NPTEL ONLINE CERTIFICATION COURSES

Course Name: Entrepreneurship Essentials

Faculty Name: Manoj Kumar Mondal
Rajendra Mishra School of Engineering Entrepreneurship
IIT KHARAGPUR

Module 05:

Lecture 21: Identifying Opportunities Based on Trend

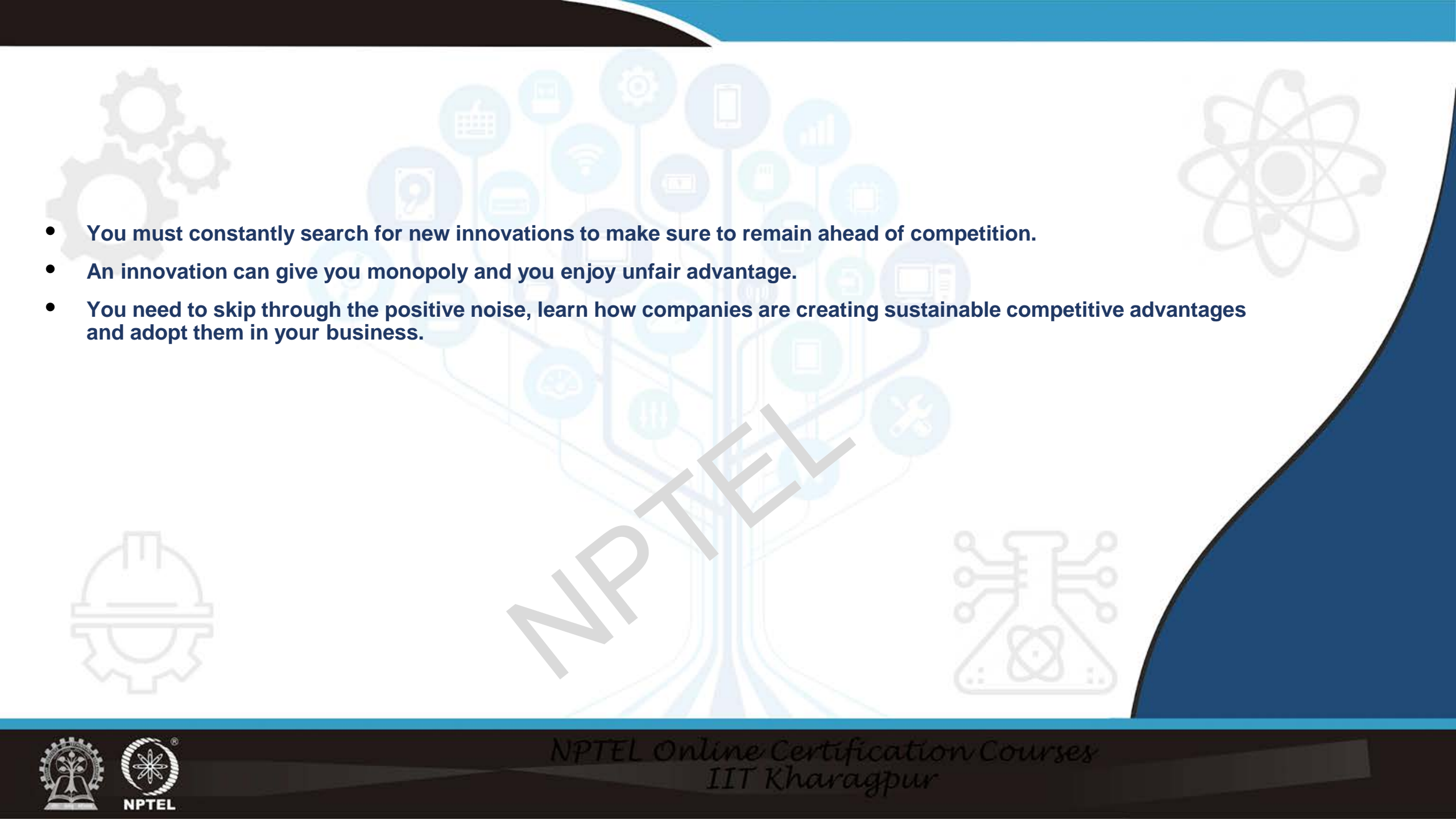# CONCEPTS COVERED

- Various trends defining the emerging business opportunities

- Our civilization has come up with new solutions to meet impending existential challenges – leading to emergence of new technologies.

- Every new technology brings with it multifarious new business possibilities.

A business model is a representation of how a business creates and delivers value for a customer while also capturing value for itself, doing so in a repeatable way.

- **You must constantly search for new innovations to make sure to remain ahead of competition.**

- **An innovation can give you monopoly and you enjoy unfair advantage.**

- **You need to skip through the positive noise, learn how companies are creating sustainable competitive advantages and adopt them in your business.**

Introduction

- **Every new technology brings with it multifarious new possibilities. It disrupts existing technologies and offers opportunities to create new business models.**

- **Steam engine emerged when there was no technology other than hand-tools.**

- **It revolutionized the manufacturing process across industries.**

- **Emergence of electricity transformed the whole industries bringing in unlimited possibilities.**

- **Advent of electronics has brought telecommunication and the programmable logic controller (PLC) bringing automation.**

Introduction

- The advent of internet transformed the way we communicate, entertain, educate, shop, manufacture, and manage our businesses.

- A whole new breed of industries offer, use, and exploit the internet.

- Analytics opened up scope for new efficiencies and analysis.

- Machine learning and Artificial intelligence has been redefining industrial activities and entering into our daily life.

- Digital communication has offered huge business opportunities and new technologies will disrupt the past and will make way for the future.

Trend: Selecting business model based on TREND

Trend provides great opportunity for starting new & winning ventures.

Those who are ahead of the trend or at least at the forefront of the trend, tend to enjoy natural advantages.

Therefore, it is important to be able to forecast the technology trend, fashion trend, social trend, lifestyle, economic and environmental trend for creation of attractive new businesses

Recent trends defining the opportunity landscape

- **Green**
- Clean energy
- **Organic orientation**
- Economic
- **Social**
- Healthcare
- **Web**
- Analytics
- **IoT**
- FinTech
- **Digital wallet**

- Digital currency (cryptocurrency
- **Robotics**
- Drone based technologies
- **Artificial intelligence, machine learning**
- Energy storage – Battery technology,

- Super capacitor /Ultra capacitor
- **Electric vehicles**
- Block chain
- **E-commerce**
- Digital communication (5G)
- **Quantum computing**
- Smart

- irrigation
- **Virtual reality (VR)/Augmented reality (AR)**
- Additive manufacturing
- Serverless computing

Green Trend

- Smart irrigation system, waterless toilet, water-efficient washing of cloths.

- Consulting firms that increase water-use efficiency

- Power saving solutions for buildings, offices, factories.

- Alternative energy for transportation, offices, factories and domestic appliances.

- Recycling.

- Paperless communication.

- Reclamation for parks.

- Plantation.

