how to raise funds. The first step is to have a detailed startup cost estimate for the business. Then, determine the source from which you would raise the required amount. This could be through self-funding, investors, loans, or grants.

Set Up A Team

This is essential to building a robot manufacturing company because it determines the project's success. A robot manufacturing company requires a well-organized structure with specialized departments to handle various aspects of the business. Therefore, you must build a formidable team to sustain this structure and mount each department

effectively. The following are the necessary departments in the robot manufacturing industry from which you will build your team. Note that these departments are technically the same department needed for land-vehicle, maritime, and aircraft manufacturing. Thus, the departments discussed here can also apply to these two sectors.

Research and development

This department is the project's pacesetter. They are responsible for designing and developing new robots and upgrading existing ones. They are robotics engineers, software developers, AI and machine learning specialists, prototyping specialists, and testing teams. Get the best personnel on merit to mount this department for effective, result-oriented operations.

Engineering

This department turns a prototype into a functional robot. It is composed of mechanical engineers who oversee the construction of the robot's physical components. Electrical engineers work on circuits, sensors, and power systems. Software engineers develop and manage the systems and algorithms.

Manufacturing and production

This department builds and assembles robots at different scales. Its members include production managers, assembly line workers, quality control inspectors, and equipment maintenance technicians.

Quality assurance

They ensure that robots meet quality and safety standards. Examples are engineers, testing specialists, and compliance officers.

Supply chain and procurement

This department is responsible for sourcing materials and components. Its members include procurement managers, supply chain analysts, and logistics coordinators.

Sales and marketing

These are responsible for promoting, marketing, and selling robots to customers. They include sales representatives, marketing managers,

digital marketing specialists, and product demonstrators.

Customer support and service

This department consists of customer service representatives, technical support specialists, warranty units, and repair technicians. They assist customers with product use and resolve issues.

Finance and accounting

This department manages the company's finances. They include accountants, financial analysts, and budget managers.

Human resources

They are responsible for recruitment, training, duty roster, employee leave, surcharge, general employees' welfare, and other related matters. They are human resources managers, recruitment specialists, and training and development coordinators.

Information technology

This department maintains the company's technology infrastructure and handles other technical issues. Its staff includes IT support staff, network administrators, and cybersecurity specialists.

Legal and compliance

They ensure the company adheres to laws and regulations. They include legal advisors, compliance officers, and intellectual property (IP) managers.

Business development

This department identifies growth opportunities and partnerships. Its members include business development managers, partnership coordinators, and market researchers.

Operations and administration

This department oversees the company's day-to-day operations. It is made up of operations managers, administrative assistants, and facility managers.

Innovation and strategy

These drive the company's long-term growth and innovation. They are made up of the chief technology officer (CTO), innovation managers, and strategic planners.

Environmental, Health, and Safety (EHS)

This department ensures workplace safety and health. They include EHS managers, safety officers, and sustainability coordinators.

CEO/Founder

This office oversees the activities of all the company's department heads and is responsible for mapping the company's goals and ensuring they are achieved.

The above departments are necessary not only for a robot manufacturing company but also for the aircraft, land vehicles, and maritime sectors.

Likely impediments to establishing a robot manufacturing company

High initial costs

Robotics manufacturing is capital-intensive and requires significant investment. You may have to fasten your belt in this respect and ensure that you are financially ready. You can read again what I said about raising money to start a company.

Technical complexity

Developing reliable and efficient robots is challenging because of their structural and computational complexity. You need to build the right team, especially when it comes to expertise and technical know-how. Employ, engage, and partner with people of like mind and the same line of dreams; they will level the mountain and make your project as feasible as you dreamt.

Competition

The robotics industry is highly competitive! So many companies compete headlong, fighting to bring one superior invention after another. For this reason, you must prioritize standards, innovation,

and scientific advancement. Ensure that your first product is at least 40% more obsolete than your second production.

Regulations

This is very important because neglecting it can mar your success. Ensure you comply with all legal and regulatory requirements, including production approvals, industrial standards, and safety standards.

Tips For Success

Be affirmative

Once you have envisioned your goal, work on yourself and remain resolute. Don't be swayed by doubts or despair; picture yourself as though you have already accomplished your objective, and there you will be. As I said earlier, it is not a herculean task; it is just a sensitive and technical industry that requires patience and expertise.

Start small

Make the project sparingly insignificant by starting small. Start small by attending conferences and events related to robot manufacturing, reading books and articles on robot manufacturing entrepreneurship, and taking online courses or pursuing a degree in robotic engineering or a related field. After this, you take manageable steps, which must follow the procedures we discussed. The point is that you shouldn't rush it or become distressed about the project.

Focus on quality

Build a reputation for reliable and innovative products. Focus on making your brand a talker; don't follow the bandwagon! Catch a niche for yourself and build a name that is equal to quality and standard. Create a market base and prioritize quality over quantity.

Build partnerships

In addition to your everyday team, collaborate with universities, research institutions, and companies in your industry. This will expose you more and guide your choices.

Stay updated

Keep up with advancements in robotics and Artificial Intelligence. Create a folder, document new robotic advancements, and incorporate them in your work if useful. Above all, be creative and curious enough to create new features that others can emulate. Owning a robot manufacturing company is a great adventure, and as an automotive CEO or intending CEO, it is worth venturing into. All it requires is interest and the will to pursue it relentlessly.

Establishing A Space Exploration Company

Elon Musk dared what was then considered an alien adventure, and today, he is not only thriving but has set the bar high. Jeff Bezos is making significant efforts with Blue Origin, as are Richard Branson, Lockheed Martin, and many other space exploration CEOs. You can be like one of these CEOs if only you desire to be. Building a space exploration company is a monumental endeavor that demands a mix of vision, technical expertise, strategic planning, and the availability of the required resources. It also demands patience because it is a long-term project. As an intending space exploration CEO, you must have existing businesses because the project is expensive and the ROI is in the future. Meanwhile, it is a business you can still enter even when you haven't made billions of dollars. You only need to understand the industry well, build the right team, and look for investors. You can go into any business in the automobile industry as long as you know how to put up a business plan and convince your investor of the ROI of the business.

To start a space exploration company, you first have to identify a niche market within the space industry, develop a detailed business plan, secure funding, build a strong team of engineers and scientists, acquire necessary technological tools, comply with strict regulations, and focus on innovative solutions that will set you out in a competitive field.

We will continue to discuss the key aspects of the approach, including market research, technological development, securing launch-related technicalities, and identifying potential customers for your space services, whether they involve satellite deployment, space tourism, or scientific research. Aside from this, you would have to make a substantial amount of capital available, build highly skilled

engineers and scientists, gain access to advanced technology, obtain government permits and licenses, have a defined space exploration goal, strong connections with the “who is who” in the industry, and a deep understanding of international space law and regulations. We shall discuss briefly below the steps to take to establish a space exploration company:

Define Your Goal

Define and determine the primary goal of your proposed company. Go for what inspires you, such as satellite launches, space tourism, planetary exploration, space mining, or other related fields. Having a definite purpose will give you focus, and you will hit with precision.

Conduct Market Research

You must understand the market scope of the sector you are entering. Study the international space exploration market and its futuristic outlook. Study companies already making waves in the industry and analyze competitive comparisons. Visit big companies like SpaceX, Blue Origin, NASA, Virgin Galactic, Axiom Space, Rocket Lab, and others.

Identify Opportunities

Study the mission and interests of the existing space exploration companies. Identify an untapped opportunity and build on it. For instance, if others are going for space tourism, alien searches, cosmic discovery, and so on, go for something different, like asteroid mining, advanced satellite technology, space debris removal, and so on.

Understand Regulations

The legal and regulatory requirements for space exploration vary by country; however, they generally involve compliance with national laws, international treaties, and specific rules set by space agencies and regulatory bodies. They are:

International Space Treaties, Outer Space Treaty (1967), Rescue Agreement (1968), Liability Convention (1972), Registration Convention (1976), Moon Agreement (1979), International Regulatory Bodies, United Nations Office for Outer Space Affairs (UNOOSA), International Telecommunication Union (ITU),

Committee on the Peaceful Uses of Outer Space (COPUOS), Commercial Space Launch Act (1984), and National Aeronautics and Space Act (1958).

Others are the Space Resource Exploration and Utilization Act (2015), International Traffic in Arms Regulations (ITAR), Export Administration Regulations (EAR), Licensing and Permits, Environmental and Safety Regulations, Intellectual Property (IP) Protection, and Insurance and Liability. I would have stopped with these highlights, but I want to go more into detail because space is foreign to us. Understanding these regulations would heighten your curiosity about other sectors. I will discuss the key points regarding international space regulations. You can research this further, especially as it relates to your country.

International space regulation comprises laws, treaties, and agreements governing activities in outer space. These regulations are formed to ensure the peaceful and responsible use of space, prevent conflicts, and promote international cooperation. The following are some key components of international space regulation:

Outer Space Treaty (1967)

This is officially known as the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other celestial bodies. This treaty establishes that space is free for exploration and use by all countries, but prohibits national appropriation of outer space. This implies that no government can claim sovereignty over celestial bodies. This treaty prohibits the placement of nuclear weapons or other weapons of mass destruction in space. It requires states to be responsible for their respective national space activities, whether conducted by government or private entities.

Rescue agreement (1968)

This is formally known as the Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space. This agreement requires that states assist astronauts in distress and return them to their home country. It also mandates the return of space objects that land in a foreign territory to the launching state.

Liability Convention (1972)

This is also known as the Convention on International Liability for Damage Caused by Space Objects. This convention holds that launching states are entirely liable for any damages caused by their space objects on Earth or to aircraft in flight. The concerned state would swiftly and unconditionally provide for whatever it requires to correct the damage caused in space (fault-based liability).

Registration convention (1976)

Officially known as the Convention on Registration of Objects Launched into Outer Space. This convention requires states to maintain a national registry of objects launched into space and provide details to the United Nations. In other words, every object launched into space must be registered, documented, and submitted to the United Nations for global accountability of space objects.

Moon agreement (1984)

Formally known as the agreement governing the activities of states on the Moon and other celestial bodies. This agreement states that the Moon and its resources are the “common heritage of mankind”; it belongs to everyone. The deal prohibits commercial exploitation of lunar resources until an international regime is established. Although this has not been widely ratified, particularly by major spacefaring nations.

Other Relevant Agreements And Guidelines

ITU regulations

The International Telecommunication Union (ITU) regulates radio frequencies and orbital slots to prevent interference between satellites.

Space debris mitigation guidelines

The United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) developed these guidelines to address the growing issue of space debris.

Artemis Accords (2020)

This is a U.S.-led initiative that outlines principles for international cooperation in lunar exploration, including transparency, interoperability, and sustainable use of space resources.

Environmental And Safety Regulations

This regulation ensures that space exploration companies comply with international environmental and safety standards. The arm bodies of this regulation are:

The National Environmental Policy Act: This regulatory body oversees environmental impact assessments for space launches.

Occupational Safety and Health Administration: They ensure employees' safe working conditions.

Intellectual Property Protection

This body regulates intellectual properties like:

Patents: This protects innovative technologies like rocket designs, propulsion systems, and new inventions.

Trademarks: This protects against unauthorized use of a company's name, logo, and branding.

Trade secrets: This is to safeguard proprietary information.

Insurance And Liability

This is also a regulatory measure to ensure you can indemnify a victim in the event of trespass. The two key policy requirements are:

Third-party liability insurance

This is required to cover potential damages for launch and re-entry activities.

Payload insurance

This policy protects against loss or damage to satellites or other payloads.

The key regulatory measures and objectives are listed above, but there are others you can research as well. Space is still a frontier for mankind, with endless possibilities. All the regulatory measures discussed above are very important, and more shall be attended to as humans explore space. Although there are challenges to these

regulations are they are:

Commercialization

The rise of private space companies in space exploration has created new challenges in appropriating regulations. Unlike governments whose goals are discovery and services, private owners focus on RIO and can compromise regulations to pull through and maximize profit.

Commercial activities such as satellite launches, space tourism, resource extraction, and others may be difficult to regulate closely as the number of private owners increases.

Space debris

The increasing amount of space debris poses risks to operational satellites and future missions, necessitating stronger international cooperation and regulations. The dynamic nature of space debris is indeterminant, so no fixed regulation can bring elastic solutions.

Militarization

While the Outer Space Treaty prohibits weapons of mass destruction in space, it does not explicitly ban all military activities, leading to concerns about the weaponization of space. No regulation can effectively control aerial activities for the abuse of national defense and space weaponry.

Resource exploitation

The legal framework for mining asteroids, the Moon, or other interstellar bodies remains unclear. Debates over whether such activities should be governed by the “common heritage of mankind” principle or allow private ownership remain. Because of its unprecedented nature, a feasible regulation for space mining has yet to be established.

Space regulatory kingpins are:

United Nations Office for Outer Space Affairs: This body facilitates international cooperation and oversees the implementation of space treaties.

Committee on the peaceful uses of outer space: This UN body

develops international space law and policy.

International Astronautical Federation: They promote global collaboration in space activities.

The future of space regulation

Space activities expand daily. Consequently, there is a growing need for updated, more comprehensive regulations to address emerging issues such as space traffic management, the mining of lunar, asteroid, and other interstellar bodies, the protection of space environments, and space emergencies, especially those that threaten human existence. To achieve this, international cooperation among all states is critical to ensuring the sustenance and peaceful use of outer space.

Steps To Ensure Regulation Compliance

Consult legal experts: Consult and work with attorneys who specialize in space law and regulatory compliance.

Engage with regulatory agencies: Discover regulatory bodies like the FAA, FCC, NOAA (depending on your country), and other relevant agencies, and communicate with them as consistently as possible.

Stay update: Stay up to date by monitoring changes in laws, regulations, and international treaties.

Document everything: Provide a logbook for recording and documenting all regulatory policies, from international treaties to licenses, permits, compliance measures, and penalties. This will guide you; you can always refer to it. Take your time and understand all regulatory bodies and their respective roles. Consult your legal team and experts in space regulations; they will guide you further. Avoid violating any regulations, as it might jeopardize your operation or bring it to a halt. The key points you must understand about space exploration regulations are listed above. Let's continue with our topic: building a space exploration company. The next subtopic is building a team, and it is as follows:

Build An Experienced Team

Building a space exploration is not something one can approach with kid's gloves; you must be prepared and give it all it requires. Building a

formidable team that will mount every department effectively is one key requirement. We have discussed all the necessary departments and the team of experts that make up each department. To build an effective team, you would need to recruit on-merit professionals in engineering, science, aerospace technology, robotics and propulsion systems, and software development.

In addition, hire experienced team leaders in business development, technology, and operations. For training, bring in advisors and industry experts, such as former astronauts, renowned space exploration CEOs, and academic advisors. Your choice of team will determine your success and downfall in this business. This is why you must not recruit your team in haste. Instead, consult a specialist firm that will source qualified candidates for each unit of operation.

Source For Funds

This stage is very key because it determines the outcome of everything. As you may know, building a space exploration company is highly capital-intensive. However, you can surmount any financial hurdle as long as you follow all the principles written in the book, especially as it concerns fundraising. Start by costing everything you need to set up this company; estimate the cost for everything, from office renting to equipment acquisition, staff, machine building, operations, and so on. Having detailed costs for everything will guide you in your fund sourcing, budgeting, and projections.

Having gotten an idea of the financial costs to start, proceed with sourcing funds. Approach investors like venture capitalists, angel investors, and private equity firms.

Develop a business plan that includes an executive summary, market analysis, product/service line, operational plan, projected income, and ROI. Ensure your business plan is comprehensive and irresistibly head-turning to potential investors. You can also consider other funding sources, such as a bank loan, government grants, partnerships (e.g., with the government, universities, or private companies), crowdfunding, and other options. You can refer to the chapter we discussed in detail on how to raise funds for a business.

Technology Research And Development

Space exploration requires constant technological innovation.

Therefore, you must base your incubation camp on research and development. Build a department for this and monitor its development daily. Discover challenges and create solutions. For example, Elon was concerned about building a reusable booster, which led to the development of robotic arm technology to solve the problem. There are so many space exploration limitations that you must research and work out means to solve, including limitations like rocket or space machine speed, reusability, accuracy, communication, advanced propulsion systems, space habitation, and so on.

Assemble a team of researchers who are hungry and passionate about technological development. Identify a need and be challenged to ensure that a solution is provided.

Infrastructure

At this point, you have to make all manufacturing facilities available for designing and assembling spacecraft, satellites, and other equipment. We have discussed different types of equipment for manufacturing land vehicles and aircraft, and the same equipment can be used for rocket manufacturing. Meanwhile, you need special equipment, such as testing site facilities, for testing rockets, satellites, and other systems. You also need launch facilities for your launch site, just like Cape Canaveral and Baikonur Cosmodrome. There are so many other infrastructures you need to set up your plant. You can research them further online.

Production Process

This is the time for the main activities. Production processes in space rockets have a complex cycle comprising design, engineering, assembly, testing, launch preparation, and mission operations. Just as with land vehicle and aircraft manufacturing, rocket production involves specialized techniques such as machining, welding, additive manufacturing, and more.

Thus, whatever you have learned in aircraft manufacturing can be applied to rocket manufacturing. This is also true for unmanned robotic space machines; whatever we have discussed in robot manufacturing can also be applied to space robotic machines. For this reason, we will talk only about satellite manufacturing.

Satellite manufacturing combines aircraft, robotics, and Artificial

Intelligence (coding). Regardless, I still want to talk about it. I will give a sparky breakdown of satellite production because, unlike land vehicles and aircraft, it is not traditional or routine.