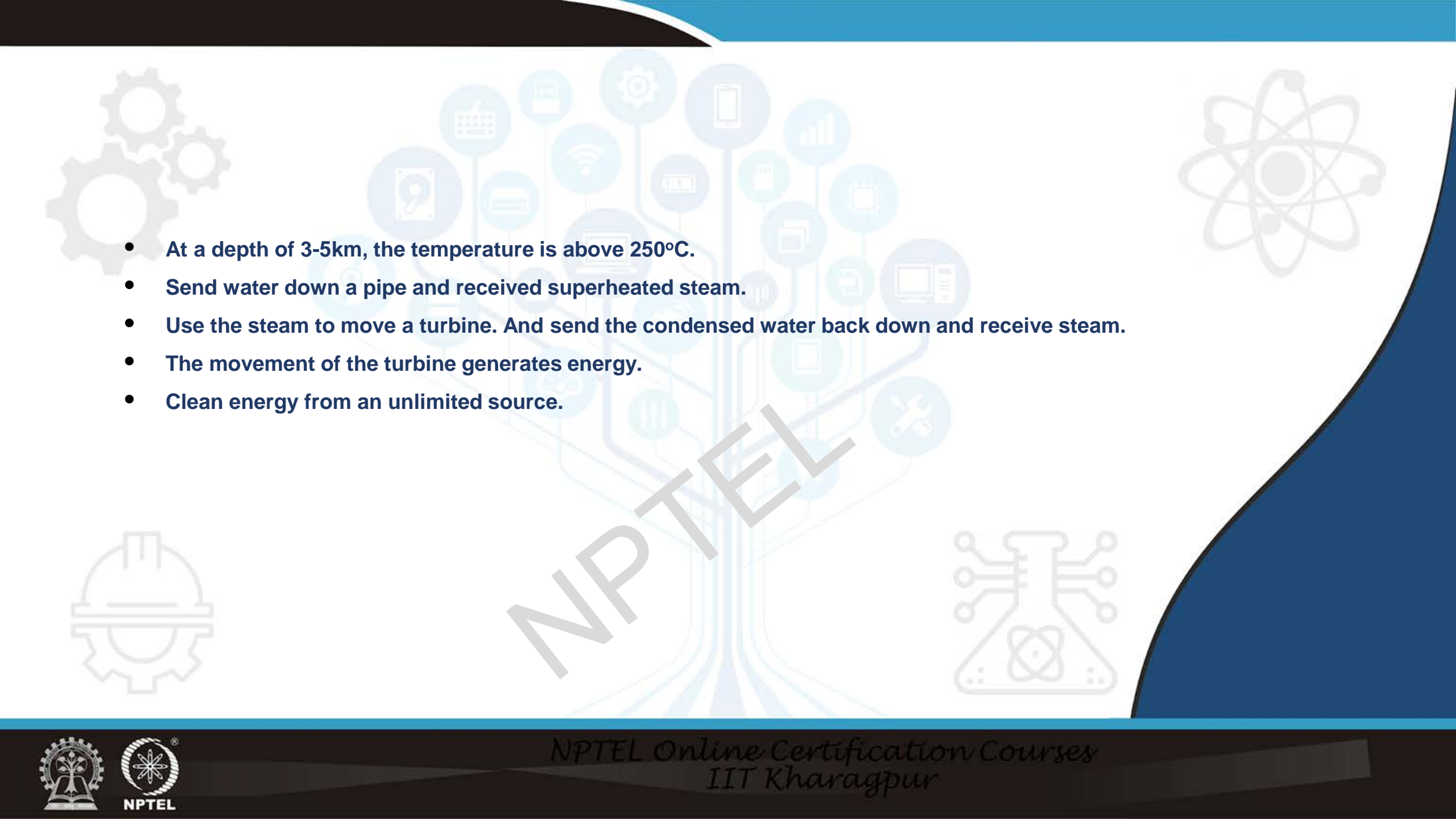- Alternative materials to trees.

Clean-Energy Trend

- Solar, wind, hydro, tidal, and geothermal.

- Adoption of green technology reduces global carbon footprint, thereby helps to earn carbon credit – a method of 'emission trading'.

- Generation of 1 MW of thermal power emits about 0.23 tonnes of carbon dioxide. Rate of 1 ton of CO_2 is US $ 20. In one year CC earnings is roughly 18,000 US $.

Geothermal Energy

Geothermal energy is thermal energy generated and stored in the Earth. The geothermal energy of the Earth's crust originates from the original formation of the planet (20%) and from radioactive decay of materials (80%).

The Geothermal Gradient
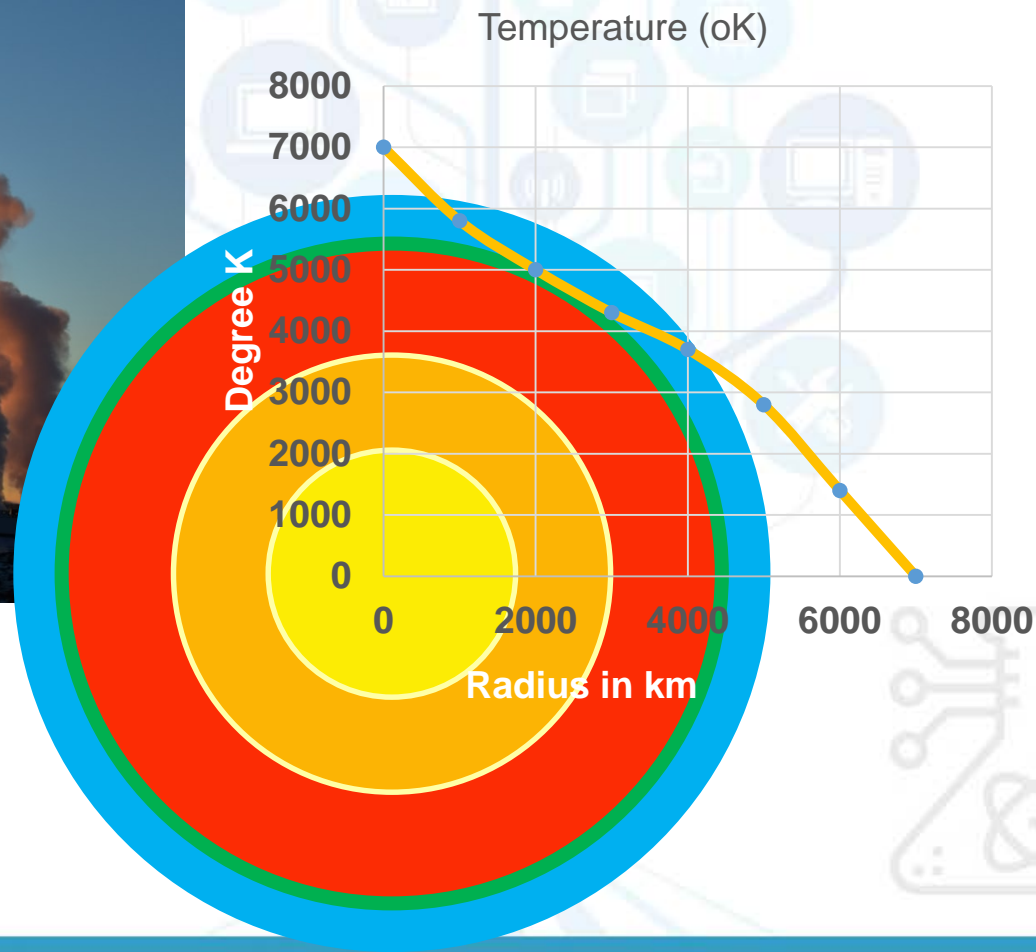
- At a depth of 3-5km, the temperature is above 250°C.

- Send water down a pipe and received superheated steam.

- Use the steam to move a turbine. And send the condensed water back down and receive steam.

- The movement of the turbine generates energy.

- Clean energy from an unlimited source.

Organic-Orientation Trend

- The price gap between organic and nonorganic food is narrowing.

- The use of organic food has gone up to 25%.

- Meat, dairy, fruits, vegetables, breads, snacks are major organic foods.

- Organic nonfood includes apparel, particularly baby apparel.

If you eat an average apple you also eat over 30 pesticides - EVEN if you washed the apple before eating it. Organic food contains no pesticides.

Organic Meat

Key requirements for organic poultry, cattle and pigs:

- **Must be raised organically on certified organic land**

- **Must be fed certified organic feed: containing no animal by-product or genetically engineered grains, and cannot be grown using persistent pesticides or chemical fertilizers.**

- **No antibiotics or added growth hormones.**

- **Must have outdoor access.**

Compelling Need

- Organic farming reduces pollution, conserve water, reduce soil erosion, increase soil fertility, and use less energy.

- Organic method of agriculture can reduce the need of fossil fuel for crop production by 70 percent. Can store CO2 by an amount equivalent to 40 percent of global emission.

- Just by reducing meat consumption, we can sustain food supply even in 2050.

Example: Healthcare trend

A total of 4,892 startups are active in the Indian healthtech space as in 2018. The healthtech startups in India raised a total of $504 Mn in 2018. The aggregate value of all the Indian healthcare market is projected at $372 Bn by 2022.