Space Satellite Manufacturing

Space satellite manufacturing is a highly complex and precise process that involves advanced engineering, rigorous testing, and meticulous assembly. Depending on their purpose, satellites have special features such as speed, geostationary orbit, low Earth orbit, communication relay, transponder, weather forecasting, navigation (GPS), broadcasting, scientific research, and Earth observation. Some satellites could be used for military purposes, such as early warning, signals intelligence, and weapon delivery. Except for passive satellites, most satellites have an electricity generation system for onboard equipment, such as solar panels or radioisotope thermoelectric generators (RTGs). So, the production processes are tied to the features that the satellite will carry. We shall discuss the traditional processes below.

Definition

Analyse critically what you want to achieve with the satellite, your target market, or what a client wants. It could be for Earth observation, communication, or scientific research, just as it may be. However, you should go for a less demanding version and gradually build an advanced one.

Design

Once you have determined the type of satellite to manufacture, you will be guided in your design, including the size, weight, power, and operational lifespan. The design stage also guides you regarding structure, subsystems, and payload. The design stage prototypes everything you need to build on the satellite and provides a pathway window. You can hire a satellite design specialist if you don't have an in-house team for this.

Subsystem development: The next step is to develop the subsystem components after design. This implies that you have to take it one step at a time, starting from the minor to the complex, or from the complex to the minor; it all depends on your level of preparation and

priority.

First, the payload is developed as the primary instrument or equipment, including cameras, sensors, communication antennas, and other components. After this, the bus is set up, and the satellite's main body is built, which houses all subsystems and provides structural support. Then, work on the power system, developing solar panels and batteries to generate and store electrical power. After the power system, work on the propulsion system; build the thrusters or engines for orbital adjustments and station-keeping. Then the thermal control system is set up, and a system that regulates temperature, such as a heater, radiator, and insulation, is installed.

Having done this, proceed to build the communication system and develop the antennas and transmitters for sending and receiving data. Lastly, the attitude control system will be built, and the gyroscopes, reaction wheels, and sensors will be designed to maintain the satellite's orientation.

Component Manufacturing

Once all necessary materials are available, it is time to process and mold them into the required shape, then assemble them according to the designed prototype. The best materials for satellite construction are lightweight and durable, such as aluminum, titanium, and advanced composites. During machining, fabricate all components with high precision to ensure they meet strict tolerances and are free of space hazards. Then, manufacture and test the circuit boards, processors, and other electronic components.

Integration and assembly of the frame and subsystems, mounting the payload onto the satellite bus, connecting all electrical and data systems, and then conducting incremental tests to ensure each component functions properly. Carry out comprehensive testing and validation on the following:

Environmental: At this point, simulate space conditions, vacuum, extreme temperatures, and radiation, to ensure the satellite can withstand harsh environmental conditions in space.

Vibration: The vibration test is essential because it ensures that the satellite can withstand the vibrations and shocks during launch.

Thermal: Verify the thermal control system's performance.

General functionality: Test all systems to ensure that they operate

as intended.

End-to-end: Simulate the entire mission to validate the project's readiness.

Launch Preparation

After building, testing, and other related activities, it is time to prepare it for launch. It all depends on the purpose. You could have built it for a private client or the government.

Whatever the case, it is still the same procedure. First, safely transport the satellite to the launch site. Then, integrate it with a launch vehicle by mounting the satellite onto the rocket's payload adapter, from which you would conduct pre-launch tests and inspections.

Post-Launch Operation

Here, the satellite is released and deployed into its intended orbit. Then follows the commissioning, which involves activating and calibrating all the systems. After this comes the mission operation, which involves collecting and transmitting data as projected.

The above are just abstract approaches to satellite building; they are sometimes broader than this. However, it is a challenging project, as it requires precision, reliability, and high cost and time, depending on the mission's complexity.

Types Of Satellites

Communication satellite: This provides TV, internet, and phone services. Examples are Intelsat, Starlink, and others.

Earth observation satellites: These monitor the weather, climate, and land use. Examples are Landsat, Sentinel, and others.

Scientific satellite: This type of satellite is used to conduct space research. Examples are the Hubble Space Telescope and the James Webb Space Telescope.

Navigation satellite: This enables GPS and global positioning. Examples are GPS, Galileo, and others.

Conclusion

Space satellite manufacturing is a collaborative effort involving engineers, scientists, and technicians from various disciplines. These

professionals ensure that the final output can withstand the rigors of space and accomplish its mission objectives.

How A Space Rocket Is Launched

Launching a space rocket is complex and requires meticulously planned operations in multiple stages. Below are the key steps involved in a space rocket launch: It all depends on the mission's purpose; for instance, if the rocket is for satellite deployment, a crewed mission, planetary exploration, etc. This will guide you in choosing the appropriate launch base after determining the payload weight, destination, and mission requirements.

Then, we will work on the trajectory by calculating the flight path, including launch windows, orbital insertion, and potential maneuvers. After this, we will integrate the payload—satellites, spacecraft, or crew modules into the rocket. The next step is transporting the rocket to the launch pad using specialized vehicles, such as crawler-transporters. Set up the launch pad, secure the rocket on the pad, and connect it to ground support systems such as fuel lines, power, and communication systems. Load the rocket with liquid oxygen, hydrogen, or kerosene propellants and pressurize the tanks. Finally, a final system check, including avionics, engines, and communication systems, is performed.

Countdown and launch

Having made everything ready, initiate the countdown sequence, which is usually hours or minutes before launch. This season's count is to synchronize all systems for a perfect takeoff. While on the count, depending on the duration of the count, at the tail count, start the rocket's engines and ensure that they reach full thrust. Lift off by releasing the rocket from the launch pad, thereby allowing it to ascend. During the initial ascent, the rocket thrusts through the atmosphere, overcoming both gravity and aerodynamic drag with great force and combustion.

Separation and flight

After the rocket has taken off, the first-stage engines burn until their fuel is exhausted, then they detach from the rocket. When these engines, whose primary function is for takeoff, burn out, the

second-stage engines ignite and continue the ascent. If applicable, the payload fairing jettisons once the rocket reaches space, and this stage places the payload into the desired orbit or trajectory. After this stage, the payload (satellite or spacecraft) is released from the rocket's upper stage. Then, the payload's systems are activated, and it begins its missions, such as communication, Earth observation, or deep-space exploration. During post-launch activities, unused stages are either deorbited to burn up in the atmosphere or directed into a "graveyard orbit." At this stage, the core focus is on the payload's performance and mission control activities, including making necessary adjustments and collecting and analyzing data from launch and the mission for future improvements.

Key Rocket Launch Terminologies

Propulsion systems: Engines and fuel systems that provide thrust.

Guidance and navigation: These systems control the rocket's trajectory.

Telemetry: Communication systems transmit data between the rocket and ground control.

Thermal protection: These are heat shields to protect the rocket during atmospheric re-entry when applicable.

Notable Rockets For Inspiration

Many rockets have been sent into space for different purposes. They can be a great source of inspiration and guide you on how to approach your own project. Study the technology behind the following rockets and grasp ideas from them:

Falcon 9: Made by SpaceX and technologically lauded for its reusable feature after the first stage, for cost efficiency.

Saturn V: This historic NASA rocket was used for Apollo missions to the Moon.

Soyuz: Made by Roscosmos, Soyuz is a reliable workhorse for crewed and uncrewed missions.

There are so many other technologically incredible space machines that you can study and build upon.

Potential Challenges In Rocket Launch

Just like in everything, a rocket launch comes with expected and

unexpected challenges that, in the worst cases, make a mission unsuccessful. Below are the common challenges faced during a rocket launch:

Gravity and drag: A rocket always requires turn-key technology to overcome the Earth's gravity and atmospheric resistance immediately after launch.

Precision: A rocket must achieve an exact trajectory and orbital parameters in space with strict and eagle precision. Achieving this is usually a huge challenge, as a shortcoming can halt the mission.

Safety: Safety is always a top priority, and safety measures are continually deployed to ensure that, if applicable, the crew is protected and that potential risks to the public are minimized.

Cost: The cost of launching a satellite, as well as development, manufacturing, and launch operations, is staggering.

A rocket launch represents the pinnacle of human engineering and technological advancement, which enables space exploration, scientific discovery, and other technological advancements.

The Lifestyle Of A Space Machine In Orbit

The journey of a space machine (a spacecraft, satellite, or probe) in transit involves several critical steps: launch, monitoring, reaching its destination, and exploration. We shall discuss this transition briefly below.

Launch And Initial Ascent

Liftoff: A space machine's first journey begins when it is lifted off the Earth with a booster. The space machine is launched aboard a rocket, which provides the initial thrust to escape the Earth's gravity.

Atmospheric exit: After lifting off, the rocket ascends through the Earth's atmosphere, overcoming aerodynamic drag and gravity.

Separation stage: During this transition, the rocket's stages are jettisoned as their fuel is depleted, which automatically causes the upper stage to take over.

Orbital Insertion

Parking orbit

This is a technical and deliberate exercise where a space machine is

placed into a temporary low Earth orbit (LEO) to allow for systems checks and trajectory adjustments.

Orbital maneuvering

This occurs when a space machine's destination is beyond Earth's orbit. The spacecraft's engines fire up to achieve the necessary transplanetary or translunar injection velocity.

Transit Phase

Cruise phase

The cruise phase allows a space machine to travel through space amid a pre-calculated trajectory, often requiring minimal propulsion.

Trajectory corrections

These are mid-course corrections made using thrusters to ensure the spacecraft stays on the correct path.

Communication

During this transit phase, the spacecraft maintains constant contact with Earth via a deep-space communication network such as NASA's Deep Space Network.

Planetary Approach

Gravity assist

This method may or may not be used. In some missions, the gravity of a planet or Moon slingshots the spacecraft, increasing its speed or altering its trajectory.

Deceleration

When the spacecraft reaches its destination, which could be a planet or a Moon, it fires its engines to slow down and enter orbit or prepare for landing.

Orbital Landing

Orbital insertion

Just as with the deceleration method, during orbital insertion, if the mission is to a planet or Moon, the spacecraft fires its engines to enter a stable orbit around the target body and then lands.

Landing

For lander or rover missions, the spacecraft descends to the surface using retrorockets, parachutes, or other landing systems. Meanwhile, there are space machines that never landed; they keep journeying into space for exploration. Examples are Voyager 1 and 2, the James Webb Space Telescope, and so on.

Mission Operations

Deployment: When the mission involves a rover or probe, it is deployed to the surface or into the atmosphere for findings.

Data collection: After a successful landing or deployment, the spacecraft collects scientific data, such as images, atmospheric readings, or soil samples.

Transmission: Here, scientists and engineers transmit samples and data back to the Earth for analysis.

Extended Missions

Exploration

The spacecraft may continue to explore its target, such as roving across a planetary surface or orbiting to map the terrain. Sometimes, a spacecraft could shuttle multiple missions while in space.

Sample return

The collected samples are being returned to Earth for detailed analysis.

Examples Of Space Machine Missions

Voyager probes

Travelled through the solar system and beyond, studying outer planets and interstellar space.

Mars rovers

Curiosity and Perseverance landed on Mars to explore its surface and search for signs of life.

New Horizons

Flew by Pluto and the Kuiper Belt, providing detailed images and data.

Cassini-Huygens

Orbited Saturn and landed on its Moon, Titan, studying the planet and its moons.

In chapter two, we discussed these spacecraft and their missions in detail. You can page back to refresh your understanding of them.

Challenges In Space Transit

Distance: Traveling vast distances requires precise navigation and long-duration systems.

Radiation: Spacecraft are exposed to harsh weather, and cosmic radiation is one of the factors.

Communication delays: As distance increases, communication with Earth becomes slower, thereby requiring autonomous systems.

Thermal management: Extreme temperatures in space necessitate the application of advanced thermal control systems.

System malfunction: Regrettably, some spacecrafts malfunction in transit, and this is more often the result of mission loss. The journey of a space machine into space is a testament to human ingenuity and curiosity, enabling exploration and discovery across the solar system and beyond.

How To Communicate With A Space Machine In Transit

Communicating with a space machine, such as a spacecraft, satellite, or probe in transit, is critical to space missions. It involves transmitting commands, receiving data, and ensuring the spacecraft remains on its intended trajectory. The following is an overview of the process and technologies used to communicate with space machines in transit:

Ground-Based Communication Systems

Deep space network

This is a sophisticated global network of large antennas in California (USA), Spain, and Australia. Operated by NASA, the DSN provides continuous communication with spacecraft across the solar system.

Other Networks

Agencies like ESA (European Space Agency) and Roscosmos (Russia) operate their deep-space communication networks, and so do others.

Communication Process

Uplink: These ground stations use high-frequency radio waves to send commands and instructions to the spacecraft.

Downlink: This is a process by which a spacecraft transmits data, such as telemetry, images, and scientific measurements, back to Earth.

Two-way communication: This system ensures real-time monitoring and control of the spacecraft.

Key Space Communication Technologies

Antennas

Antennas send and receive signals on both ground-based missions and spacecraft. A high-gain antenna is a large directional antenna used on spacecraft for long-distance communication. A low-gain antenna is smaller, omnidirectional, and used for shorter-range communication.

Transmitter and receiver

This device encodes and decodes signals for transmission and reception.

Modulation and encoding

These techniques ensure that data is transmitted accurately and efficiently over long distances.

Steps To Communicate With A Space Machine

Tracking: The ground stations use radar and telemetry data to track the spacecraft's position.

Signal transmission: Signals are transmitted and received when radio waves send commands from the ground station to the spacecraft.

Data reception: Here, the spacecraft receives the commands, executes them, and then sends back data to the ground team.

Data processing: At this stage, the ground stations process the received data and relay it to mission control for analysis.

Autonomous System

Onboard computer : Some spacecraft are equipped with computers to perform tasks autonomously, especially during communication blackouts.

Pre-programmed command: Some commands are often uploaded in advance to handle routine operations or emergencies.

Examples Of Space Communication

Voyager probes

They communicate with Earth from interstellar space using the DSN.

Mars rovers

Use orbiters like the Mars Reconnaissance Orbiter as relays to send data to Earth.

James Webb Space Telescope

Webb transmits scientific data from its orbit around the Sun-Earth L2 point.

Challenges In Space Communication

Distance: As the spacecraft travels farther from Earth, signals weaken, requiring powerful antennas and sensitive receivers.

Signal delay: Communication delay increases with distance; for instance, signals take about 20 minutes to travel between Earth and Mars.

Interference: Cosmic radiation and other sources of noise disrupt

signals.

Power constraints: Spacecraft have limited power, so communication systems degrade when energy efficiency is low.

Future Communication Technologies

Laser communication

This system uses lasers rather than radio waves for faster, more efficient data transmission. NASA's Laser Communications Relay Demonstration is an example.

Interplanetary internet

This is a method for developing protocols for seamless communication across the solar system, or for planting internet satellites across the planets and beyond to build an efficient communication network. Effective communication with spacecraft in transit is essential for mission success, enabling real-time control, data collection, and scientific discovery across vast distances.

Conclusion On Building A Space Exploration Company

The space industry is one of the most exciting and rapidly evolving sectors, offering immense opportunities for innovation, scientific discovery, and commercial growth.

Establishing a space exploration company is a monumental challenge, but with the right vision, strategy, and execution, it can become a reality. Today, the future of space exploration is no longer limited to governments; private companies like SpaceX, Blue Origin, and Rocket Lab have proven that ambitious ventures can succeed. By combining bold vision with disciplined execution, your space exploration company could play a pivotal role in humanity's next giant leap. Space exploration has begun, and the future focuses on it. To put it differently, space exploration is the future of human adventure. Its market scope is huge and futuristic as far as humans can live on Earth. I am interested in space exploration. As a matter of fact, I have registered a domain name for this purpose. Of course, if Elon, Bezos, and others can venture into this and succeed, why can't I or you? Therefore, you can research this more and dare to achieve it.

Maritime Manufacturing

Building a maritime manufacturing company—whether focused on shipbuilding, marine equipment, offshore structures, or underwater technology—requires a mix of engineering expertise, industry knowledge, regulatory compliance, and strong business strategy. Below, I shall take you through a step-by-step guide to building a successful maritime manufacturing company.

Define business model

The maritime industry is vast; therefore, specialization is crucial. You can do many things under the maritime company, so choosing the one that inspires you will be a good approach. You could go for any of the following:

Shipbuilding: This includes commercial vessels, luxury yachts, naval ships, and boats.

Marine components: You could go into the manufacturing of components for fish, such as propellers, engines, navigation systems, sonar, and so on.

Offshore structures: You can specialize in manufacturing offshore structures, such as oil rigs, wind turbines, floating docks, and more.

Subsea technology: You may choose to work in subsea technology, such as ROVs, underwater drones, pipelines, etcetera.

Eco-friendly solutions: This is another sector in which you can specialize. Examples include electric boats, hydrogen-powered ships, and anti-fouling coatings.

You may pursue any of the above or all of them concurrently, depending on your vision and scope. Meanwhile, for the sake of this topic, we will discuss only how to build a maritime manufacturing company.

Determine Your Client

Determine who your client is; this will guide you in getting started smartly. Determine if your client is:

Your company: This depends on your goal; you may choose to manufacture and still use the product for another service. For instance, you may build a ship and use it for a transportation business under your company.

Business-to-Business: This is when you manufacture and supply to

shipyards, oil companies, and private establishments.

Business-to-Government: This is when your target client is the government for defense contracts, Coast Guard vessels, and other naval vessels.

Direct-to-Consumer: This is when you manufacture and sell directly to individual vessels, such as luxury yachts, fishing boats, and recreational boats.

Carry Out Market Research

Product demand analysis

Find out who needs your product. Determine the product demand ratio, which could come from shipping companies, militaries, offshore energy firms, private companies, or individuals.

Competitor benchmarking

Study the industry kingpins in detail and determine whether to operate comparatively with them or outperform them. Today, the key players in maritime manufacturing are Fincantieri, Hyundai Heavy Industries, Damen Shipyards, and others.

Regulation

We discussed regulations in space exploration, and I said that they apply to other sectors, including maritime manufacturing companies. Anyway, all regulatory bodies have the same regulatory structure as discussed under space exploration companies. Meanwhile, the popular maritime regulatory bodies, the International Maritime Organization (IMO) and Safety of Life at Sea (SOLAS), and other local maritime laws. You must understand regulations and laws well because they guide your scope and limits.

Supply chain

Determine the availability of raw materials such as steel, composites, and electronics, and ensure they are readily available and at the best prices. I have previously discussed in detail how to raise funds to start a project, as well as the regulations and departments involved. Thus, we won't discuss the above here. You can page back for a better understanding.

Setup Facilities

Location

Of course, you must choose a location near deep-water ports for easy transport and testing.

Shipyard requirements

Make the following available: dry docks and slipways for vessel construction, heavy cranes, welding stations, CNC machining, ROV testing pools, and subsea equipment. Also, make digital tools such as CAD/CAM software, AI-driven design optimization, and 3D printing for prototypes available. The equipment to set up is limited to the type of project and the scope of specialization. Regardless, make an effort to ensure that you have acquired all necessary products. It will make your production processes smooth.

Build Your Team

Hire an experienced and specialized team to work with; hire:

Architects: For vessel design & hydrodynamics.

Marine engineers: For propulsion and electrical systems.

Welding/Fabrication specialists: For steel, aluminum, and composite work.

Supply chain managers: For sourcing of materials globally.

Regulatory/Compliance experts: For IMO, SOLAS, and EPA rules.

Building Stage

The maritime industry is vast and segmented. It all depends on what you want; you could choose to specialize or go into manufacturing, any type. The following are types of vessels:

Cruise ships. Ship. Submarine, Canoe, Ferry, Speedboat, Boat, Fishing boat, Yacht, Barge, Houseboat, Jet ski, Tugboat, Freighter, Hovercraft, Liner, Tanker, and Private vessels.

You may either manufacture one of the above or all of them. Well, below are the basic approaches in production processes:

Material selection

Start by selecting and making available all required materials, including steel, aluminum, mechanical and electrical components,

and other composites such as carbon fiber, for high-performance vessels. Basic raw materials are:

Steel: This is the commonest material used due to its strength and durability, especially for big ships and boats.

Aluminum: Often used for smaller vessels where weight reduction is important.

Fiberglass is regularly used for smaller boats due to its ease of molding and lighter weight.

Wood: Historically used for boat building, it is still used in some smaller craft today, especially for furniture.

Production Process

Typically, ships and boats are built by constructing large sections or “blocks” of the hull separately, often upside down in a dry dock, then lifting and welding them together to form the complete structure; this method is called “block construction” and involves detailed design plans, steel cutting, panel fabrication, and assembly on the slipway before final outfitting and launching. Below are the basic steps in the production processes:

Cutting/shaping: Laser/plasma cutting application.

Welding/assembly: Automated welding robots for precision.

Panel fabrication: Here, the cut steel plates are formed and welded into smaller sections called panels.

Block assembly: These panels are assembled into larger prefabricated sections (blocks) that represent portions of the hull or superstructure.

Block erection: Cranes lift the prefabricated blocks and position them on the slipway to be welded together, forming the main hull structure.

Outfitting: Electrical, plumbing, navigation systems.

Mechanical: Outsourced or in-house (same production process as land-vehicle manufacturing).

Painting: Robotic application.

Furniture/Facilities: Outsourced or in-house.

Testing

Testing the vessels to determine performance is necessary, depending on the type of vessel you are building. There are many maritime

vessel testing methods, including dynamic stability tests, endurance and maneuvering trials, seakeeping assessments, non-destructive testing, hydrodynamics, and so on. These are all crucial to ensure safety, performance, and compliance.

Sales, Marketing, And Distribution

In a previous chapter, we discussed sales and marketing in detail. Meanwhile, most sales of maritime products are preorders. However, in the presence of competition, getting these preorder clients becomes a marketing strategy.

To achieve this, try to attend maritime expos such as SMM Hamburg, Nor-Shipping, Posidonia, and others, depending on your country and international affiliations. Reach out to private companies and individuals.

Future Growth And Innovation

Despite its ancient origins, maritime technology is futuristic and full of incredible innovations. Currently, maritime innovation is advancing toward autonomous ships, AI-driven navigation and unmanned vessels, green shipping, hydrogen/ammonia-powered engines, and wind-assisted propulsion. Offshore wind expansion is also advancing, with the manufacturing of floating wind turbine platforms. You have to research these innovations further and build on them. If possible, invent something smarter, and you will be sought after.

Building a maritime manufacturing company is complex but highly rewarding, considering the growing demand for shipping, offshore energy, and eco-friendly marine technology. By focusing on a clear niche, securing strong funding, complying with regulations, and investing in skilled talent, your company can become a key player in the industry. More detailed information about owning and managing a maritime manufacturing company is available. Of course, I can't exhaust everything in this book. All I have done is give you step-by-step guidelines for further research and understanding everything therein. You can also enroll in our MACEOS Academy for in-depth studies.

Automotive Lubricants

I will go into more detail on this topic because of its importance and business interest.

Automobile lubricants reduce friction, prevent wear, dissipate heat, and protect engine components from corrosion. The right lubricant ensures smooth operation, fuel efficiency, and vehicle longevity. I will give a summary of how automobile lubricants are manufactured towards the end of the topic. Below are the types of automobile lubricants:

Engine Oil

Function

Engine oil lubricates all the essential engine parts, such as the pistons, crankshaft, and camshaft. It also reduces friction, cools the system, and cleans up.

Types Of Engine Oil

Synthetic oil: This type of oil is chemically engineered for high performance, better viscosity, and longer life.

Synthetic blend: This mixture of synthetic and conventional oils is believed to have better protection than mineral oil.

High-mileage oil: This is made specifically for older engines, usually from 75,000 miles up, and it contains additives that reduce leaks and wear.

Viscosity Grades

Viscosity indicates oil flow characteristics at various temperatures, such as 5W-30, 10W-40, and so on.

Transmission Fluid

Function: To lubricate the gears and transmission system, reducing friction and cooling the transmission components. Below are the types of transmission fluid:

Automatic transmission fluid: This is specially formulated for automatic transmissions.

Manual transmission fluid: Designed for manual gearboxes, it's typically thicker than ATF.

CVT fluid: This fluid is used for continuously variable transmissions (CVTs) and offers unique lubrication properties.

Additives: This may include detergents, antioxidants, and anti-foam agents.

Differential Fluid

Function: The differential fluid lubricates the differential gears, which distribute power from the engine to the wheels. The following are the types of differential fluid:

Hypoid gear oil: This is often used in rear-wheel-drive vehicles to handle the high friction and heat generated by the differential.

Synthetic differential fluid: This is high-performance and is often used in high-performance or off-road vehicles.

Viscosity: The differential fluid typically comes in higher viscosities, such as 75W-90 and 85W-140

Power Steering Fluid

Function: Power steering fluid lubricates the power steering components, making steering easier.

Types: Typically available in mineral and synthetic varieties, some may be specific to a given vehicle's make and model. These help maintain hydraulic pressure for smooth steering, particularly in power steering systems.

Brake Fluid

Purpose

The brake fluid transmits force in the braking system, allowing the brakes to function efficiently. Below are the types of brake fluid:

DOT Fluid

Named after the Department of Transportation and numbered after its boiling point, which includes DOT3, DOT4, DOT5, and DOT5.1, each having different moisture absorption properties and boiling points.

Mineral oil brake fluid

This is used in some European vehicles, such as certain Citroën and

Peugeot models.

Silicone brake fluid

This fluid is known for its resistance to moisture and higher boiling point, but may not be compatible with all systems. It protects against corrosion, prevents air bubbles, and ensures reliable braking performance.

Coolant

Function

It regulates engine temperature, preventing overheating in hot weather and freezing in cold weather. Types of coolant are:

Inorganic additive technology: A traditional green coolant is typically used in older vehicles.

Organic acid technology: This is usually orange or pink and is used in modern vehicles with longer change intervals.

Hybrid organic acid technology: This technology combines improved performance and extended life, heat transfer, corrosion prevention in the engine and cooling system, and protection of seals and hoses.

Grease

Function

Grease lubricates parts that experience constant friction, such as wheel bearings, suspension components, and steering joints. Grease also prevents wear, rust, and heat build-up in moving parts. Below are the types of grease:

Lithium-based grease: This grease is common for general automotive use.

Calcium-based grease: This grease is usually used in water-resistant applications, like marine vehicles.

Synthetic grease: Often used in high-performance vehicles, providing better resistance to heat and longer-lasting lubrication.

Clutch fluid

Function

Used in vehicles with manual transmissions to operate the clutch, enabling smooth gear shifts. Clutch fluid allows the clutch plates to disengage and engage properly. There are two types of clutch fluid, and they are:

Mineral oil-based clutch fluid: This oil is used in some vehicles with hydraulic clutch systems.

DOT fluid: DOT brake fluid is used for the clutch hydraulic system in some systems.

Windshield Washer Fluid

Function

Washer fluid keeps the windshield clean and free from obstructions to the driver's visibility. The fluid helps to remove dirt, debris, and bugs from the windshield, improving visibility.

Summer washer fluid: This type is water-based with minimal additives.

Winter washer fluid: This includes antifreeze properties that prevent freezing at lower temperatures.

Air-Conditioning Refrigerant

Function: Used in a vehicle's air-conditioner system to facilitate heat exchange and cooling by cycling refrigerant through the evaporator and condenser. Below are the types of refrigerants:

R-134a: This is the most common refrigerant used in vehicles made before 2020.

R-1234yf: More recent model vehicles use this newer refrigerant with a lower global warming potential.

Fuel Additives

Function

Improve fuel quality and prevent build-up in fuel injectors and fuel lines. It cleans the fuel system, improves performance, and prevents engine knocking. Examples are:

Fuel injector cleaners

This is used to clean deposits from injectors, improving fuel efficiency. Octane boosters are used to increase the fuel's rating, reducing engine knocking.

Summary

These lubricants are essential for maintaining a vehicle's optimal performance and longevity. Using the correct type and regularly changing these fluids per the manufacturer's recommendations is crucial for vehicle maintenance. Meanwhile, the lubricants discussed above can also be used on aircraft and ships; only the specification is required.

Automotive Lubricant Production

Automotive lubricants are produced through a carefully controlled process that blends refined base oils with advanced chemical additives to meet the specific demands of engines and machinery across land, air, and sea.

Base oil refining

Manufacturing begins with refining crude oil or producing synthetic base oils through chemical processes such as hydrocracking or gas-to-liquid (GTL) synthesis. These base oils provide the foundation for engine oils, transmission fluids, and hydraulic lubricants. Aircraft and marine applications often require higher-purity synthetic oils due to extreme temperature and pressure conditions.

Additive formulation

Special additives are incorporated to enhance performance. These include:

- Detergents and dispersants (keep engines clean)
- Anti-wear and friction modifiers
- Anti-oxidants and corrosion inhibitors
- Viscosity index improvers (stabilize the thickness across temperatures)
- Anti-foaming agents

Aircraft oils require additives that maintain stability under high altitude conditions, while marine oils include detergents that

neutralize fuel impurities and salt exposure.

Precision blending

Base oils and additives are blended in heated, computer-controlled mixing tanks. The blending process varies by lubricant type:

Car lubricants focus on balanced performance, fuel efficiency, and engine cleanliness.

Aircraft lubricants require exceptional thermal stability, low volatility, and strict aviation-grade purity.

Ship lubricants must handle slow-speed engines, heavy fuels, and corrosive environments.

Filtration and quality testing

The mixture is filtered to remove impurities and then tested for viscosity, oxidation resistance, volatility, and performance under simulated engine conditions. Aviation and marine lubricants undergo more rigorous international certification due to safety and regulatory demands.

Packaging and distribution

After passing quality checks, lubricants are packaged into drums, cans, and bulk containers, then distributed to automotive workshops, airlines, maritime fleets, and industrial users.

Automotive lubricants in cars, aircraft, and ships play a key role in ensuring engine protection, efficiency, and long-term reliability, and their manufacturing process reflects the high precision and engineering required for modern mobility.

Automotive Fuel

This is a broad topic that I want us to discuss in detail, as it will guide you should you decide to go into vehicle oil sales. Vehicles run on different types of fuels, each with unique properties, advantages, and applications. I will give a summary of how automotive fuels are manufactured towards the end of the topic. Below are the fuels used by vehicles:

Gasoline

Gasoline or Petrol is one of the most common fuels used in cars,

motorcycles, SUVs, and light trucks.

Octane Ratings

Regular: This is 87 octane, which is the standard for most cars.

Mid-grade: This is between 89 and 90 octanes; it performs better in some engines.

Premium: Premium is between 91 and 94 octanes, ideal for high-performance and luxury vehicles, including turbocharged and high-compression engines.

Advantage

Petrol is widely available, has a good energy density, and allows smooth engine operation.

Disadvantage

The major disadvantage of petrol is its higher emissions (CO_2 , NOx) and lower fuel efficiency compared with diesel.

Diesel

Diesel is used for trucks, buses, heavy machinery, SUVs, and cars. There are two major types of diesel, and they are as follows:

Ultra-low sulfur diesel: This type of diesel is the standard in most countries.

Biodiesel. Examples of this type of diesel include B5, B20, and B100, which are blends of vegetable oil and animal fat.

Advantage

Diesel has very good fuel efficiency, with a margin of 20-30% over gasoline. It also delivers higher torque, which is good for towing/hauling and helps prolong engine life.

Disadvantage

It has higher NOx emissions and is more expensive in some regions.

Compressed Natural Gas

CNG is a fuel primarily composed of methane, which is compressed to a fraction of its normal volume and stored in high-pressure tanks. It is a cleaner-burning alternative to gasoline and diesel. CNG is used

by buses, cars, fleet vehicles, and some modified cars.

Advantage: Compressed Natural Gas is cheaper than gasoline and diesel, lower in CO₂ emissions, and cleaner combustion.

Disadvantage : It has limited refueling stations, lower energy density, and requires heavy fuel tanks.

Liquefied Petroleum Gas

This is a flammable mixture of hydrocarbon gases, primarily propane and butane, that are liquefied under pressure. It is a common fuel source for cooking, heating, and various industrial applications. LPG is a by-product of natural gas processing and crude oil refining. It can be used in modified gasoline cars, taxis, forklifts, and other applications.

Advantage

LPG has lower emissions than gasoline, and it is cheaper than petrol and diesel.

Disadvantage

LPG is believed to reduce engine power by 10-15%, and it has fewer refueling stations.

Ethanol

This fuel blend consists of gasoline with a specified percentage of ethanol. It's primarily used as motor fuel and is often referred to as a biofuel additive. Common blends include E10, E15, E85, and E100. Ethanol is also used for Flex-fuel vehicles (FFVs).

Advantage

Ethanol is renewable, made from corn and sugarcane, and reduces reliance on fossil fuels.

Disadvantage

It has a lower energy density and is not compatible with most engines outside FFVs.

Hydrogen Fuel Cell

A hydrogen fuel cell is an electrochemical device that converts

hydrogen's chemical energy into electrical power, producing water and heat as by-products. It's a clean and efficient way to generate electricity, with potential for transportation, stationary power, and other applications.

Examples of hydrogen-powered car brands are the Toyota Mirai, Hyundai Nexo, Mercedes GLC, and Honda CR-V. Hydrogen reacts with oxygen to produce electricity, which in turn powers these vehicles.

Advantage

It has zero emissions, producing only H₂O vapor, and its refueling is fast.

Disadvantage

It has a high production cost and very few refueling stations.

Electric

A Battery Electric Vehicle (BEV), or a full-electric vehicle, uses electricity from an onboard battery pack to power one or more electric traction motors, providing propulsion. The electricity source is rechargeable lithium-ion batteries. Tesla, Nissan, BMW, BYD, Rivian, Ford, Hyundai, Mercedes, Porsche, Audi, and others are examples of automobile brands that have manufactured full-electric vehicles. This is a sign that automobile brands are going electric.

Advantage

Electric vehicles have zero emissions, low operating costs, and are noiseless while in use.

Disadvantage

It has a limited range, long charging times, and, over time, battery degradation.

Hybrid

A hybrid electric vehicle combines a gasoline engine with an electric motor to improve fuel efficiency and reduce emissions. There are three types of hybrid vehicles: hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and mild hybrid electric

vehicles (MHEVs), each with varying degrees of electrification and fuel efficiency.

MHEV: Provides mild assistance from an electric motor, primarily during acceleration. An example of MHEV is the Suzuki Ertiga.

HEV: This type of vehicle uses a larger battery and electric motor for more significant fuel savings and regenerative braking. A good example is the Toyota Prius.

PHEV: On the other hand, they have larger batteries and can be plugged in to charge, offering longer electric-only driving ranges. An example of a PHEV is the Chevrolet Volt.

Advantage

Hybrid cars have better fuel economy than pure gasoline cars and lower emissions.