HEALTHCARE FUNDING TREND IN INDIA FROM 2014 TO 2018

Amount in Million Dollar

Year	Amount
2014	164
2015	307
2016	193
2017	347
2018	504
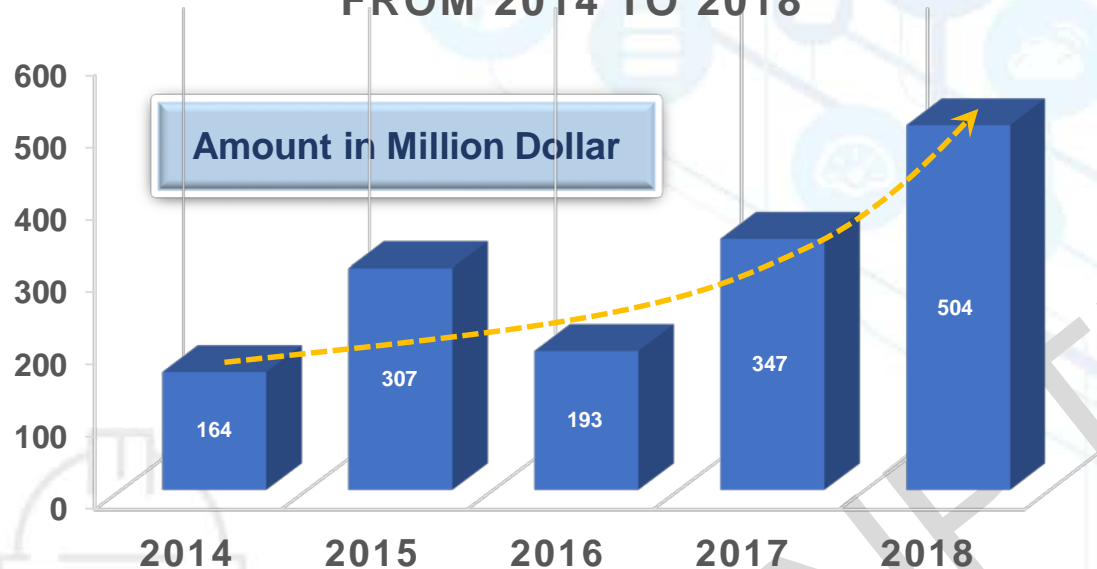
- The artificial intelligence-powered bots are being implemented in a wide variety of business verticals. You can book flight, order meals, check weather, get notified, and a plethora of other things.

- A new Spotify bot lets you suggest a song in a conversation and immediately play it, and Apple also has similar Music bot.

Chatbot

Redefines the way businesses interact with customers

- **Healthcare**
  - **Personalized experience, schedule doctor, notify caregiver**

- **Banking & Financial**
  - **Notify services, maturity information, & many more**

- **Hospitality**
  - **View & compare offers, compare room, availability info**

- **Manufacturing**
  - **Provide real-time information**

- **Retail**
  - **Keep customer informed about offers**

- **Insurance**

  - **Customer updating**

- **Human resource**

- **Sales & Marketing – smart segmenting**

- **Supply chain**

- **Customer care**

- **Workplace productivity - Business texting**

- **Content search**

Some Specific Trends that Helped Creating New Business Opportunities

- Usage

- Lend and pay a fee

- Collaborative consumption

- Circular economy

- Good enough or frugal innovation

- Free – Freemium, google, Spotify – zero marginal cost society

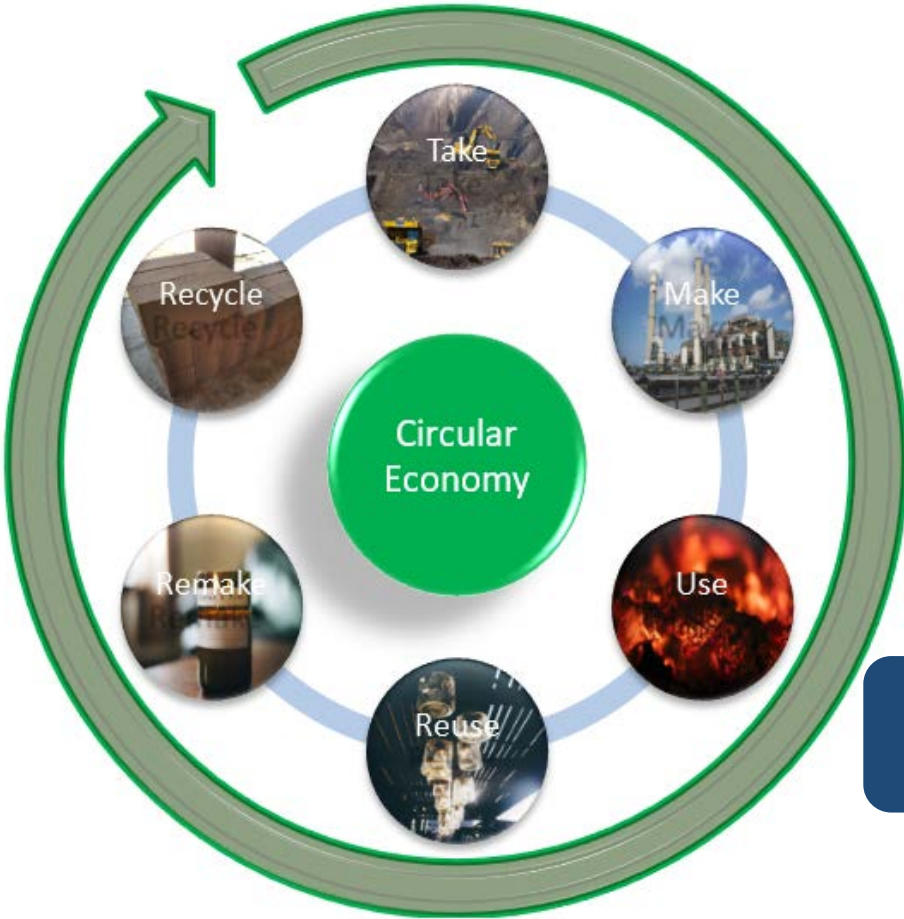- Performance based business model

- Experience – you pay money to go to a concert/show, though you can listen to the music free

- Crowd sourcing

- BoP/poor

Collaborative consumption

- **Carpool**

Linear Economy

Circular Economy

Linear process of consumption or linear economy

Take → Make → Use → Dispose → Pollute

Circular Economy: Take, Make, Use, Reuse, Remake, Recycle

et al. 2018)

Photo courtesy: The Tampa Bay Estuary Program, Yosh Ginsu, Paweł Czerwiński, Dominik Vanyi, Javier Graterol, Jeffrey Wegrzyn, Pop & Zebra on Unsplash

NPTEL

Economic Trend

Recession

- garden products, business coaching, discount retailing, credit and debt management, virtual meetings, outsourcing, and entire do-it-yourself movement.

- **Collaborative consumptions.**

Economic growth

- Discretionary expenditure (wants rather than needs), luxury goods, car rental, travel and tour, investment management, healthcare.

Social Trend

- **Connecting to friends and relatives**
- **Facebook, Myspace, LinkedIn, WhatsApp, Hike, Tinder, Pinterest, Instagram, Flickr**
- **Aging population have unique problems. Even aging entrepreneurs offer business opportunities.**
- **Annual festivities**

Health Trend

- Aging population needing health care is a long term trend today.

- Cosmetic procedure, mind expansion such as the brain gym or Vibration Brains, personal health portals, point-of-care testing facilities, fitness centers, fitness toys, fit food, convenient care clinic, wellness coaches.

Web Trend

- As we moved from one generation of wireless connectivity, newer business models emerged disrupting the status quo

- Low cost entry-barrier in consulting, blogging, online video, mobile applications, Wi-Fi apps, direct to home delivery of contents (Netflix)

- Apple and Android allow entrepreneurs to create and market their applications retaining 70 % of the revenues generated.

- Online interactive games have offered high growth opportunity

- E-Commerce

Web design's biggest trends for 2020

- **Designing truth –** separate truth from promotion

- **Accessibility is the key –** 26% of the United States' population experiences some form of disability

- **Content is no less important in UX design –** content is more important than design

- **Inclusivity is key –** empathize, treat "others" not as others, but as part of us

- **The no-code revolution has arrived** – just write and code get generated.

- **The rise of the visual developer** - coder or not, its easy

- **Role is not identity** - everyone is a designer

2020 Trends May Inspire New Business Ideas

- **1. Peer groups for community interaction**

- **2. Implementation of machine learning and AI**

- **3. DevOps availability for businesses of all sizes - Automated cloud deployments**

- **4. Demand for professional organizers - "Tidying Up with Marie Kondo"**

- **5. Continued demand for**

sustainability - quality, long-lasting items

- 6. Increased use of drones and 3D cameras

- 7. Emphasis on personalized experiences

- 8. Consumer preference on convenience

- 9. A growing gig economy

- 10. Support for veteran entrepreneurs

https://www.uschamber.com/co/start/business-ideas/new-business-trends

Following are some trends about customer engagement. Ignore at your own peril.