Disadvantage

It has higher maintenance, and PHEV, for example, needs charging infrastructure.

Propane

Propane-Autogas is slightly different from LPG. It's a popular alternative fuel, often used by fleets, and is preferred for its cost savings, energy security, and environmental benefits.

Advantage: Propane burns cleanly and reduces engine wear.

Disadvantage: It has lower energy content and is unpopular.

Kerosene

PETROL, GAS, BIO FUEL, SOLAR.

Kerosene, which is also called Paraffin oil, is a flammable hydrocarbon liquid derived from petroleum. Although it is not commonly used in modern passenger vehicles, kerosene has specific applications in certain engines and regions, especially jet engines. Powers jet engines, such as turbofan and turbojet engines, commonly found in commercial airliners, cargo planes, and military jets, are fueled by kerosene. It is divided into two: Jet-A, the most commonly used fuel for commercial and civilian aircraft, and Jet-A1, a variant primarily used on international flights due to its lower freezing point of -47°C compared to Jet-A's -40°C .

Advantage

Kerosene is efficient for aviation uses due to its high energy density; it is cheaper than diesel, good for cold climates, and has safer storage than gasoline.

Disadvantage

Kerosene's key disadvantage is its low lubricity, which can damage modern petrol and diesel engines. It also has lower energy and higher sulfur content, producing harmful emissions. Furthermore, it is not optimized for cars as it may cause engine knocking or deposits.

Summary

Other future automobile fuels include biofuels (algae-based and synthetic), Solid-state batteries, solar, and others. All the fuels we have discussed above can be used for land vehicles, aviation, and maritime applications, which use specially modified fuels such as heavy fuel oil (HFO), very low sulfur fuel oil (VLSFO), marine diesel oil (MDO), and marine gas oil (MGO). Meanwhile, they are all by-products of all the fuels we have discussed above.

Automotive Fuel Production

Automotive fuels are produced through a complex refining process that converts crude oil into high-quality, engine-ready energy sources for land, air, and sea vehicles.

Crude oil extraction and distillation

Fuel production begins with crude oil extracted from underground reservoirs. At the refinery, the crude is heated in a distillation tower, where it separates into different components based on boiling points. This initial separation yields gasoline, diesel, kerosene, and heavier marine fractions.

Processing and conversion

To meet modern fuel standards, these fractions undergo additional refining processes:

Cracking: Breaks heavy molecules into lighter, more useful ones (e.g., gasoline and jet fuel).

Hydrotreating: Removes sulfur and impurities to reduce emissions.

Reforming: Enhances octane levels for high-performance engines. For aircraft, kerosene is further refined to produce Jet-A and Jet-A1, which require exceptional thermal stability and purity.

Blending to final specifications

Refiners mix various streams and additives to achieve specific performance characteristics:

Car fuels (gasoline and diesel): Formulated for clean combustion, engine efficiency, and low emissions.

Aviation fuels: Must meet strict international standards for freezing point, energy density, and safety.

Marine fuels: Such as marine diesel and heavy fuel oil (HFO), are blended to withstand long voyages and operate efficiently in large ship engines.

Quality control and testing

Each fuel type undergoes rigorous testing for viscosity, flash point, energy content, stability, and contamination. Aviation and marine fuels face more stringent testing due to safety and environmental regulations.

Storage and distribution

After certification, fuels are stored in tanks and transported through pipelines, tankers, and trucks to:

Filling stations (cars)

Airports (aircraft)

Ports and shipyards (marine vessels)

Automotive fuels, whether for cars, planes, or ships, are manufactured through highly controlled processes to ensure efficiency, safety, and environmental compliance, supporting global mobility across all sectors.

Parachute

As unpopular as the parachute may sound, it is classified under the automotive industry as a means of transportation and is highly in demand. My interest in parachutes and the need to discuss them in this book grew after I watched their role in returning NASA astronauts from the International Space Station aboard SpaceX's Crew Dragon

spacecraft. In March 2025, two sets of supersonic parachutes — drogue chutes for initial stabilization and main parachutes for a soft landing —were used to return NASA astronauts. This milestone achievement not only marked another success for Parachute since André-Jacques Garnerin's first successful jump in 1797, but also further defined its importance in the industry.

A parachute is a device that slows a person or object's descent through the atmosphere by creating air resistance. It is widely used in aviation, military operations, sports, and space exploration.

Parachute Manufacturing

This exercise seems insignificant because we are unfamiliar with parachutes, but, as I said, after discovering their importance and futuristic nature, I became interested. I need to open others' eyes to this. For example, I have talked about a future where space machines will blanket the atmosphere. In this civilization, parachute travel to the Earth will be a game. This is because a large spaceship cannot easily shuttle to Earth; consequently, parachute travel will be among the alternatives. Parachute manufacturing involves precision engineering, the use of high-strength materials, and rigorous testing to ensure safety and reliability. We shall discuss briefly how a Parachutist is manufactured so that it is familiar to us and also to those who may wish to enter the Parachutist business. Below are abstract processes in manufacturing a Parachute:

Design

As with others we have discussed, design is one of the foundations, and it is determined by the type of product you are manufacturing —in this case, the type of parachute you want to manufacture. Determine if it is a Parachute for skydiving, cargo, military, or space exploration.

Parachute design contributes to 60% of its production. Therefore, computer simulation is necessary for aerodynamic modeling to ensure optimal drag and stability. The prototype is then tested in wind tunnels.

Material

Parachutes are made from lightweight, durable, and tear-resistant

fabrics like Nylon (Ripstop), Kevlar/Aramid, Polyester/Silk, and Zero-Porosity Fabric, which is also used for ram-air parachutes.

Canopy cutting

This is all about the Parachute shape or body-building processes. It involves the use of lasers and CNC cutting, which is precision cutting into the panel using computer-guided machines. The panel shapes could be triangular gore for round parachutes and tapered for ram-air parachutes.

Sewing/assembly

This is simply the assembly stage that involves sewing and knitting materials. Industrial sewing machines are used to stitch panels together, and reinforced stitching is employed. These processes also include line attachment points, whereupon the suspension lines are anchored with bar tacks for ultra-strong stitches.

Suspension lines

These are made with braided nylon and Dyneema for high strength and low stretch. The length and number of suspension lines vary by parachute type; for instance, we have 9–30 lines for skydiving. Lines are hand-tied or spliced for maximum strength.

Harness/container system

The harness securely connects the skydiver (or for other purposes) to the parachute

system, distributing the forces of descent and deployment across the body. The harness is made of nylon webbing with padded shoulder/leg straps. It also serves as the base for the parachute container, ensuring that it is properly positioned and supported during the jump. Conversely, the container serves as a protective storage and deployment mechanism for the main and reserve parachutes, often with a 3-ring release system. An Automatic Activation Device (AAD) is also installed for emergency deployment. The AAD automatically deploys the reserve parachute when a skydiver cannot do so herself. It monitors the skydiver's altitude and rate of descent, and if a certain speed and altitude are reached without the main parachute being deployed, the AAD cuts the reserve container closing loop and

initiates the deployment of the reserve parachute.

Testing

Here is the tertiary stage of production. At this point, you would have to inspect everything you have done. Ensure that every stitch and line is checked for defects. Test the load capacity; for example, a Parachute canopy usually has a maximum weight capacity of 2–3 persons. There are other inspection measures you can carry out; it depends on the type of parachute.

Packaging

Depending on the type of parachute, it is carefully folded and packed by certified riggers.

How Parachute Works

The following are how Parachutes is operated:

Drag principle: When a Parachute is deployed, its large canopy catches air, increasing air resistance and slowing down the descent.

Freefall: In this type, a jumper exits the aircraft, accelerates due to gravity, and deploys the parachute for a safe landing.

Terminal velocity: Without a parachute, a skydiver would accelerate to 200 km/h; with a Parachute, this speed drops to as low as 20 km/h as soon as the parachute is deployed for a safe landing.

Deployment method

The deployment is usually done manually by pulling the ripcord, inflating, and performing a glide landing.

Types Of Parachutes

There are many types of Parachutes, including Round Parachutes, Ram-Air Parachutes, Rogallo Wing parachutes, Ribbon/Annular Parachutes, Skydiving Parachutes, Reserve Parachutes, Cargo Parachutes, Drogue Parachutes, Brake Parachutes, and others. You can research more about these to learn their uses and features.

Parachute Components

Canopy: The fabric part that catches air.

Suspension lines: Connect the canopy to the harness.

Harness: Straps securing the parachute to the user.

Deployment system: Ripcord, pilot chute, and Automatic Activation Device (AAD).

Vent holes: Allow controlled airflow for stability.

Uses Of Parachutes

Skydiving/BASE Jumping: Sport parachuting.

Military: Troop airdrops and cargo delivery.

Aviation safety: For emergency ejection seats (fighter jets).

Space missions: Landing capsules.

Sports/racing: Dragsters, drone recovery.

Conclusion

Parachutes have become vital to the automotive industry due to their unique roles and future applications. I envisage a future where we can use a smart parachute to return to Earth from deep space. Today, we are still celebrating Felix Baumgartner's record 39 km (24 mi) jump using a stabilization parachute, but it is just a close-range jump compared to the heights we can reach with a parachute in the near future.

Computer Manufacturing

The production of a computer is a complex and highly coordinated process that involves engineering design, semiconductor manufacturing, component assembly, software integration, and quality testing. It combines precision science, advanced materials, and global-scale production. The following are the five key production process stages:

Concept, Design, And Engineering.

Product Concept

Before any physical component is made, the following considerations must be determined and defined:

- The purpose of the computer (gaming, office use, servers, laptops, etc.)
- Performance goals (speed, memory, graphics power)
- Size, weight, battery life (for laptops)

- Target users and market price
- Hardware/Architecture Design

This stage requires specialists to design the following: The system architecture, Electrical pathways, Circuit boards (motherboard layout), Cooling systems, and Component compatibility. Meanwhile, software engineers plan the firmware and BIOS (basic input/output system), which will help the hardware communicate during startup.

Prototyping

Specialist engineers build prototype devices to test the Heat management, Battery performance, Processor speed, Durability, and Fault tolerance. Once these are tested and stable, the designs can proceed to manufacturing.

Semiconductor (Chip) Manufacturing

The heart of every computer is the microprocessor (CPU) or system-on-chip (SoC). Chip manufacturing is one of the most advanced industrial processes in the world. I will discuss chip manufacturing separately in full after sensor manufacturing.

Silicon wafer production

The process of producing computers starts with silicon, a chemical element and metalloid, extracted naturally from silica, found in sand and quartzite, through a high-temperature process that uses carbon to reduce silicon dioxide to pure silicon metal. This silicon is then refined for use in various products or further purified to produce single crystals for electronics. In computer production, silicon is purified and melted into a single crystal (ingot), which is then sliced into thin wafers.

Photolithography

This process prints microscopic circuits onto the silicon wafer: a wafer is coated with a light-sensitive material (photoresist), ultraviolet light projects circuit patterns through a mask onto the wafer, and chemical etching removes exposed areas, creating nanoscale transistors. This process is repeated several times to build multi-layered circuits.

Transistor formation

Modern chips contain billions of transistors. Transistor formation is one of the most critical steps in semiconductor manufacturing, where the tiny electronic switches power computers created on a silicon wafer. These tiny switches determine how fast and efficiently a computer can calculate. As discussed above, the process begins with preparing the silicon surface and depositing thin insulating layers, such as silicon dioxide. Photolithography is then used to map the transistor's layout by exposing specific areas of the wafer to ultraviolet light through a patterned mask.

Packaging

After slicing the wafer into individual chips, each chip is mounted on a small protective housing. Then metal connectors (pins) are added, after which the chip is tested for functionality.

Manufacturing Key Components

A computer is a system composed of several critical components, each produced separately before assembly. These key components include:

Motherboard

A multilayer circuit board that connects all parts. The process of manufacturing a motherboard is by etching copper pathways, soldering sockets and connectors, mounting chips and capacitors, and Quality-control testing.

Memory (RAM)

RAM modules store active processes, and they are manufactured through Semiconductor wafer processing, Packaging into RAM sticks, and Module testing.

Storage Drives (HDD/SSD)

This is a storage drive consisting of HDDs, which have spinning disks and magnetic read/write heads, and SSDs, which use flash memory chips and controllers, respectively.

Power Supply Unit (PSU)

This converts AC power from the wall into stable DC power for components.

Graphics Processing Unit (GPU)

GPU is made like CPUs, but it's specialized for visual computation.

Computer Components

There are so many components in a computer that are specific, components like:

Battery packs (lithium-ion cells)

Thin displays (LCD/LED panels)

Keyboard mechanisms

Touchpads

Lightweight casings (plastic, magnesium, or aluminum)

Assembly Of The Computer

Once components arrive at the assembly plant, the computer is built as follows:

Automated Assembly: This is done by robots and technicians, and they do the following:

Place the CPU onto the motherboard, install RAM, add SSD or hard drive, install cooling fans or heat pipes, connect power supply, Mount graphics cards (if applicable), and Route all cables.

Additional Assembly (laptop): Fit components inside slim chassis, install screen hinges

Assemble the keyboard and touchpad, insert the battery pack, close the bottom casing screws, and perform firmware Installation. Before the computer starts booting, ensure that it gets BIOS/UEFI firmware and Firmware for touchpads, keyboards, and the battery

Software Installation And Final Testing

Operating system installation comprises Windows, macOS, Linux, ChromeOS, or a custom OS, Drivers for hardware components, Pre-loaded applications, and Security features

Stress Testing and Quality Assurance

At this stage, the computer undergoes the following testing: Boot

tests, Temperature/heat stress tests, Graphic rendering tests, Battery life and charging tests (for laptops), and Connectivity tests (Wi-Fi, Bluetooth, ports). After these exercises, faulty units are either repaired or rejected.

Packaging And Distribution

After productions are certified, the computers are cleaned up, documentation and accessories are added, units are sealed, and products are shipped worldwide.

Sustainability/Circular Manufacturing (Modern Trend)

Reusability and environmental responsibility have become part of modern computer production. This is a modern trend in computer manufacturing that includes: using recycled plastics and metals, reducing energy use in chip factories, building modular designs for easier repair, and offering recycling programs for old devices.

Conclusion

The creation of a computer is a multi-layered, high-precision process that blends advanced engineering, semiconductor physics, global logistics, and strict quality control. From the microscopic transistors on a silicon chip to the final polished device, every step requires specialized knowledge, cutting-edge technology, and coordinated manufacturing.

Smartphone Manufacturing

A smartphone is one of the most complex devices ever mass-produced. Its creation involves advanced engineering, semiconductor manufacturing, global supply chains, precision assembly, and rigorous testing. The entire process can be grouped into six major stages, and they are as follows:

Concept Development/Product Design

Market research/product vision

Before you go into phone manufacturing, first, you have to define your target customers (youth, professionals, enterprise users), the features needed (camera quality, battery life, performance, AI

integration), price category (budget, mid-range, flagship), and so on. These considerations will determine the phone's size, the materials to be used, the camera setup, the hardware specifications, and the technology infusion.

Industrial/mechanical design

At this stage, your designers and engineers need to come in to create 3D models of the smartphone's body, including its shape, layout, thickness, and weight, as well as the material selection, such as aluminum, glass, plastic, ceramic, and others.

Hardware architecture

This stage requires electronics engineers to design the Motherboard layout, Component placement, Battery position, Cooling mechanisms, Antenna configuration, Camera system arrangement, and other technological infusions.

Software/user interface planning

Here, the software teams define the Operating system version (Android, iOS, HarmonyOS, etc.), UI customization, Security features, preloaded applications, and other relevant AI integrations. Once these procedures are approved, the smartphone's production moves to prototyping.

Semiconductor (Chip) Manufacturing

Of course, a smartphone is also a computer; just like in a computer, a smartphone depends on tiny semiconductor chips, including the CPU/SoC (the brain of the phone), GPU (graphics processing), Modem (4G/5G connectivity), Memory chips (RAM, ROM), and Image processors. These chips are manufactured using a highly sophisticated process.

Silicon wafer creation

Just as in a computer, chips are made of purified silicon extracted from sand. Silicon is melted, formed into cylindrical ingots, and sliced into thin wafers.

Photolithography

Here, a wafer is etched with microscopic circuit patterns using UV light, Photomasks, and Chemical developers. This process is repeated dozens of times, creating billions of tiny transistors.

Doping, etching/layering

At this stage, transistors are formed through Ion implantation, Thin-film deposition, and Metal interconnection layers. This is what makes the chip capable of performing calculations.

Chip packaging

Here, the wafer is cut into individual chips, each tested, encased in a protective package, and soldered onto substrates. When this process is finished, the chips are ready for various uses.

Manufacturing And Sourcing The Phone's Components

A smartphone has over 2,000 individual parts, sourced globally. I will summarily discuss key components as written below:

Display

Smartphone displays are usually OLED or LCD panels made from Glass substrates, Organic light-emitting materials, Backlights (for LCD), Touchscreen digitizers, and Protective layers (Gorilla Glass, Sapphire, etc.).

Camera

As you may know, a modern phone may have between 3 and 5 cameras, each with an image sensor, Lens modules, Focus motors, and a Stabilization system (OIS/EIS).

Battery

A phone battery is the life of the phone. Thus, the primary focus is on the performance and life of the battery, which is usually equipped with Lithium-ion or lithium-polymer cells, custom-shaped for each model, and infused with temperature sensors and power-management chips.

Motherboard

This is a highly compact circuit board containing a CPU / GPU/modem, Memory chips, an Audio codec, Power management ICs, an NFC coil, a Wi-Fi/Bluetooth module, and charging circuits.

Casing

Phone casing is a highly considerable component in phone manufacturing because it is the end-result of exterior designs. Phone casings are usually made of Aluminum alloy, Stainless steel, Glass, and Polycarbonate, with Buttons, Speakers, and Sensors. After the above-discussed stages, the following components are manufactured: Volume and power buttons, Proximity sensor, Gyroscope, Accelerometer, Fingerprint sensor, Microphones, and Speaker grills. Each component is produced by specialized factories.

Assembly Of The Smartphone

The assembly of smartphones typically takes place in high-tech facilities using both robots and human workers. Below are the types of smartphone assembly.

PCB assembly

This has to do with the motherboard, which is produced through Surface-mount technology (SMT), Solder paste application, High-speed pick-and-place machines, Reflow ovens, and Automated optical inspection. This creates the device's internal "brain."

Core unit assembly

The core unit assembly, which is usually done by experienced technicians, includes the chipset on the motherboard, RAM and storage, Power circuits, Connector ports, Cameras, Speakers, a Vibration motor, and Sensors.

Body assembly

The body assembly is a celebratory stage because it is a type that reveals the output of the production processes. The assembly processes include the Screen, which is fused to the frame with high-precision bonding machines, the Motherboard is then placed inside the frame, the Battery is installed and connected, the Camera

modules are aligned and sealed, the Antenna and SIM tray are added, and the Back cover is sealed (glued or screwed).

Software installation

Before closing the device and making it available for use, some sensitive software needs to be installed as follows: the bootloader is installed; the operating system is flashed; drivers for the camera, display, sensors, and battery are installed; security certifications and encryption are enabled; and regional settings and apps are added.

Testing, Quality Control/Certification

Before leaving the factory, each device undergoes highly strict tests as shown below:

Hardware tests

This procedure includes Screen color calibration, Touchscreen sensitivity, Camera autofocus and clarity, Antenna signal strength, Battery charging/discharging, and Speaker and microphone quality.

Stress tests

Here, the system's strength and durability are tested, including heat resistance, Drop tests, Pressure tests, Waterproof ratings (IP67/ IP68), and Long-term usage simulations.

Software tests

Just as a stress test is crucial for product certification, a software test is equally crucial, and any device that fails is repaired or scrapped. They include Boot sequence, Wi-Fi/Bluetooth/SIM connectivity, App performance, and Security validation.

Certification

Depending on the market and country, before distribution comes certification, which may include NCC (Nigeria), FCC (USA), CE (Europe), SAR (radiation compliance), and Battery safety certifications.

Packaging/Global Distribution

Once approved, the phone is polished and cleaned up to remove

fingerprints and dust. After which, it will be packaged and boxed, containing the User manual, charging cable, Adapter (if included), SIM ejector, Warranty card, and others, just as the case may be. Then it will be sent for global distribution, which may include Retail stores, Telecom operators, Online marketplaces, and Country-specific warehouses. Known brand smartphone manufacturers distribute millions of units per month.

Conclusion

Making a smartphone is a highly advanced, global process involving precision manufacturing, innovative engineering, hundreds of suppliers, and strict quality control. From the atomic-scale transistors on the chip to the final polished device in your hand, every smartphone represents the combined effort of thousands of engineers, factories, and technologies working together.

Below is a comprehensive, structured, and professional explanation of how a sensor is made. This covers scientific principles, materials, engineering, fabrication, calibration, and real-world applications. It is suitable for academic use, technical training, or industry publications.

Sensor Manufacturing

A sensor is a device that detects physical, chemical, or environmental changes and converts them into readable signals, usually electrical. Examples include temperature, pressure, motion, touch, and gas sensors, among others. The creation of a sensor involves materials science, electronics engineering, microfabrication, and precision calibration. The process varies by sensor type, but the general steps remain similar.

Concept, Design/Engineering.

Defining the purpose

Determine the use of the sensor you want to manufacture, such as what the sensor should detect (temperature, motion, light, gas, pressure, etc.), the required Sensitivity, Accuracy, and response time, and the Operating environment (heat, cold, vibration, moisture).

Choosing the sensing mechanism

Sensors manufacturing relies on known scientific principles, which include:

- Thermoelectric effect (temperature sensors)
- Piezoelectric effect (pressure and vibration sensors)
- Capacitance change (touch and proximity sensors)
- Light-to-current conversion (photodiodes)
- Chemical reaction detection (gas sensors)
- Magnetic induction (Hall effect sensors)

The above things determine the materials and structure.

Electronic circuit design

Here, the engineers design Signal conditioning circuits, Amplifiers, Filters, Microcontrollers (if needed), and Power systems, from which a prototype circuit is created before mass production.

Material Selection (The Foundation Of The Sensor)

Sensors are made from materials that physically react to stimuli. These materials include Semiconductor Materials, which are Silicon (Si), Gallium arsenide (GaAs), and Germanium. They are used in optical, pressure, chemical, and motion sensors. The Polymer Materials are used for humidity, gas, and flexible sensors; the metals, which are composed of platinum, nickel, copper, and aluminum, are used in temperature RTD sensors, among other things.

The Piezoelectric Crystals, on the other hand, comprise quartz and lead zirconate (PZT), used for vibration, pressure, and acoustic sensors. And finally, the Nanomaterials (Modern Sensors) are made of graphene, carbon nanotubes, and nano-coatings. These materials are used for improved sensitivity, response time, and miniaturization.

Microfabrication Of The Sensor Element

Most sensors today are manufactured using microscale techniques similar to those used in chip production. This process is called MEMS (Micro-Electro-Mechanical Systems) fabrication. Microfabrication includes:

Wafer preparation: A silicon wafer is cleaned and prepared.

Thin-Film Deposition: Here, layers of metal or semiconductor are deposited using Chemical vapor deposition (CVD), Physical vapor

deposition (PVD), and Sputtering. These layers form the sensor's responding surface.

Photolithography: Just like chip manufacturing, here, a light-sensitive resist is applied, UV light shines through a mask to imprint patterns, and Patterns define microscale electrodes, sensing areas, and circuits.

Etching: This is a stage in which unwanted material is removed using wet chemical etching and Dry plasma etching. This shapes the sensor at the micro- or nanoscale.

Doping: This process involves adding tiny amounts of impurity atoms, such as boron, phosphorus, or arsenic, into pure silicon to alter its electrical properties. This step is essential in creating the transistors and semiconductor components that power a smartphone's processor, memory, sensors, and communication chips.

Micro-structural formation: This is used for sensors such as accelerometers and pressure sensors, where micro-cantilevers or membranes are formed. These tiny structures move or bend when exposed to stimuli.

Creating The Sensor Housing/Packaging

This plays a good role because sensors must be protected from environmental damage while still detecting signals accurately.

Encapsulation: This is about materials such as epoxy, plastic, or ceramics that protect the sensor core.

Wiring/Connectors: This involves the Gold bonding wires, Solder pads, Connector pins, and Shielded cables (for noise reduction).

Protective layer: To ensure durability, sensors may be coated with Silicon gel (moisture protection), Ceramics (heat protection), and PTFE (chemical resistance).

Housing materials: Housing materials are used to build a protective component for the sensors, and they include: Plastic (low-cost consumer sensors), Aluminum (automotive sensors), Stainless steel (industrial sensors), and Ceramic (high-temperature conditions).

Integration with electronics

A sensor produces raw signals that must be processed by embedded electronics, such as Amplifiers, Analog-to-digital converters, Microcontrollers, Wireless modules (Bluetooth/Wi-Fi), Calibration

circuits, and Power management modules. This transforms physical changes into accurate digital outputs.

Calibration

Calibration ensures that sensors are accurate and reliable. Below are the types of calibrations:

Factory calibration

Sensors are exposed to known reference conditions such as Standard temperature chambers, Controlled gas concentrations, precisely measured pressure, and Certified weights or vibrations. The resulting signals are compared to known values and corrected.

Software Calibration

Modern sensors store calibration algorithms in memory, such as Offset adjustments, gain corrections, and Linearization curves.

Auto-Calibration Features

Advanced sensors recalibrate themselves over time; examples are gyroscopes and gas detectors.

Quality Control/Testing

Every sensor undergoes Electrical testing, Stress testing for heat, vibration, humidity, and shock), Chemical resistance test, Accuracy verification, and Long-term stability test. Sensors that fail are reworked or discarded.

Final Assembly/Distribution

After passing tests, sensors undergo labeling, which involves Serial numbers, Calibration certification, and Production batch IDs. Then comes the packaging, which includes the User manuals, Safety instructions, Wiring diagrams, and Installation kits. And finally, the sensors will be distributed to relevant users, including Automotive companies, Smartphone manufacturers, Industrial automation firms, Healthcare device makers, and Consumer electronics brands.

Summary

Creating a sensor involves a combination of physics, materials

science, microfabrication, electronics engineering, calibration, and testing. From the microscopic transistors to the final packaged device, each sensor represents high precision and advanced manufacturing processes.

Microchip Manufacturing

A microchip, also called an integrated circuit (IC) or semiconductor chip, is the core component inside smartphones, computers, cars, medical devices, and nearly all modern electronics. Making a chip is one of the most advanced manufacturing processes on earth, combining nanotechnology, materials science, precision engineering, and automation.

The process of manufacturing a microchip can be broken into 10 major stages, and they are as follows:

Raw Material

Purifying silicon from sand

Microchips are made from silicon, which is derived from silica (SiO_2) found in ordinary sand. The processes are as follows:

Quartz Sand: Here, a high-purity quartz sand is heated in an electric furnace, after which, impurities are removed, and the result is 99.99% pure silicon.

Forming a Silicon Ingot: At this stage, the silicon is melted, and a single crystal “seed” is dipped into it. The seed is slowly pulled out while rotating, forming a perfect, cylindrical monocrystalline silicon ingot, sometimes 1 to 2 meters long. Meanwhile, this crystal must have a near-perfect atomic structure for chip performance.

Slicing The Ingot Into Wafers

Wafer Cutting: This is done with highly precise diamond-tipped saws that slice the ingot into ultra-thin wafers, usually 300 mm diameter (industry standard for advanced chips), and 0.5–0.7 mm thick

Polishing: Wafers are polished to mirror-smooth; the surface must be atomically flawless because modern chips contain nanometer-scale features.

Depositing Thin Material Layers On The Wafer

Chips consist of many thin layers of Silicon, Metals (copper, aluminum), Insulators (silicon oxide, silicon nitride), and Polymers. These layers form the pathways and devices (transistors) of the chip. The methods used in achieving this include Chemical Vapor Deposition (CVD), Physical Vapor Deposition (PVD), Atomic Layer Deposition (ALD), and Thermal oxidation. Each layer is usually a few atoms thick.

Photolithography

Photolithography is the heart of chip manufacturing, where patterns representing billions of transistors are printed onto the wafer. The processes include:

Photoresist coating: Here, a light-sensitive chemical is applied.

Mask alignment: This mask (stencil) contains the chip design.

UV exposure: This is an extreme ultraviolet (EUV) or deep ultraviolet (DUV) light that shines through the mask.

Developing: During development, exposed areas of the resist are washed away, leaving patterns.

Etching: Here, the exposed material beneath the area is removed.

Resist removal: This leaves a patterned wafer.

This process is repeated dozens or hundreds of times to create multiple layers of the chip.

Modern Scale

Current chips use 5nm, 3nm, and soon 2nm technology nodes. Expectantly, future sizes may be smaller than a virus.

Etching: This is all about carving the circuit structures; after photolithography, unwanted material is removed through wet and dry etching.

Wet Etching: Here, chemical solutions dissolve exposed materials. Electric fields and ionized gases remove material with extreme precision. Etching forms include Transistor channels, Gate structures, Insulator gaps, and Metal pathways. This is where tiny structures such as finFET transistors are created.

Doping

This process changes the Electrical Properties of silicon to make it

conductive in specific regions. Engineers inject impurities such as Boron (p-type) and Phosphorus or Arsenic (n-type) into it; this process is called ion implantation. Doping creates the essential regions of a transistor, such as the Source, Drain, and Gate channel, with nanometer-level accuracy.

Metallization

Metallization is all about adding interconnected wires to the transistors, because it must be connected by microscopic wires.

Metal Deposition: Here, the thin layers of copper or tungsten are deposited, and these activities follow:

Chemical Mechanical Polishing: The surface is polished flat so additional layers can be added.

Multi-Layer Routing: Modern chips have 30–50 layers of metal interconnects.

This complexity allows billions of transistors to communicate at high speed.

Wafer Testing And Chip Dicing

At this stage, the Wafer-Level Testing is being carried out, which involves electrical probes -testing each chip (“die”) directly on the wafer, whereupon defective chips are marked and working chips move to the next stage. After this comes Dicing, where a diamond blade or laser cuts the wafer into individual chips. A single wafer contains hundreds of large CPU/GPU dies and thousands of smaller microcontrollers or sensors.

Packaging Of The Chips

Packaging is very important because the tiny silicon die is extremely fragile and must be protected. It ensures Electrical connectivity, Heat dissipation, Mechanical protection, and Compatibility with motherboards. The packaging steps are as follows:

Mounting: The chip is bonded onto a substrate.

Wire bonding or flip-chip bonding: Connects the chip to the package pins using gold/copper wires or solder bumps.

Encapsulation: Protective resin or ceramic package added.

Heat spreaders/heatsinks: Added to high-power processors (CPUs/GPUs).

Final Testing

This involves quality screening comprising Functional tests, Power tests, Performance benchmarking, and Stress tests (heat, vibration, voltage). After this process, defective units are discarded or downgraded.

Sorting (binning)

During sorting, CPUs with higher performance or lower power consumption are sold as premium models. This is how different versions of the same chip family are created, and of course, the lower denominations are distributed accordingly. Distributions of chips are usually to Smartphone makers, Computer manufacturers, Automotive companies, and Industrial device manufacturers.

Conclusion

Making a chip is very complex and requires the following:

- Extreme purity (atomic-level precision)
- Extreme miniaturization (nanometer features)
- Extreme complexity (billions of transistors)
- Extreme automation (cleanrooms, robots, EUV machines)

A modern microchip takes several months and over 1,000 steps to produce, involving some of the most advanced tools ever created. Because of the complexity of chip manufacturing, only a small number of companies worldwide, such as TSMC, Samsung, Intel, and others, have the capability to manufacture leading-edge chips.

The Summary Of Chapter Ten

There are so many other sectors in the automobile industry that you can build upon as a CEO outside of selling and buying vehicles, or other means that you started with. As I said, I built the foundation for becoming an automobile CEO by buying and selling vehicles because it's the lowest rung you can start on and survive in the industry, even when you don't have a penny.

This is just because we are very familiar with vehicle sales. As you can see, there are so many other things you can do in the industry to become a renowned automobile CEO. This chapter is my favorite because of the business opportunities it has presented in the automotive industry. Choose one of the businesses we have discussed above and build on it. What matters is understanding and supplementing your vision with the material in this book. Dream big and desire to contribute positively to the industry.

CHAPTER ELEVEN

BUILDING A CONGLOMERATE

As I said earlier, no amount of wealth is enough for a businessman. Thus, there is a need to aspire to make more money every day. Unfortunately, the automotive industry's financial scale often prevents it from sustaining daily sales. Because of this, we need to turn to related businesses that can generate residual income. For instance, as a car dealer, you can also sell car parts, lubricants, accessories, etc. You can also set up a car wash service, an automobile workshop, or logistic services. Engaging in any of these complementary businesses will generate more income for you and expand your scope. Meanwhile, you shouldn't engage in a side hustle that is not within the automotive industry, especially when you are not well-established. The downside is that it might divert your attention from your primary business, thereby compromising your growth.

Apart from engaging in related businesses, you can acquire more skills in the field by enrolling in automotive-related courses or any training that will improve your knowledge. This aspect is essential, as you will get to meet top personnel who are highly educated and can relate very well with you when you are well-rounded in your knowledge. Therefore, acquiring skills or taking professional courses is also a pathway to creating a residual income.

Your knowledge, skills, and education can transform into income when well utilized. Meanwhile, I want you to understand that wealthy financial moguls like to associate with educated, up-to-date individuals who possess the prerequisite qualities to mingle with wealthy financial experts. This, in one way or another, will open

doors for you and bring in more businesses, even ones outside your industry. Having a residual income is necessary because it fills in during a sales drought. Ensure that you create at least one residual income avenue and see how supportive it is. Note that you don't engage in one that will take most of your time, which may likely affect your primary business.

How To Build A Conglomerate

A conglomerate is a large corporation composed of several smaller companies, known as subsidiaries. The parent corporation is referred to as a holding company, while the individual companies are traditionally called subsidiaries. These subsidiaries usually operate in relative independence from each other and report to the holding company. A conglomerate usually comprises subsidiary companies that may come from a single or multiple industries, resulting in a diversified business portfolio. The parent company is responsible for making strategic decisions about the conglomerate's overall direction and future. There are several ways to build a conglomerate. I will discuss the three most common ways: Acquisition, Expansion, and Extension.

Acquisition

This is the traditional method of forming a conglomerate. This method involves one company buying another, usually through a cash purchase or a stock exchange.

An example is a company that specializes in vehicle manufacturing, then buys another company in the aviation sector, then another that manufactures robotics, then another that is into space transportation, and so on.