1. Consumers will demand more control over their data.

2. Alternative lending will continue to grow.

3. Everything that can be personalized will be personalized.

4. Subscription services will continue to skyrocket.
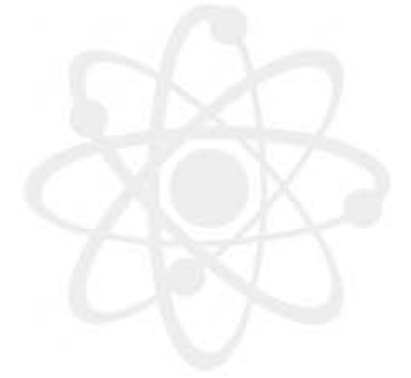
5. Socially irresponsible firms will struggle.

An article by Rashan Dixon in https://www.entrepreneur.com/article/323660

Peter Morville's "user experience honeycomb":
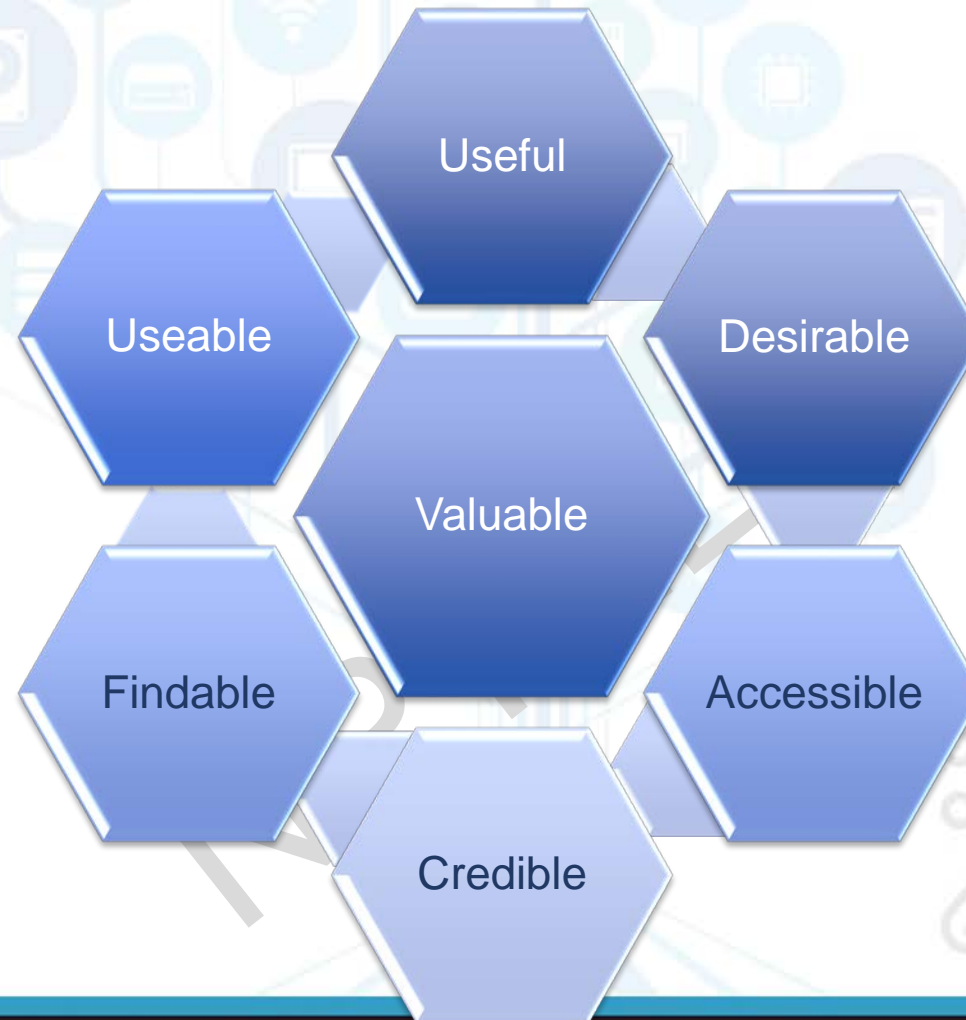
A few examples of mega-trends that greatly transform businesses

- Global Warming and climate change

- Scarcity of vital resources such as food, water, and land

- Recycling

- Global population growth

- Urbanization

- Digitization and robotics

- Artificial Intelligence

- Shifts in geopolitical power

- Human longevity and associated health and care challenges

- The Internet of Things (IoT) and how everyday devices are becoming more 'smart'

- Autonomous transportation

- Brain-machine interfaces

REFERENCES

➢   https://www.cbinsights.com/research/arvr/

▢   https://inc42.com/features/healthtech-startups-landscape-india/

▢   **https://webflow.com/blog/web-design-trends-for-2020**

▢   https://home.kpmg/xx/en/home/insights/2018/12/kpmg-artificial-intelligence-in-control.html

▢   **Icons from https://www.flaticon.com/**

▢   Icons made by Eucalyp

from www.flaticon.com

▢   The White Space and Business Model Innovation   by Mark W. Johnson

CONCLUSION

- Extrapolate the adage "Necessity is the mother of all inventions" and it will appear that new technology emerges to tackle the existential crisis faced by our civilization. Therefore, look for imminent problems to identify the next big technology.

- Every new technology brings with it multifarious new possibilities. It disrupts existing technologies and offers opportunities to create new business models.

NPTEL ONLINE CERTIFICATION COURSES

Course Name: Entrepreneurship Essentials

Faculty Name: Manoj Kumar Mondal
Rajendra Mishra School of Engineering Entrepreneurship
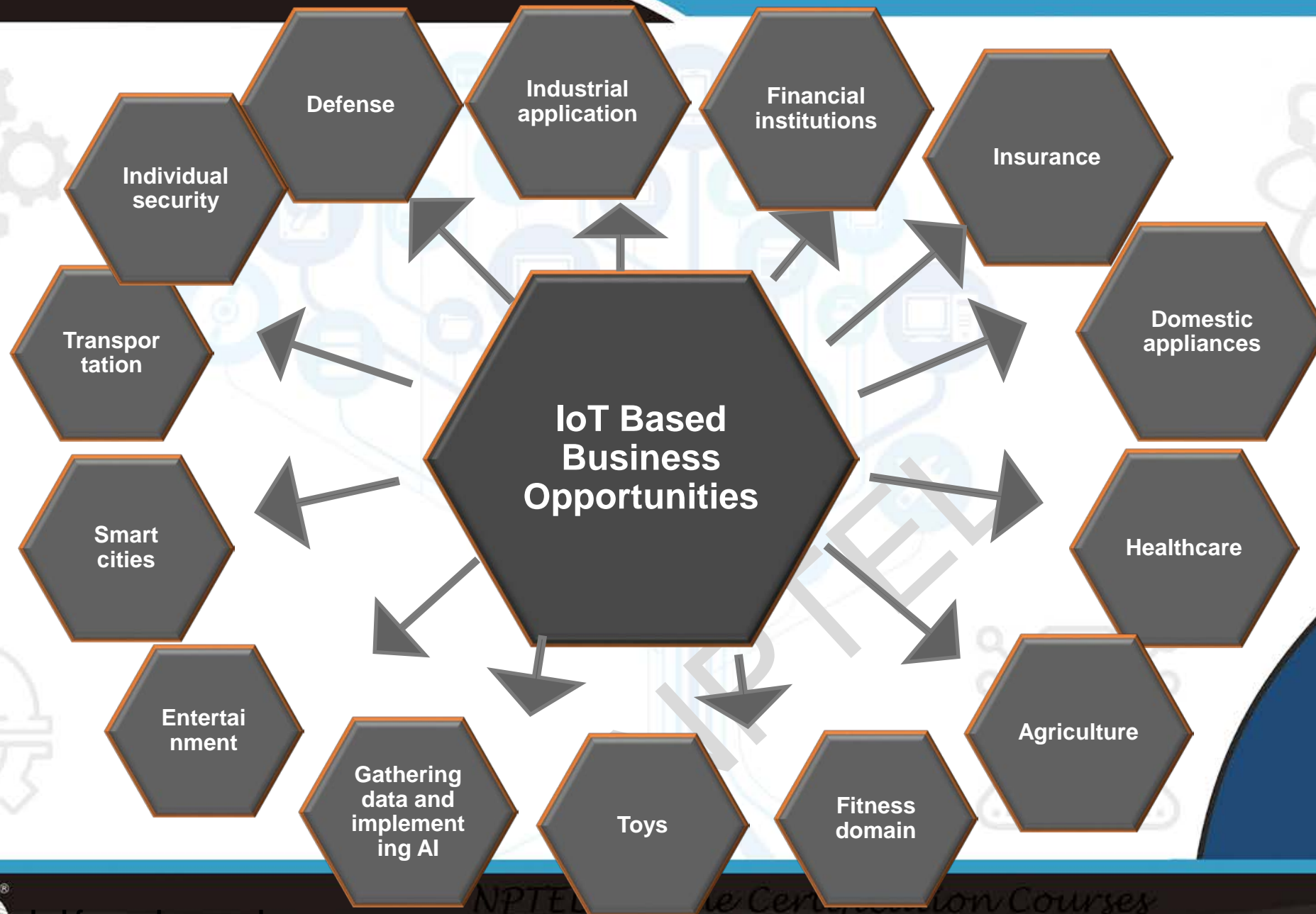**IIT KHARAGPUR**