These companies that you have been able to buy as a result of your growth in the business are called subsidiaries, whereas your primary company that generated the money you used to buy these companies is called a parent or a holding company. The incorporation of these companies under a single umbrella company created a conglomerate. In a situation where a target company to be purchased is large in both scope and value, a merger could occur between the two companies, and both will become the holding company after the merger. It all depends on the merger clause. You may choose to rename

the company or maintain the name of one of the two companies. Acquisitions are always a better option, as acquired firms quickly gain acceptance from the public, enter new markets, and leverage the parent company's resources and expertise.

Expansion

When your company has grown exceedingly, a craving for expansion ensues. This raises the question of establishing subsidiaries in other high-density business locations. The exercise of planting businesses in other areas will give birth to your business's expansion. And by the time you establish as many subsidiaries as possible, your business will become a conglomerate.

This type of conglomerate formation is usually organic and highly advantageous. One key advantage is that incorporation is always easy because it was built organically. As a result, integrating into a single management is less demanding than the acquisition process.

Extension

This is a type of conglomerate in which a holding company grows from a single business unit and extends into other businesses, usually in a related field. For instance, you sell tires, and after the company has realized huge growth, you decide to expand from tire production to yacht manufacturing. If the same success story is recorded, you can expand to aircraft manufacturing, AI, space machines, road construction, and so on. By the time you have developed to have as many companies as possible, it becomes a conglomerate. Elon Musk is a good example of a CEO who built a conglomerate through business extension. Other CEOs include Bernard Arnault and Robert Ley of Volkswagen Group.

The apex goal of all CEOs is to build a global conglomerate. When your business is thriving, and you have a surplus to run it, save up for reinvestment. This noble step is what gives birth to a conglomerate. Meanwhile, as much as you have been advised to have a side hustle related to your line of business, the case is different when it comes to building a conglomerate.

When building a conglomerate, you can diversify into as many businesses as possible, but it is still advisable to limit your diversification to businesses you have a good understanding of. In

fact, you can still have a conglomerate while in the same industry. For example, as an automotive CEO, you can go into oil, hardware manufacturing (engine, gear, steering, etc.), tire and battery manufacturing, vehicle accessories like seat covers, dashboard polish/spray, foot mats, air fresheners, and many others. You can go into yachting, boats, shipping, trains, aircraft, space machines, AI, and so on. You can also go into transportation and road construction.

The above businesses are related to the automotive industry, and you can build a conglomerate from them. As you can see, our industry is as big as you can imagine. In fact, apart from the energy industry, I would say that our industry is the most futuristic. Although our industry is a by-product of energy, the only way energy can be best utilized is through machines and AI. Therefore, our industry is as futuristic as the energy industry. The following are the things you should know and do to effectively build and manage a conglomerate:

Investment

Investment is the strategic commitment of capital, time, or resources with the expectation of generating future returns or creating long-term value. It is a cornerstone of economic growth and personal financial planning, enabling individuals, businesses, and institutions to build wealth, expand operations, and foster innovation. In the corporate context, investments may include acquiring assets, funding research and development, entering new markets, or improving operational efficiency. For individuals, investment typically involves financial instruments such as stocks, bonds, real estate, or mutual funds, each offering varying degrees of risk and reward.

Sound investment decisions rely on thorough analysis, risk management, and strategic foresight. They balance short-term gains with sustainable outcomes, aligning financial objectives with broader economic and social goals. Ultimately, investment is not merely the act of spending; it is the disciplined pursuit of growth, stability, and future prosperity.

Shares

Shares represent units of ownership in a company and entitle the holder, known as a shareholder, to a portion of the company's profits, assets, and decision-making rights. They form the foundation of

corporate finance, enabling companies to raise capital for expansion, innovation, and operations. Shares are broadly classified into ordinary (common) and preference shares. Ordinary shareholders typically have voting rights and receive dividends based on the company's performance, while preference shareholders enjoy fixed dividends and priority in liquidation.

The value of shares fluctuates based on market performance, investor confidence, and the company's financial health. Trading on stock exchanges provides liquidity and investment opportunities for individuals and institutions. Professionally managed shareholding promotes corporate transparency, accountability, and growth, making shares an essential instrument in both personal wealth creation and global economic development.

Digital Currencies

Digital currencies are electronic forms of money that exist solely in digital format and enable secure, instant, and borderless transactions without the need for physical cash. They represent a significant evolution in global finance, merging technology, decentralization, and innovation to redefine how value is stored and transferred. There are two main categories: centralized digital currencies, managed by institutions or payment platforms, and decentralized digital currencies, such as cryptocurrencies, which operate on blockchain technology. Cryptocurrencies like Bitcoin, Ethereum, and stablecoins use cryptographic systems to ensure transparency, security, and immutability of transactions.

Increasingly, governments are exploring Central Bank Digital Currencies (CBDCs); state-backed digital money designed to complement traditional fiat systems while enhancing efficiency and financial inclusion. Digital currencies offer numerous advantages, including reduced transaction costs, faster cross-border payments, and enhanced financial accessibility. However, they also raise considerations around regulation, cybersecurity, volatility, and privacy. As the global economy continues to digitalize, digital currencies stand at the forefront of the next financial revolution, transforming how individuals, businesses, and nations interact with money in an interconnected world.

Business Negotiation

Business negotiation is a structured dialogue between two or more parties aimed at reaching a mutually beneficial agreement on matters such as contracts, partnerships, pricing, or strategic collaborations. It is both an art and a science, combining communication, strategy, and psychology to align differing interests while preserving relationships. Effective negotiation requires thorough preparation, including an understanding of objectives, alternatives, and the other party's motivations. Key elements such as clarity, active listening, emotional intelligence, and adaptability are crucial for building trust and finding common ground.

Successful negotiators focus not merely on winning but on creating long-term value, ensuring that agreements are sustainable, transparent, and aligned with organizational goals. In today's interconnected economy, business negotiation serves as a vital leadership skill, enabling cooperation across cultures, industries, and markets while driving innovation and shared success.

Business Partnership

A business partnership is a formal arrangement between two or more parties who agree to collaborate to pursue shared commercial goals. It combines resources, expertise, and networks to achieve outcomes that would be difficult to accomplish independently. Partnerships may take various forms, including general partnerships, limited partnerships, joint ventures, and strategic alliances, each defined by its structure, risk distribution, and management responsibilities.

Effective partnerships are built on trust, transparency, and clearly defined objectives. They require well-drafted agreements that outline each partner's roles, profit-sharing terms, decision-making authority, and dispute-resolution mechanisms. Beyond legal frameworks, successful partnerships thrive on open communication, mutual respect, and a shared vision. In today's global economy, business partnerships are instrumental in driving innovation, entering new markets, and strengthening competitive advantage. When strategically managed, they create synergy by combining strengths, mitigating risks, and fostering long-term growth for all stakeholders involved.

Government Partnerships

Government partnerships are collaborative arrangements between public institutions and private or non-governmental entities to achieve shared social, economic, or developmental objectives. These partnerships leverage the strengths of each participant — the policy authority and regulatory capacity of government, combined with the innovation, efficiency, and resources of the private sector or civil society. Common forms include Public-Private Partnerships (PPPs), public-social collaborations, and multi-stakeholder alliances. They are often used to deliver infrastructure projects, advance technological innovation, enhance public services, and promote sustainable development.

Effective government partnerships are built on transparency, accountability, and mutual benefit. Clear contractual frameworks, measurable performance indicators, and stakeholder engagement ensure that objectives are met efficiently and ethically. In an era of complex global challenges, from urbanization to climate change, government partnerships play a vital role in driving inclusive growth, fostering innovation, and improving the quality of public services, ultimately bridging the gap between governance and progress.

Business Structure

A business structure defines the legal and organizational framework within which a company operates. It determines ownership, management responsibilities, tax obligations, liability, and the decision-making process. Choosing the right structure is a critical strategic step, as it influences a business's efficiency, growth potential, and long-term sustainability.

Common Types Of Business Structures Include

Sole Proprietorship: Owned and managed by a single individual, offering simplicity but with unlimited personal liability.

Partnership: Involves two or more individuals sharing ownership, profits, and responsibilities under agreed terms.

Limited Liability Company (LLC): Combines the flexibility of a partnership with the limited liability of a corporation.

Corporation (Ltd. or Inc.): A separate legal entity that limits owner liability, allows for share issuance, and facilitates large-scale

growth.

Cooperative: Owned and operated by members for their mutual benefit.

An effective business structure aligns with an organization's size, goals, regulatory requirements, and risk tolerance. Beyond legal formality, it serves as the foundation for strategic governance, financial management, and operational clarity — ensuring the business can adapt, grow, and thrive in a competitive environment.

Company Structure

A company structure refers to the formal arrangement of roles, responsibilities, and relationships within an organization. It establishes how activities such as decision-making, communication, and resource allocation are directed toward achieving the company's objectives. A well-defined structure enhances efficiency, accountability, and collaboration across all levels of the organization.

Types Of Company Structures

Functional Structure: Organizes employees by specialized functions, such as marketing, finance, operations, and human resources.

Divisional Structure: Groups operations by product lines, geographic regions, or market segments, allowing greater focus and flexibility.

Matrix Structure: Combines functional and divisional elements, promoting cross-departmental collaboration and resource sharing.

Flat or Horizontal Structure: Minimizes hierarchical layers, encouraging agility, innovation, and open communication.

Network or Hybrid Structure: Integrates external partnerships or subsidiaries into the company's operational framework.

An effective company structure aligns with the organization's strategic goals, scale, and culture. It ensures clarity of authority, optimizes workflow, and supports both innovation and control. Ultimately, a well-designed structure enables a company to respond effectively to change, sustain growth, and deliver consistent value to stakeholders.

Brand Management

Brand management is the strategic process of building, maintaining, and enhancing a brand's identity, reputation, and value in the

marketplace. It involves defining what the brand stands for, its vision, values, and promise — and ensuring that every customer interaction consistently reflects those principles. Effective brand management goes beyond logos and visuals; it encompasses customer experience, communication, product quality, and emotional connection. It requires continuous monitoring of market perception, competitor positioning, and consumer behavior to maintain relevance and trust.

Core elements of brand management include brand strategy development, visual identity design, marketing communication, public relations, and brand equity measurement. In the digital era, it also extends to online reputation management and social media engagement, ensuring coherence across all touchpoints. Strong brand management builds credibility, loyalty, and differentiation, allowing businesses to command premium value and sustain long-term growth. Ultimately, it transforms a name or symbol into an enduring asset that shapes perception, inspires confidence, and drives success.

Multinational Networking

Multinational networking refers to the strategic establishment and management of relationships, systems, and operations that connect organizations, partners, and stakeholders across multiple countries. It enables businesses to coordinate activities globally, share knowledge, and leverage cross-border opportunities while adapting to regional markets and cultural dynamics. Effective multinational networking integrates communication infrastructure, strategic alliances, and digital connectivity to support collaboration among subsidiaries, suppliers, and clients worldwide. It relies on robust information technology systems, global supply chains, and efficient governance frameworks that align international operations with corporate objectives.

Beyond logistics and technology, successful multinational networking emphasizes cultural intelligence, regulatory compliance, and relationship management — ensuring that partnerships are built on trust, mutual benefit, and respect for local contexts. In today's globalized economy, multinational networking is a key driver of innovation, competitiveness, and resilience. It empowers organizations to operate seamlessly across borders, access diverse

talent and markets, and respond swiftly to global challenges while maintaining a unified corporate vision and integrity.

Global Mega-Corporation

A global mega-corporation is a large-scale enterprise with extensive operations, influence, and market presence spanning multiple continents. These corporations often dominate their industries through vast financial resources, advanced technology, and integrated global supply chains. They operate across sectors such as finance, energy, technology, manufacturing, and consumer goods, shaping international trade and economic trends. Global mega-corporations are characterized by complex organizational structures, including subsidiaries, joint ventures, and regional divisions, that enable them to adapt to local markets while maintaining unified corporate governance. Their strategies emphasize innovation, diversification, and sustainability, supported by sophisticated data analytics and digital ecosystems that drive efficiency and competitiveness.

Beyond commerce, these corporations exert significant social, political, and environmental influence. They set global standards, invest in emerging markets, and often contribute to massive-scale infrastructure development and employment. However, their size and power also invite scrutiny regarding ethical practices, environmental responsibility, and corporate transparency. In the modern economy, global mega-corporations represent both the pinnacle of enterprise integration and the challenge of responsible globalization, embodying the balance between profit, purpose, and planetary stewardship in an interconnected world.

Awards/Recognitions

Winning awards and recognition as a CEO reflects exceptional leadership, vision, and impact within an organization and the broader industry. Such honors acknowledge not only personal achievement but also the team's collective success, the strength of the company's strategy, and its contribution to economic and social progress.

Recognitions often highlight excellence in areas such as innovation, corporate governance, sustainability, transformation, and leadership influence. They serve as public validation of a CEO's ability to navigate challenges, inspire people, and drive measurable

growth while upholding integrity and purpose.

For the organization, a celebrated CEO enhances brand reputation, investor confidence, and employee morale, reinforcing trust among stakeholders and positioning the company as a leader within its field. Ultimately, winning awards as a CEO is more than a personal milestone — it is a symbol of visionary leadership and organizational excellence, demonstrating the power of strategic thinking, ethical stewardship, and consistent performance in shaping the future of business.

Peer Groups

Peer groups are networks of individuals or organizations that share similar roles, interests, or professional goals, providing a platform for collaboration, knowledge exchange, and mutual support. In a business context, peer groups often consist of executives, entrepreneurs, or industry professionals who come together to discuss challenges, share insights, and identify opportunities for growth. These groups foster collective intelligence, allowing members to benefit from diverse perspectives and real-world experiences. Through regular meetings, workshops, or forums, participants engage in strategic discussions on leadership, innovation, market trends, and best practices.

Effective peer groups operate in an environment of confidentiality, trust, and accountability, enabling open dialogue and constructive feedback. They help leaders refine decision-making skills, enhance professional development, and maintain objectivity in complex situations.

In essence, peer groups serve as a strategic support system — strengthening leadership capacity, encouraging continuous learning, and promoting collaboration that extends beyond competition, ultimately driving both personal and organizational advancement.

Identity

Identity is the defining essence of an individual, organization, or brand — encompassing the values, characteristics, and attributes that distinguish one entity from another. It shapes how one perceives oneself and how others recognize and understand one. In a personal context, identity reflects a combination of experiences, beliefs, and aspirations that guide behavior and decision-making.

For organizations, identity represents the core purpose, culture, and value proposition that influence reputation and stakeholder relationships. A strong corporate identity aligns vision, mission, and communication, ensuring consistency across all actions and expressions.

Effective management of identity fosters authenticity, trust, and clarity. It creates coherence between internal values and external perception, enabling individuals and institutions to navigate change without losing their essence. Identity is not static; it evolves with growth, environment, and purpose — serving as both a foundation of integrity and a beacon of direction in a dynamic, interconnected world.

Philanthropy

To build a conglomerate, you must, one way or the other, win the heart of the Government, corporate establishments, and the general public. This is because a conglomerate often influences all aspects of life; as a result, it is usually everyone's affair. And the best way to achieve this is for the CEO to be as globally philanthropic as possible.

A CEO can become a global philanthropist by leveraging their resources, influence, and networks to create meaningful impact across borders. This begins by supporting causes that address global challenges, such as education, healthcare, climate change, poverty, and access to technology. By establishing foundations, funding scholarships, donating to international relief agencies, or partnering with global NGOs, a CEO can reach communities far beyond his home country. He can also leverage his company's strengths to drive social good, such as sponsoring innovation programs, empowering young entrepreneurs, or supporting sustainable projects in developing nations. Using his public voice to advocate for fairness, equality, and humanitarian efforts further amplifies his/brand's impact. Global philanthropy is achieved through intentional giving, strategic partnerships, and a genuine commitment to improving lives around the world.

Height of Success

The height of success represents the pinnacle of achievement, a state reached through vision, discipline, resilience, and an unwavering

commitment to excellence. It is not defined solely by wealth or recognition, but by the realization of purpose, the fulfillment of goals, and the lasting impact one creates within an organization or society. Reaching this level demands strategic foresight, innovation, and ethical leadership. It reflects the ability to turn challenges into opportunities, to inspire others, and to sustain growth amid change. At the height of success, individuals and enterprises not only achieve distinction but also set new benchmarks for others to follow.

True success extends beyond personal accomplishment; it embodies influence, legacy, and contribution — the capacity to uplift others, shape industries, and drive progress. It is both a milestone and a responsibility, reminding every leader that greatness is measured not just by how high one rises, but by how profoundly one transforms the world along the way.

CHAPTER TWELVE

THE LIFE OF A SUCCESSFUL CEO

The life of a successful CEO is one of vision, discipline, and relentless determination. It demands the ability to make strategic decisions under pressure while inspiring teams toward a common goal. A true CEO balances innovation with practicality, focusing not just on profits but on sustainable growth and organizational impact. Behind every success story lies a routine of continuous learning, resilience, adaptability, and all the qualities that enable a leader to navigate change and uncertainty with confidence. Successful CEOs understand that leadership is service; they empower others, build trust, and cultivate cultures that encourage excellence. Assuredly, the life of a successful CEO is defined not only by the results he has achieved but by the values, integrity, and legacy he left behind.

The Evening Life Of A CEO

What can I say here? Well, the first step to being brave in your fate is to determine to be happy. And the only way to be truly happy is to live your dream. When you accomplish what you have always dreamed of being. This dream is often the apex goal, and its actualization brings fulfillment and rest. It is when you are at this height that you can reflect and see how you have traveled over the years to get to your prime goal. Now, this reflection may reveal the perfect decisions you made and the avoidable mistakes you gave in to. This reflection could be scripted from your teen years, youth, and adulthood. You could remember something you did as a teen that you regret as a setback. Of course, there were some scenes in which you

behaved well, and you are thankful that they contributed to where you are now. Similarly, this applies to the days of your youth.