Module 05:

Lecture 22: Circle of Competence and Effectuation

CONCEPTS COVERED

- Revisiting trend-based business model identification.

- While an opportunity may seemingly appear to be attractive, you have to ask the question if it is within your core knowledge domain before adopting it.

- Know your circle of competence and stay close to its enter.

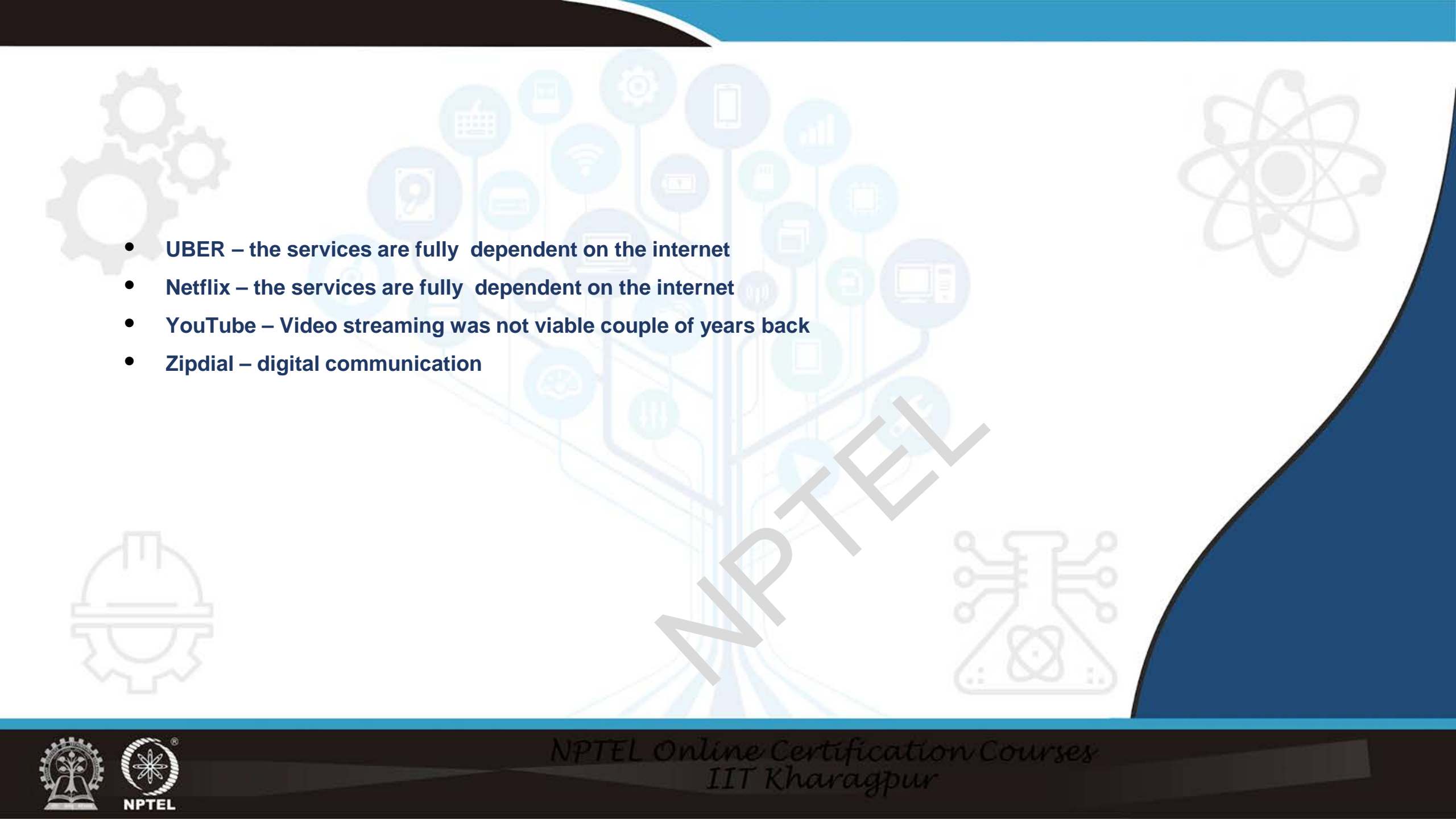- Effectuation – know your strengths and weaknesses and decide what business to start.

IoT based Business Opportunities

- Individual security
- Defense
- Industrial application
- Financial institutions
- Insurance
- Transportation
- Domestic appliances
- Smart cities
- IoT Based Business Opportunities
- Healthcare
- Entertainment
- Gathering data and implementing AI
- Toys
- Fitness domain
- Agriculture

NPTEL Online Certification Courses
IIT Kharagpur

NPTEL

- **UBER – the services are fully dependent on the internet**

- **Netflix – the services are fully dependent on the internet**

- **YouTube – Video streaming was not viable couple of years back**

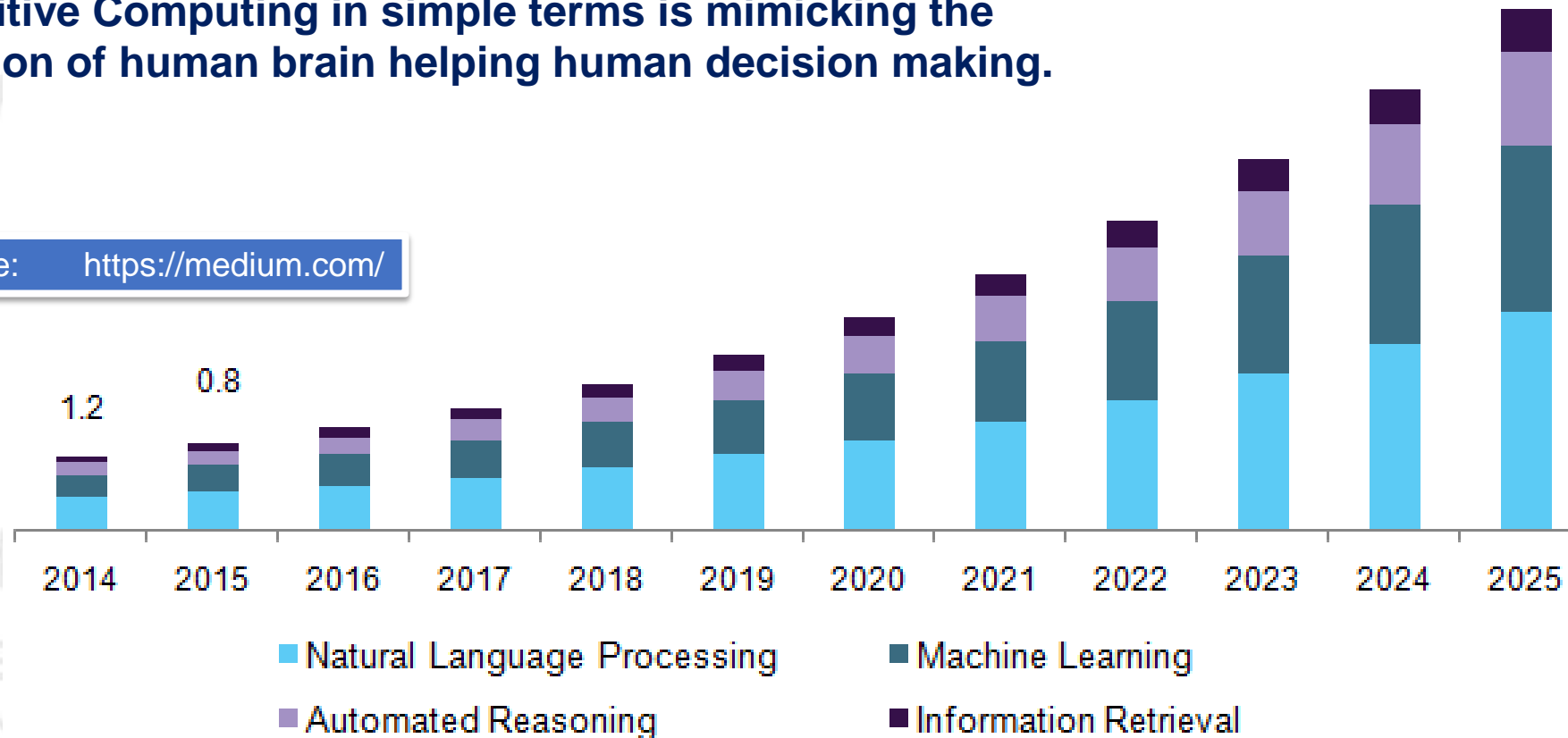- **Zipdial – digital communication**

Business Opportunities in IoT

- Smart Cities.
- Transportation.
- Semiconductor & Components.
- Telecommunications.
- Healthcare.
- System Design.
- Manufacturing.

- Software.

Use of AI In Cognitive Computing Is Creating Huge Business Opportunities: Projected to reach US $ 50 billion by 2020

Cognitive Computing in simple terms is mimicking the function of human brain helping human decision making.

Source: https://medium.com/

Legend:
- Natural Language Processing
- Machine Learning
- Automated Reasoning
- Information Retrieval

Selecting business model based on TREND has some downsides

- Intuitively, startups in the emerging technology domains should enjoy natural advantages. [Sometimes, figuratively referred to as "Blue Ocean" – a market segment where there is seemingly no competition]

- However, establishing business around new products has many challenges.

- Even established companies find it difficult to convince increasing number of customers to adopt the new products in spite of clear and pronounced advantages.

Adventuresome, usually highly educated, inquisitive, innovative mind, risk takers.

Leaders in respective segment, educated and knowledgeable ok with risk.

Socially active, take calculated risk, need a lot of validation to trust a new product.

Look for validation and revalidation, concerned for value for money. Averse to new experiment.

Complacent, averse to try lesser known product, risk averse.

Geofrey Moore: Crossing the chasm.

Innovator 2.5%

Early Adopters 13.5%

Early Majority 34%

Late Majority 34%

Laggards 16%
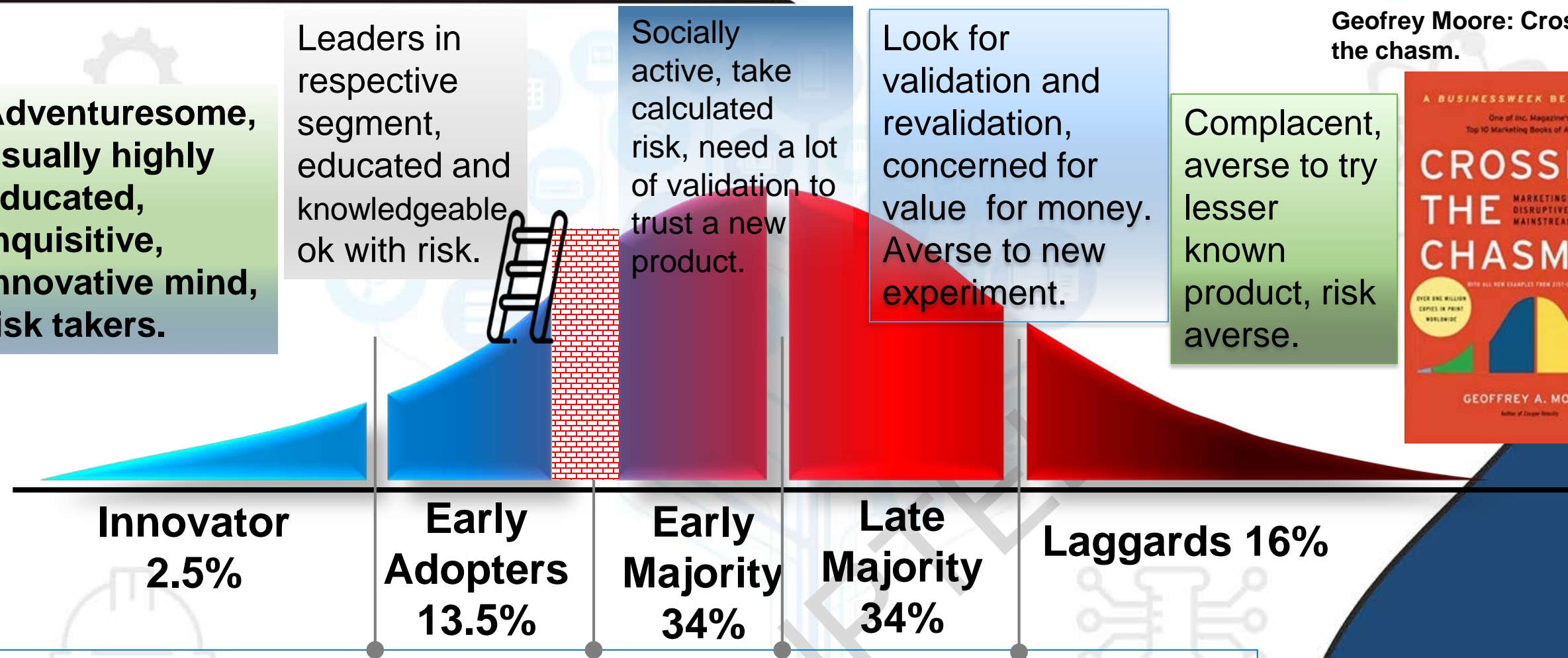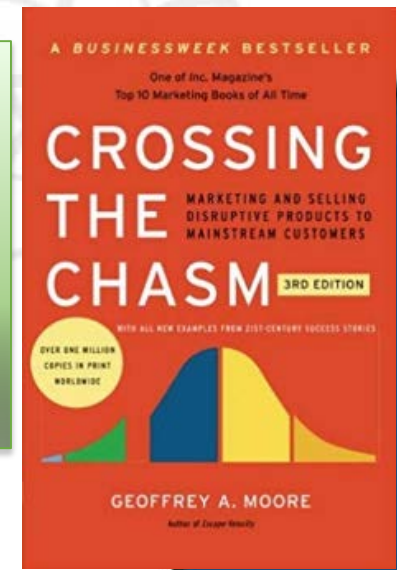
Product Adoption Curve

Types of consumers from new product adoption perspective

Identifying Business Model Based on Trend

- The product or service may be ahead of time.

- Crossing the chasm. Many of them fail at the growth phase.

- Consumer may not respond to new change or fail to comprehend the benefit. [P&G introduced concentrated laundry detergents, it failed because consumers could not conceive how a few drops could clean as well as a cap-full of Tide.]

- Strategy formulation and execution.

- Blue ocean market is too attractive and soon competition comes from no-where.

Anki Robotics and Artificial Intelligence

- **Despite being popular at places like Toys R Us for its AI race cars, the company tried to pivot to becoming a developed robotics company based on AI.**

- **They made invaluable progress in fleshing out what this new human-machine relationship might look like.**

- **They had wonderful products, but failed to grow from toys to something else.**

- **Starting in 2013, they raised $200 million, employed 200 technocrats, achieved annual sales of $100 million, sold 1.50 million robots, and shut down in April 2019.**

Airware:

- The drone operating system startup Airware shuts down after raising $118 million from top investors like Google's GV.

- The startup ran out of money after trying to manufacture its own hardware that couldn't compete with drone giants like China's DJI.