For this book, I will focus on adulthood because it is where your career journey begins. This topic applies to the present, past, and future; however, it is primarily for the present. So, as you are standing on your balcony, maybe from a hundred-story building as a successful automotive manufacturer, an aeronautic engineer, a vehicle reviewer, or generally, as a successful automotive CEO, you suddenly begin to reflect on how you got to where you are. And your reflections include the following (note that whatever I say here is allegorical; it's your avatar post-experience in the industry, which is also in the "now.")

How Or What Led You To Join The Automotive Industry

As you look ahead, you can remember how it all started and the circumstances that led you to join the automotive industry. You joined the industry because you have a great passion for it, which is why you made it. You fall into the first-class category, and this category owns the industry. They study the industry, identify opportunities, and drive innovation. It is this category of automotive CEOs who run the industry and determine its future. This is unlike those who joined the industry to make money and jump out of it. There are those who joined the industry because a relative was already in the business, and they went into it inadvertently.

This category of automotive CEOs is always untimely and unsuccessful. The reason is that they don't work out of passion but for money and their belly. As a result, ideology and creative ability plummet. The reason why those who joined the industry for the passion of it are successful and innovative is that they think instinctively, create intuitively, and solve problems subconsciously. They can't quit because the industry is part of their lives, and they don't get tired of working because any work in the industry is a way of life for them.

The Decisive Decisions That You Took That Sustained You

As you reminisce, you can recall the decisions you made that have led you to where you are now. However, your ultimate reflection is the "decisive decisions," in other words, the decisions that paved the way for your success. This decision has a "definite purpose". Having come to the industry for the love you have for it, the only thing that will determine your success in the industry is having a definite purpose, and this has to do with your area of

specialty in the industry. You can't be successful in the automotive industry when you haven't specialized in one of the sectors of the industry.

In the last chapter, I talked about the areas you can specialize in the automotive industry. Don't pursue so many things at a time; it will disorganize you. If you are going into vehicle tire manufacturing, stick to it 100%; bring innovation and revolution to the sector.

Don't desire to become a tire manufacturer, an aircraft manufacturer, an auto dealer, a vehicle reviewer, etc., at the same time. You must choose one at a time and become successful in it.

I remember when I interviewed Innocent Chukwuma of IVM for the 2025 edition of the African Automotive Magazine. When asked for his advice to aspiring Automotive CEOs, he said they should find a sector within the automotive industry and specialize in it. That he couldn't do everything by himself, he needed people from different sectors of the industry to work with.

I'm not implying that you can't do more than one thing at a time, but it pays more to specialize and be the best at it.

Thus, your reflection on your decisive decisions was choosing the area of specialization that made you who you are today. The challenging and failed time that you almost gave up, the sacrifices you made that brought you to where you are now, the people and organizations that assisted you to get to where you are now, and the shameful steps that you took.

You certainly took steps that led to setbacks for you, of which you are not proud today. Among many unhealthy steps you took in your success journey, the most shameful was competition.

To progress and become successful in this industry, you must kill the spirit of competition. This applies to every other career. Competition is a limitation! The reason it is a limitation is the fact that you have drawn a curtain around your growth. To put it differently, you have made your competitors your model. Competing inhibits you from standing out and limits your potential. The best way to manage people in your field is to see them as resources, not competitors. Learn from what they have done and achieved, and then improve on it. Propose businesses to them and take every opportunity. Competition blinds and is tantamount to envy, which rots the bone.

The Luck, Grace, And Favor Moments.

As you think back, you can remember some things that you did in the

past that you ought to have been punished for, but one way or the other, you got away with them because of luck, favor, or grace. There were some businesses that undeservedly came to you, from which you made a fortune effortlessly. There were times that you exposed yourself to harmful habits that could have led to sickness or untimely death, but luck, favor, and grace vindicated you. There were times that you exposed yourself to dangers like accidents, women, alcohol, and other unhealthy lifestyles, but luck, favor, and grace showed up.

As you reflect back, the most profound of these are those business partners and staff who came into your life and contributed to the growth of your business. Luck, favor, or grace brings you the best business partners and operational team. Having good business partners and staff is not a matter of merit but of luck. Most often, money cannot buy this. Of course, we have business owners whose businesses were ruined by bad partners and staff. Thus, you were fortunate to have had great business partners and staff.

I have worked with a large number of employees, and I'm convinced empirically that good and efficient employees are not found by luck. You could engage a grade "A" employee, and his work attitude will be cold. Conversely, a grade "C" could lift your company from the bottom to the top. The requisite is devotion and commitment, and not having a first-class certificate or a decorated résumé. It is all by chance! Meanwhile, to position yourself for luck, favor, or grace, you must first be what you expect. If you look forward to having good business partners, you must be a good partner to others. Similarly, if you want to build good staff around you, you must treat them well and treat yourself well. If "luck" is a universal law, you must first make yourself "luck" for others – J-ib.

The Temptation Times And Unforeseeable Events

We go through so many things during our journey to success. The temptation of engaging in destructive things. Things like alcohol, cigarettes, drugs, women, cheating, deceptive lies, anger, and tests of integrity. When you start a business, especially when such a business has begun to thrive, temptations will creep in. This temptation might ruin you or make you. It will ruin you when you give in, and build you when you overcome.

When money comes, the exuberance is often irresistible. It would expose you to an unfruitful lifestyle that you had not imagined you would give in to. When money comes in, you would like to mingle with some

friends in the same line of business or with those outside it. At this point, they would like to show you the latest clubs in town and fun hangout spots. Well, alcohol is a mocker. Drugs are destroyers! Women are destiny stealers, and clubs are money spenders. Unhealthy lifestyles will ruin you and bring your business to a close. What do you go to a club for? It is to drink alcohol, be with women, dance, and show off. It is unhealthy for you and your business. There are some places you should avoid, such as clubs, beer parlors, dirty parties, casinos, and betting centers.

These places expose you to hazards, and the worst of them is “women”. Women destroy kings and bring down kingdoms. And, if women can bring down kingdoms, what is your business? To overcome the temptation of women, take your time and find a woman that you will see every woman in. In other words, a woman who will take your eyes off other women and direct your focus on yourself and your business. Don’t let your little success in your business expose you to what will destroy you and your business.

Avoid the temptation of alcohol and cigarettes. They are terrible for your health. Alcohol will not make you better when you drink it, nor can it make you less of a person when you don’t drink it at all. As a matter of fact, you are a billion times better when you don’t take alcohol at all. Ignore those who preach that a little of it is good for your health – that red wine is good for your heart. These claims have not been proven by any doctor. I’m not saying that alcohol is a poison; regardless, when abused, it is more dreadful than poison. In the same way, cigarettes are not good for your health. Cigarettes are as harmful to our health as any drug out there. As a matter of fact, cigarettes have been proven to be more harmful to our health than marijuana.

Whatever the case, drugs of any kind are bad for human health. Be it heroin, marijuana, cigarettes, shisha, tobacco sniffing, etc. These drugs are a huge temptation when you allow any of them to have access to your life. Abhor them completely and enjoy a healthy life. Of what profit would it be to you, having labored for years to be successful, only for a bad lifestyle to rob you of your life?

When your business starts thriving, you will have the experience of what they call the “social ladder.” This means that you will step high from what you used to be. You will start hanging out with the category of people you might not have gone out with when you had no money. But now that you have climbed the social ladder, you will be exposed to many

casualties. You will realize that what these classes of people usually engage in is deadlier than anything in the dark. Ignore the so-called social class and set your own standard.

Another temptation that ruins business is cheating and deceptive lies. Don't cheat your business partners. In fact, don't cheat anyone, however tempting it is for you to do so. Temptation sometimes comes hugely, and as such, you will find it very difficult to overcome. Well, however strong and enticing this temptation is, don't cheat anyone to prosper yourself. Pay all the required sacrifices and receive the result.

I have encountered so many temptations, many of which were irresistible. There are some guys I know who are into "Yahoo," and they've actually made fortunes from it. They bought and built houses, established businesses. Bought cars and were generally swimming in financial freedom. A few of them contacted me and sold me on joining them in the business, and I passively declined. This was at a time when I was almost destitute. But I had no choice because such is not of me, and I can never steal from another to enrich myself. My pre-judgment has been: How would I feel at seventy years old when I had defrauded innocent people to enrich myself? I will feel miserable, of course! This temptation comes with a test of integrity. It is hallucinogenic!

I have had similar experiences that almost swept away my integrity; there was a time when a distant friend from the USA told me he wanted to transfer money to Nigeria using my company account, and that he would give me 30% of the total amount.

This temptation was colossal because the money was huge. The 30% was 10 times my total worth. Meanwhile, I knew this friend of mine was into internet fraud when he was in Malaysia before he got a job with a company in the USA. Earlier, I told him I would get back to him, and when I did, I asked him about the source of such a large amount of money. He then told me that I should understand that a client is willing to pay. Immediately after he said this, I confirmed my suspicion.

I was troubled by this. First, my share of the money would change my life, and second, I didn't want to offend my friend, who was persistently calling for my response. Anyway, to cut a long story short, I declined the offer because I couldn't convince myself to defraud someone to enrich myself. I knew the money was a fraud.

In the end, my fear manifested, and my friend cut me off afterward and never called me or was willing to hear from me again. Nevertheless,

I was at peace on the inside because this person in question shouldn't be my friend; he doesn't belong in my category. There are so many irresistible things poised to tempt your integrity as your business grows. I can't start enumerating many of them. But whatever it is, adopt the golden rule, which is: "do unto others as you would have them do unto you", and apply it in your daily life. Make sure you set integrity principles that guide your life and business. An undeniable truth is that when you compromise your integrity, it will affect your life and business. Therefore, as you stand now and meditate on how you journeyed to what you are today, which of the temptations did you fall for? And how did you compromise your integrity? Well, for you to have become a successful automobile CEO, you were smart and a good man. Even if you had fallen into any of these temptations, you might have quickly paid the price and corrected yourself. It is on account of this that you are where you are today. Perhaps you would have gone higher than where you are today, but one or more of these temptations has limited you. It could be that you were 98% successful, but it limited you to 75%. Regardless, you still have the opportunity to avert that temptation by passing the information on to the upcoming ones. The profit may not directly come to you, but you will be rewarded for helping others overcome it.

To be successful, you must readily arm yourself against temptations. And how do you overcome these temptations? The best way to overcome temptation is to set rules and principles for yourself and act in accordance with them, regardless of how irresistible the bait is. Determine not to womanize, drink alcohol, smoke, cheat people, tell lies, and compromise your integrity. Always fight to cast your net on the right side. It will reflect on your life and success outwardly.

Seedtime

Now, reflect on your inputs that have metamorphosed into who you are today. The seed time! This is a time when you worked sacrificially for what you hoped to achieve. These seeds were the result of your unrelenting efforts to grow your business after your dream. There are many of these seeds, but I will choose the prime, which is "commitment". Commitment is the best seed sown for any business. Commitment is more important than start-up capital, assets, structure, staff, business partners, and so on. It is the force that drives you from the starting point of your dream to your limelight. Without commitment, no business stands, no matter how

much is invested in it. Thus, commitment is the greatest seed a man can sow in his business. It is a seal for a breakthrough! As you reflect on your seed time, commitment is, of course, the highest seed you sowed in your journey to becoming a successful automotive CEO.

Patience Time

Now, you are standing and reflecting on times in your success journey when you used patience effectively. You could realize that you were actually a patient person, or that you had made hasty decisions you are not proud of today. For a business to outlive its owner and reach future generations, it must be built on patience. Mastering patience is a quality every businessperson must have. Patience has the power to control ugly situations and ultimately bring them to your advantage. In pursuit of success, the dexterity to make it now is always high. In fact, some of us will start a business that is only a few months old and yet want it to become a ten-year-old business. Some of us want to build houses, drive cars, and live affluent lives on a business that is yet to stand. There will come a time in business when patronage ceases and sales are very low. At this point, patience is the only thing to reckon with.

There will be a time when your people disappoint you, and you could lose your wrath with them, but patience will arrest your wrath. And ironically enough, it was a wrath that could have cost you a lot! There are so many things that will try you as a man in your business, but patience prevails over their consequences. Apart from the attitudinal aspect of our dispositions, patience also plays a significant role in decision-making, especially in business-related decisions. In fact, every breakthrough decision in a business took painstaking patience to make. The most rewarding patience you can probably reflect on now is the one you exercised when things were not working the way you wanted them to. Patience is all you need to sail victoriously through unpleasant moments.

Self-Development

How developed am I? You have just asked yourself this question while reflecting on your past. Of course, you can give an immediate answer to yourself concerning this because your 'self-development' is in the present. It is what you are now: Your wisdom, education, anthropology, spirituality, and technical know-how. You can assess these things and give yourself an immediate response. Self-development is the most excellent tool you must

possess to succeed in all facets of life, especially in business. This is very key, and I will go into a bit more detail about it. The importance of self-development cannot be overemphasized, as it transforms and determines what you will become.

The number one thing you need for self-development is wisdom. As it is said in the Scripture, “Wisdom is the principal thing”. This means that there is nothing ahead of wisdom, not even money, material things, honey, sex... anything you can think of! So, wisdom is the most prized asset in the universe. And how can we gain wisdom? Well, there are two ways: One is inherent, and the other is by acquisition. Most people are born with divine wisdom and develop it more as they grow, whereas others work hard to gain wisdom through many means.

The best way to gain wisdom is to ask God for it. The second way is to think deeply and broadly, and the third way is to study thoroughly. You must do everything possible to gain wisdom. It is more valuable than gold and diamonds. It is incomparable! As a matter of fact, when you have wisdom, you can always use it to make money. Of course, you would have to apply it several times in your business dealings.

The second thing you need for self-development is education. Education is very important, especially in this modern age. In fact, if you are not educated today, you will fall behind your educated peers. Education is encompassing, as it serves as a light with which you will trade with the world. The best utility for education is to have an unwavering devotion to an endeavor that interests you. As you are in the automobile business, you would have to concentrate on an automobile-related field of study and understand it well. Regardless, there is still a need for abstract knowledge about other things. As the saying goes, “know at least one thing about everything.”

If you have an SSCE, you could get part-time admission to the university while still running your business to further your education. You can also take complementary courses on subjects that will be useful to you and your business. Above all, read the news regularly and keep yourself updated. The important thing about education as it relates to business is that it allows you to mingle with the honchos of the industry. For instance, if you go out with the top men in the industry, and they begin to discuss things even outside your industry, it's expected of you to engage them very well and make constructive contributions. And if you don't have the knowledge of what they are talking about, you will be mute, thereby left

behind.

Education is encompassing; there is no end to it. At one point in my life, I was so zealous about studying and learning everything. Today, I have taken many courses, both online and offline, and I have lost count. Yet, the passion to know more engulfs me. The more one learns, the less educated one appears. Therefore, our quest for knowledge outlives us.

The third is anthropology. Anthropology is the science of humanity that studies mankind in the areas of biology, evolutionary history, social characteristics, and human culture, especially as it distinguishes humans from other animal species. You need to study anthropology because it helps you understand who you are and what you are made of, and to live in harmony with your society and other animals. Mastering this field of study will open great doors for you. It will allow you to flow well in your business and daily life. And, of course, it will enhance your societal acceptance. Anthropology is broad and generally divided into several subfields, such as archaeology, cultural anthropology, linguistic anthropology, and physical or biological anthropology (each of which has an applied component, making a fifth subfield).

Archaeology is the study of human artifacts; anything created by humans, from ancient temples to yesterday's garbage. It is closely allied with history, as its roots extend from the ancient to the modern. Archaeology helps us understand the past, human evolution, culture, religion, and beliefs. As a CEO, it's important you understand these fields, as they will root your mind and your understanding of the world. The understanding of the world colonizes you in the world. It makes you feel like you belong and not walk in ignorance. Cultural anthropology is the study of living human societies and cultures. This includes everything you do, from playing soccer to washing clothes to nursing a baby to writing a report to eating—anything related to human activities that is cultural in origin. Cultural anthropology is affiliated with psychology and sociology, as well as economics, political science, and history. As a CEO, you have to study these fields and gain a broad understanding of them. They will be very helpful to you, especially regarding your psychological reasoning and social affiliation.

Linguistic anthropology is another field of anthropology that deals with the development and relationships of language(s). What we say is a map of how we view the world and our overall understanding. Language is powerful! commendably, humans have created thousands of languages,

and these languages make our daily lives worthwhile.

Understanding a given language gives us the space to mingle with society effectively. As a CEO, understanding a language is very important as it helps in business communications, especially when they are bilateral. As an international businessman, you should endeavor to understand at least two of these four languages: English, Chinese, French, and Spanish. These four languages are used globally, and understanding two of them will aid your bilateral or multilateral business relationships. You can hire a translator to teach you a language of your choice. You can enroll in an online language course. Alternatively, you can teach yourself using ChatGPT, Google Translate, and other AI language translators. If you practice consistently, you will understand a language in a year.

The last is biological anthropology. This is the study of the human organism over time and across various evolutionary developments. It is a broad field of study that requires specialization. However, abstract knowledge will go a long way for you. For example, Paleoanthropologists studied the earliest humans and other characteristics of our ancestors. They usually work with geologists and paleobotanists on forensic studies.