- Airware was far ahead of the game in building the software.

- The existing drone hardware wasn't sophisticated enough to absorb the granularity of data needed to train their algorithms.

- So they wanted to build the hardware themselves.

- But DJI and Ebee quickly caught up and Airware ended up burning hole in their pocket.

# Therefore, overemphasizing on trend in selection of business model may not always be such a good idea.

- Airware lost focus from the area of their strength, which was building operating system, to making hardware.

- Instead of meeting needs of existing customers, they tried to define the need themselves and tried to build it.

- Hardware is a different market and is a different business altogether.

Circle of competence

It does not matter how big is your circle. What matters is that you can create competitive advantage in this circle and can be winner remaining within it.

You actually know and have command over

Circle of competence
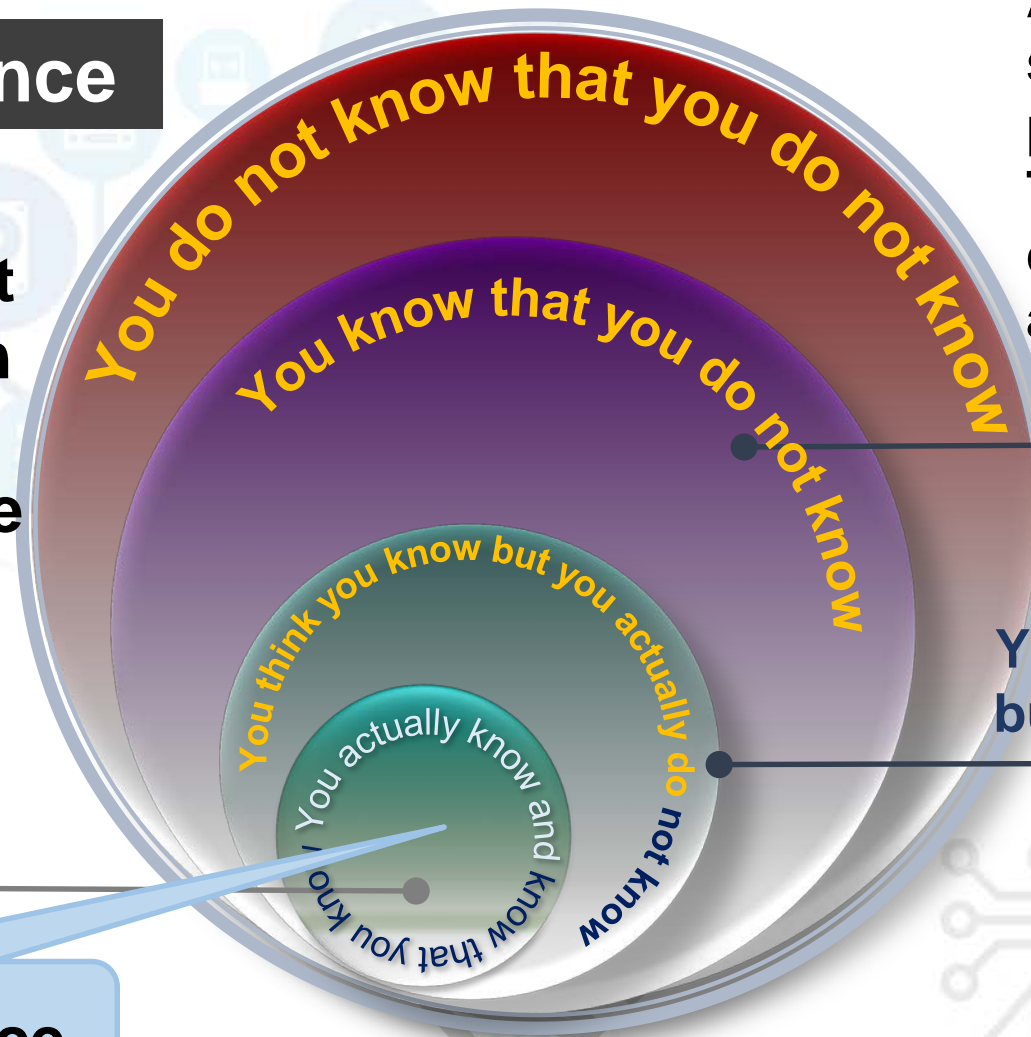
A circle of competence is the subject area which matches a person's skills or expertise. The mental model was developed by Warren Buffett and Charlie Munger.
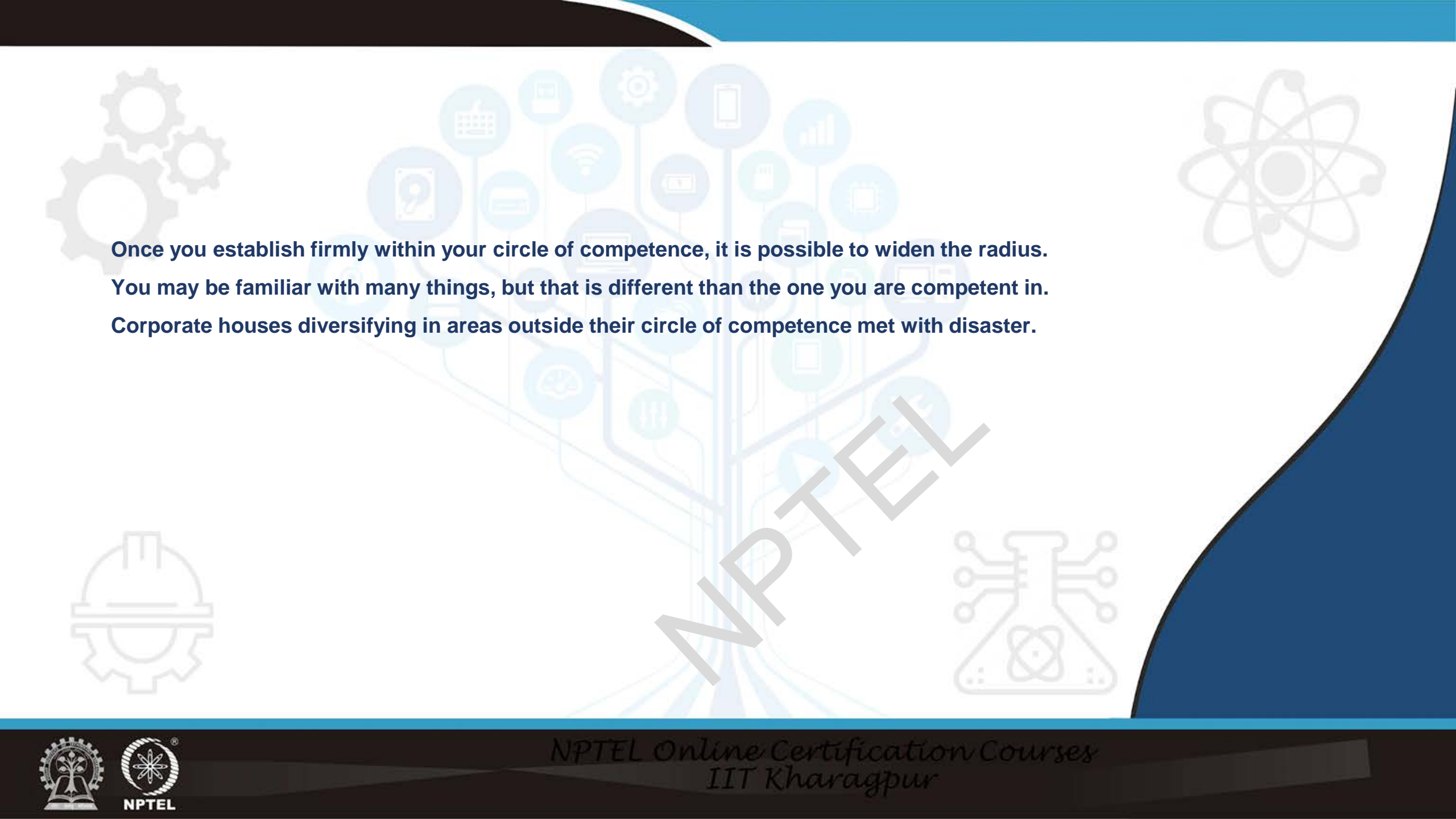
You do not know that you do not know

You know that you do not know

You think you know but you actually do not know

You actually know and know that you know

You know that you do not know.