Other biological anthropologists study everything from genetics to disease to breastfeeding. They collaborate with biologists and geneticists in their studies. You may ask what an automotive CEO has to do with these studies. Well, the journey to becoming a successful CEO is demanding and encompasses everything. Meanwhile, biological anthropology helps you understand your biological formation and evolution. You need to know all this because it helps you understand human history and what you are made of.

The fourth thing is spirituality. As you are a successful automotive CEO, what is the frequency of your spiritual life? What do you believe in, and how affirmative are you about it? What is your post-life belief? Well, spirituality is personal. However, it is an exercise you need to survive in your endeavor. The prime purpose of spirituality is morality. It's targeted at sanitizing society. In other words, it's meant to control our conduct and build the inherent character of man. Spirituality is broad, but I will limit it to morality. And this is the golden rule of spirituality: "do unto others as you would be done unto you". And "love others as you love yourself." These are the key essences of spirituality as it concerns human morality.

The final item on our list is "technical know-how." To keep it simple, this is your general knowledge of everything, especially technical things.

For example, your understanding of automobile mechanisms, computers, phones, sewing machines, book writing, scripting, artwork, programming, and so on. It's the knowledge and understanding you have of everything. Now, your ultimate worth as far as exchange and value are concerned is what you can offer. And what you can offer is tied to the knowledge you have. Therefore, you need as much knowledge about things as possible.

The best way to learn about everything is to develop an interest in it and study it. You have to read about everything. This is why you must use your time productively and not frivolously. For example, instead of spending three hours drinking with friends, you could limit it to 40 minutes and use the rest of the time for something much more fruitful. And if you are desperate enough, you can still study while among your friends. You must study things until you take your last breath on Earth. Study about heaven, study about Earth, study about the ocean, study about mosquitoes, human anatomy, black-chain, Innoson, soccer, plants, woman, dreams, current affairs, AI, space, the universe, education, God, human brain, spirit, food, etc. Study about everything, and you will become everything – J-ib.

Having broad knowledge about many subjects is essential for personal and professional growth. It strengthens your ability to think critically, make informed decisions, and adapt to new situations. A broad knowledge base also enhances creativity, enabling you to connect ideas across fields and solve problems more effectively. In leadership and business, understanding various topics, from technology to human behavior, improves communication, builds confidence, and helps you relate better to people from diverse backgrounds. Ultimately, knowing “a bit about everything” equips you to navigate life with clarity, curiosity, and a strategic sense of awareness. In return, your value will be worth everything.

Recreational Activities

The fact that you are standing on your balcony is a sign that you are a recreational man. You could have had this reflection in your sitting room, your bed, or some other more introverted place, but you chose to do it in the open. Recreational activities are outdoor activities purposed for relaxation, pleasure, exercise, excursion, natural gaming like hunting, fishing, trapping, camping, picnicking, exploring caves, nature study, bicycling, horseback riding, birdwatching, motorcycling, tobogganing, ballooning, hang gliding, hiking, golfing, snowmobiling, skiing, rock-

climbing, animal training in the zoo, woodcutting, swimming, and so on. We have many of these activities, depending on an individual's interest. Recreational activities are very important to us because they relax and rejuvenate us. We need this because it helps us in so many ways. It allows us to stay aloof and think abstractly about our lives and business.

Don't get worked up! Don't be too determined to work so hard that it works against you – J-ib. You have to rest. You have to go to recreational activities that interest you and unwind. Learn to avoid or manage mental and physical stress.

There was a time when I slept three to four hours a night because I wanted to contribute more and become more successful. This was after I read in a book that Thomas Edison slept four hours a night, which contributed to his scientific prowess. So I tried this, but in the end, I found I was less productive than I used to be when I slept 6 to 8 hours a night. I discovered that during the day, I became a bit lymphatic, thereby contributing less. The reason is that my body didn't get the amount of sleep it needed. As a result, there is a deficiency that variably affects my performance. I had to return to my normal sleep pattern, after which I became strong and productive in daytime activities again.

Another scenario is my exercise routine. I used to go to bed at 12:45 am on average. There are some days that I go to bed at 3 am, sometimes 2 am, and even 4 to 5 am; it all depends. The fact is, I used to wake up at 5 am for exercise regardless of when I went to bed. Well, I just wanted to maintain the discipline of waking up at 5 am for exercise. In the long run, I realized that I do nothing whenever I go out for exercise. I barely jog because I've always been weak. I always achieved less, and when I returned, I still felt flabby and inactive. On realizing this, I decided to abolish the 5 am exercise routine. I decided I would exercise whenever I felt I should, which could be at any time of day or night. And guess what? I have been much more productive since I made this decision.

Recreational exercise is very important in our daily lives. You have to understand your body and travel according to its cravings. Institute the principle of leaving everything behind to revamp yourself in all aspects. Learn to go on holiday and rest as much as you can. In fact, this is usually the time you have to evaluate what you have done so far and propose ideas on how to perform better. Recreational time allows you to audit your company's brand, including its logo, structure, sales/marketing strategy, client satisfaction, feedback, bank account, employee evaluation, self-

evaluation, plan projection, public acceptance, health state, and others. Thus, you can still achieve a lot while on a holiday. Note that the above things are not to be done devotedly, I mean, like sitting down to work on them. No, they are done reflectively. For example, you can visualize how you can improve your company's logo even while you are swimming, and vice versa. In summary, recreational activities are important for personal and business development. Aside from these things, the moment is always overwhelming, just as you are on your balcony reflecting on it now.

My Understanding Of The Universe

I can imagine how hard it is for you to collectively summarize your understanding of the universe. The universe is a mystery to many, especially the inconceivable universe. Well, regardless of the fact that the universe is complex to understand, it's important that we reason and think about it at all times. As a matter of fact, the more understanding you have about the universe, the more evolved you become. The more understanding you have about the universe, the more affirmation you have in your belief.

Religion believes that the universe was created by a supreme being known as "God". In contrast, science theorized that it came into existence as a result of a bang, popularly known as the "Big Bang." Whatever the case, we are a product of the universe, and the Earth, in particular, is an interesting place to me. Personally, as an adult with my experience and education, I have empirically concluded that, as there is a physical realm, so also a spiritual realm. And a human being is made of both the physical components and the Spirit. Meanwhile, I don't want to impose this assertion on you; it's only a preamble to state my point.

Science also theorized that our physical components are made of substances in the physical universe. This is why it is said that man is "stardust." Science is now attributing the spiritual aspect of man to fundamental particles. For instance, string theory posits that fundamental particles are not particles but rather strings of wave-light. This theory has dwarfed the Higgs Boson (Quarks). Some scientists also believe in quantum entanglement, which functions like a spirit. It is said to be spooky: two quantum particles can interact with each other no matter how far apart they are. Regardless of how the universe was created and what it's made of, the conceivable universe is very large and expansive. For example, we have trillions of galaxies, each with trillions of stars, many of which are bigger than our sun. And just like our sun, each star has its

planets and moons. You can imagine how expensive the universe is. Yet, this is only 5% of the universe.

According to science, 68% of the universe is dark energy. Dark matter, on the other hand, accounts for about 27% of the universe. The rest, everything that has ever been observed with scientific instruments, the Earth, and all the matter in space, accounts for only 5% of the universe's size. Dark matter and dark energy remain ambiguous and mysterious, especially dark energy, because science currently knows nothing about it.

Science also believes that life might be outside our planet, known as "Aliens". This idea was birthed by a phenomenon known as UFO (Unidentified Flying Object). Some eyewitnesses claimed to have seen unidentified machines flying in space. Over this, some people, especially in the academic world, believe that it's Aliens on a voyage to Earth. Some theorized that these aliens operate in a dimension different from that of humans, since their manifestations are sometimes incorporeal.

Science theorized that the universe would end through a process called the "Big Crunch." Religion, on the other hand, especially Christianity, believes that some heavenly bodies like stars, planets, and moons will be destroyed and that there will be a new heaven and Earth, which will be occupied by people saved by God through Jesus Christ, and they will live in eternality. Eternality refers to the state of existing without beginning or end, beyond the boundaries of time, change, and decay. It describes a form of existence that is timeless, uncreated, and unending, often associated with the divine, the spiritual realm, or the fundamental essence of reality. In philosophy and theology, eternity represents permanence and absolute continuity, standing apart from the temporary nature of the physical world. It invites reflection on the deeper mysteries of life, existence, and the infinite.

Across cultures and beliefs, the idea of an afterlife reflects humanity's deep search for meaning beyond physical existence. Many traditions hold that life continues in another form, whether as a spiritual journey, a realm of peace, reincarnation, or reunion with a higher presence. These beliefs offer comfort, moral guidance, and a sense of purpose, reminding people that their actions on earth shape their spiritual path.

The spiritual aspect of life encourages individuals to look inward, cultivate compassion, and live with intention. It emphasizes connection to oneself, to others, and to the unseen dimensions of existence. Whether expressed through faith, meditation, reflection, or service, spirituality

helps people navigate life with clarity, resilience, and hope. The universe is much more than as written above. As a result, you have to reach out and do more research so you can develop your personal proposition. In all, you have to believe that you are the universe and whatever the universe has is deposited in you.

The Family I Built

Reflecting upon your life, what kind of family have you built? How happy are you with your family? Did you succeed in keeping them with you, or did you break them apart? Well, building a family, I can say, is a thing of luck sometimes. Some people have made serious commitments to sustain a family, and it still breaks apart in the end. Some people make less effort yet live happily as a family. Whatever the case, family is important in our lives, especially the nuclear family. Your family is the only place you can run to when everyone on Earth has rejected you. Your family is the people you should contact unapologetically in an emergency. It's your family that people will call for your identity at death; therefore, after God comes a family. Now, how did you manage your family and business during a time of struggle? What did you sacrifice for the peace and harmony of your family, and what did your family sacrifice for your business? In what way have you lifted up your family, and in what way has your family lifted you up? Family brings mixed emotions; it brings joy and security, but it can also create dependency and attachment. Your family can make you when you are fortunate, and it can break you when you are unfortunate. Some family members will love you and be truly happy about your progress, while others will hate you and envy your progress. Therefore, manage a family with great introspection.

The best way to manage your family and build a chasm between them and your business is to build attachment among your people. Build attachment for your wife, mother, father, siblings, and children. This will always make you nostalgic whenever you unjustifiably stay away from them. And how do you build an attachment for your family? An attachment comes from the bond you build with your family over time. Therefore, you must create time to bond with your family, especially your children. Of course, you built bonds with your parents and siblings while growing up, but you need to take steps to strengthen those bonds.

No matter the circumstance, you should never ignore or avoid your parental responsibilities to your children. Ensure that they are provided

with immediate needs. Give them a good education, if possible, to a PhD level. Create time for them and provide parental guidance. Renew the bond with your parents, siblings, and wife. The best way to achieve this is to show concern, cater to their needs, and do something new for them. Establish your siblings, especially the younger ones. Take it upon yourself to always spend time with your family and those you cannot be with. Make sure you put a call through, too. Avoid returning home late. When you close from work, go home straight and avoid hanging out with unscrupulous people for a drink or other unfruitful activities.

Allocate play time for your children. Play with them, say good words to them, tell them how great they will be, and reprimand them when they misbehave. Take them out for recreational activities, enroll them in a good school, and ensure they are properly fed and clothed. Always make time for your wife and express your love for her. Get her a gift whenever possible. Establish and support her. Be ready to accommodate her flaws. Build her mentally and spiritually. This is not necessarily for her but for your benefit. The reason is that when she is happy, she will give you peace of mind.

Your Contribution To The Automotive Industry

As a successful automotive CEO, how have you changed the industry? Did you end up in the manufacturing sector, or did you buy vehicles and resell them to end users only? Or you probably finished in another automotive sector? Every industry evolves, and the automotive industry is no exception. For this reason, anybody who enters the automotive industry must contribute to its evolution. This will be their ultimate achievement, and this evolutionary change can immortalize them.

You may ask how it can immortalize you. Ford Motors immortalizes Henry Ford. The airplane immortalized the Wright Brothers. Elon Musk shall be immortalized by SpaceX, X, Neurolink, and Tesla. Karl Benz is immortalized by Mercedes-Benz. A vehicle airbag is immortalized in John W. Hetrick. A traffic light immortalizes John Peake Knight, and so on.

I have discussed the list of careers we can build upon in detail. Please refer to it for a better understanding. The bottom line is that you have to do something revolutionary in the industry; shift from the norm and come up with something contemporary.

What Is Expected Of A Modern Automotive CEO

A modern automotive CEO holds a strategic position to influence the future of mobility across multiple sectors. His contribution begins with advancing sustainable land transportation, developing cleaner vehicles, supporting EV infrastructure, and promoting efficient supply chains. By investing in renewable energy, intelligent design, and safer transportation systems, he can help shape a greener and more connected mobility ecosystem.

Beyond land vehicles, an automotive CEO can expand into maritime innovation by supporting electric boats, smart ports, and hybrid propulsion systems that reduce marine pollution. Partnerships with shipbuilders and logistics companies can accelerate the adoption of cleaner technologies at sea.

In aviation, an automotive CEO can drive cross-industry collaborations to develop lightweight materials, battery innovations, and autonomous systems that support electric aircraft and unmanned aerial vehicles. Encouraging engineering expertise and manufacturing scale to contribute to safer, more efficient air mobility solutions. With the rapid rise of Artificial Intelligence, a modern automotive CEO should champion AI-powered manufacturing, autonomous driving systems, predictive maintenance, fleet optimization, and mobility data platforms. Ensuring that AI becomes the bridge that connects land, sea, and air transport, creating a unified intelligent network.

Looking further, an automotive CEO can contribute to space exploration by supporting aerospace engineering, producing high-precision components, and investing in materials and propulsion research. His insights into mass production, energy efficiency, advanced robotics, and speed can accelerate the development of spacecraft, satellites, and off-planet mobility systems. In essence, a modern automotive CEO influences not just cars, but the entire mobility landscape, driving innovation that connects roads, oceans, skies, data systems, and even outer space into the future of universal transportation.

The People To Reward And People To Remember

Now, in your success, “who and who” are worthy of your reward or to be remembered? Well, they could be few or many. The fact is that there should be people we reward for our success. And these are people who played a major or minor role in your journey to success.

In your success, don't get carried away and forget those who assisted you on your journey. This could even apply to those who contributed to your progress but pulled out on the way.

Rewarding people is a good virtue for a CEO. Recognizing good deeds will hearten others.

The best way to reward and appreciate people who have shown kindness to you is to respond with sincerity, gratitude, and meaningful actions. A heartfelt "thank you" is powerful, but appreciation becomes deeper when it is expressed through thoughtful gestures, such as offering support in return, giving a small gift, or acknowledging their impact publicly. Recognizing their effort, showing respect, and keeping them in your thoughts and prayers also strengthens the bond. Ultimately, the greatest reward you can give is continued goodwill, loyalty, and the readiness to extend kindness to others, creating a cycle of positivity inspired by the good they have shown you.

Post-Success

Congratulations on your success in the automotive industry. Thank you for driving change in the industry and helping people in the cause. We are proud of you and expect more from your establishment. What is the forecast now? What is the structure of your company? When are you retiring? To whom shall you hand over your company? What further innovation would you want to bring to the automotive industry? These are key questions that will help you in your post-success state. This state is as important to you as when you are starting up your business. As it's said, "it's harder to sustain success than in the process of becoming successful. What is your way forward? Well, in the presence of success, unlimited opportunities are available. At this point, you have to open your eyes to see great opportunities around you. This period calls for greater advancement. It all depends on your goals and your age. Regardless, you must progress to a height greater than where you are now.

No company with a good structure and revenue would want to liquidate. Therefore, you should have this business philosophy of your company outliving you. It all depends on your plan and who you want to hand it over to. It could be that you want to employ capable individuals to run the company on your behalf, or you want to tell it. Conversely, you want to "will" the company to your children. Whatever the case, you are expected to diversify the industry and pursue innovations that enhance

its quality. You can diversify by entering another industry and making a change. As a matter of fact, you can diversify into other sectors in the industry until you build a conglomerate.

Happy Exit

This is the prime! You are a failure if you achieve the whole universe and die unhappy. Though you have done well in your business, revolutionizing the industry and achieving everything but dying unhappy, you are a failure. What measures your success is the state of your spirit, soul, and mind at death. You must die a happy man if you must be ascribed a successful man. This is the ultimate success! Dying a happy man gives you positive hope in life and the afterlife.

The only way we will die happy is by acting justifiably in our dispositions, from our teenage years to adulthood. This justification is working in absolute righteousness. The truth is that we can never be justified as long as we have acted wrongly. Therefore, it's imperative that we do it right at all times because this builds up over time and determines our state at death.

You must choose uprightness over anything. You must not tell harmful lies, cheat, steal, betray, or engage in illicit businesses and other things that work against your conscience. Because when your conscience is with no guilt, you will die a happy man.

Post-Life

Post-life refers to the concept and period beyond an individual's physical existence, encompassing the legacies, memories, and lasting influence they leave behind. In a professional and societal context, it extends beyond mortality; it represents the enduring impact of one's values, actions, and contributions. For leaders, innovators, and creators, post-life significance is defined by the institutions they build, the lives they influence, and the principles they uphold. It reflects the transition from personal achievement to collective remembrance, where one's work continues to inspire growth, purpose, and transformation.

Managing one's post-life legacy involves intentional leadership, mentorship, ethical conduct, and vision-driven decision-making, ensuring that achievements today create enduring value tomorrow. Expectantly, post-life is not the end of a journey, but the continuation of influence, a testament to a life lived with purpose, integrity, and lasting contribution to humanity's progress.