You think you know, but you do not know

Circle of Competence

- **No one can learn everything.**

- **Even the best brain focuses on a narrow knowledge domain.**

- **Legendary investors Warren Buffet and Charlie Munger term this "narrow domain" as "circle of competence," an area that one knows very well.**

- **One can excel well if s/he sticks within this area.**

- **The size of that circle may vary across individuals but understanding its boundaries is vital.**

- **Tom Watson, Founder of IBM, a true believer in operating within ones' circle of competence, has famously said,**
"I'm no genius. I'm smart in spots – but I stay around those spots."

Circle of Competency – the Genesis

- In the complex corporate world it is impossible to master multiple things and perform.

- Even the companies with huge resources focus on a niche area to grow and prosper.

- This is famously called "Circle of Competency" by Warren Buffet and Charlie Munger.

Once you establish firmly within your circle of competence, it is possible to widen the radius.

You may be familiar with many things, but that is different than the one you are competent in.

Corporate houses diversifying in areas outside their circle of competence met with disaster.

Do not try to do everything or even many things.
Focus on the one thing you can do the best

- Do not dilute your focus by trying to do many things.

- Large number of products or services is a vanity metric: avoid it.

- Try to do one thing very well, particularly better than competitors.

- Try automating things so you can concentrate on other important things.

- Train and empower your juniors or hire professionals so that you can focus on more important things like formulating strategies for growth and preemptively keep an eye on competition, create better value for customers.

Circle of Competence (CC)

- Business case studies cite the case of GE, which successfully diversified within CC during 1981 and created huge wealth: from $12 b om 1981 to $400 b in 2001.

- They further diversified outside CC that went disarray and the value reduced to $76 b in 2019.

- Tatas, Birlas, Reliance, and many recent new enterprises such as OYO, FlipKart, Ola, have successfully diversified into variety of businesses.

- There are examples of disastrously failed diversification:

- Coke diversified to New Coke – failed and launched Coke Classic. Cosmopolitan magazine to yoghurt.

Achal Bakeri: Symphony Ltd.

An example of diversification leading to disaster and reverting back to outstanding performance.

- **MBA from US.**

- **Installed an air cooler that made a lot of noise, gathered rust, often leaked and had to be covered.**

- **Exasperated, Bakeri saw a huge business potential in superior quality air coolers and decided to build one that was sophisticated.**

- **Exported his air coolers in 60 countries the company market capitalization went above Rs 4,500 crore.**

https://www.youtube.com/watch?v=n03ebikt2Z8

Achal Bakeri: Symphony Ltd.

An example of diversification leading to disaster and reverting back to outstanding performance.

- He noticed unique synergies of logistic and marketing efforts in diversifying into manufacturing and selling geysers, room heaters, exhaust fans, flour mills, washing machines and water purifiers.

- After 8 years of diversification, the company lost more than 50% of its peak net worth and was declared a sick company.

- In 2002, reported loss of ₹31 crore on sale of ₹28 crore.

- The market wrote off the company.

- The market capitalization went down to almost 'nil'.

Achal Bakeri: Symphony Ltd.

An example of diversification leading to disaster and reverting back to outstanding performance.

- The company could restructure its debt.

- Dropped all the new products except the geyser.

- They came back to profit in 2008.

- Took over a Mexican company manufacturing eevaporative water coolers and became the largest water cooler maker in the world.

- The present market capitalization is more than one lakh crore Rupees.

Summarized from an article by Sulekha Nair in https://www.firstpost.com on Feb 02, 2015

Circle of Competence (CC): A time-tested strategy

- The concept of the Circle of Competence has been used over the years by Warren Buffett as a way to focus on investing in companies whose business is well-understood.

- The concept was articulated in his 1996 Shareholder Letter, where he wrote "What an investor needs is the ability to correctly evaluate selected businesses."

Entrepreneurial Expertise

What are the characteristics, habits, and behaviors of the species called entrepreneur?

Effectuation

Entrepreneurs constantly make decisions and take actions

Is there a pattern of their thought and basis of their decisions?

The basis of decisions and actions by successful entrepreneurs seem to follow a pattern or principles?

Effectuation

Effectuation

- Saras Sarasvathy, a cognitive scientist, studied 30 founders of companies ranging in size from $200 M to $6.5 B and spanning a variety of industries from steel and railroad to teddy bears and semiconductors and bio-tech.

- The results are these principles of Effectuation.
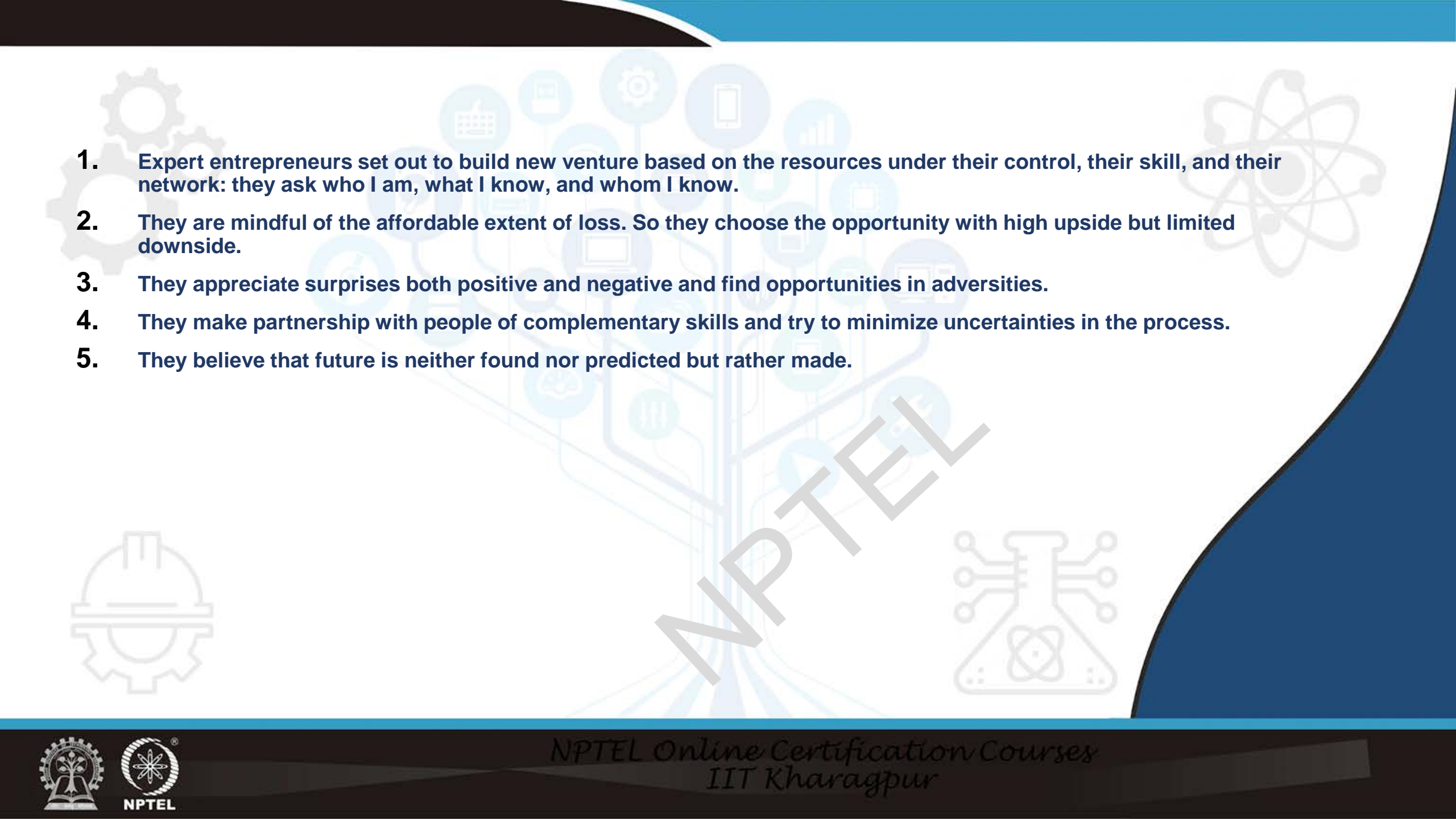
Business Models Generation/Innovation
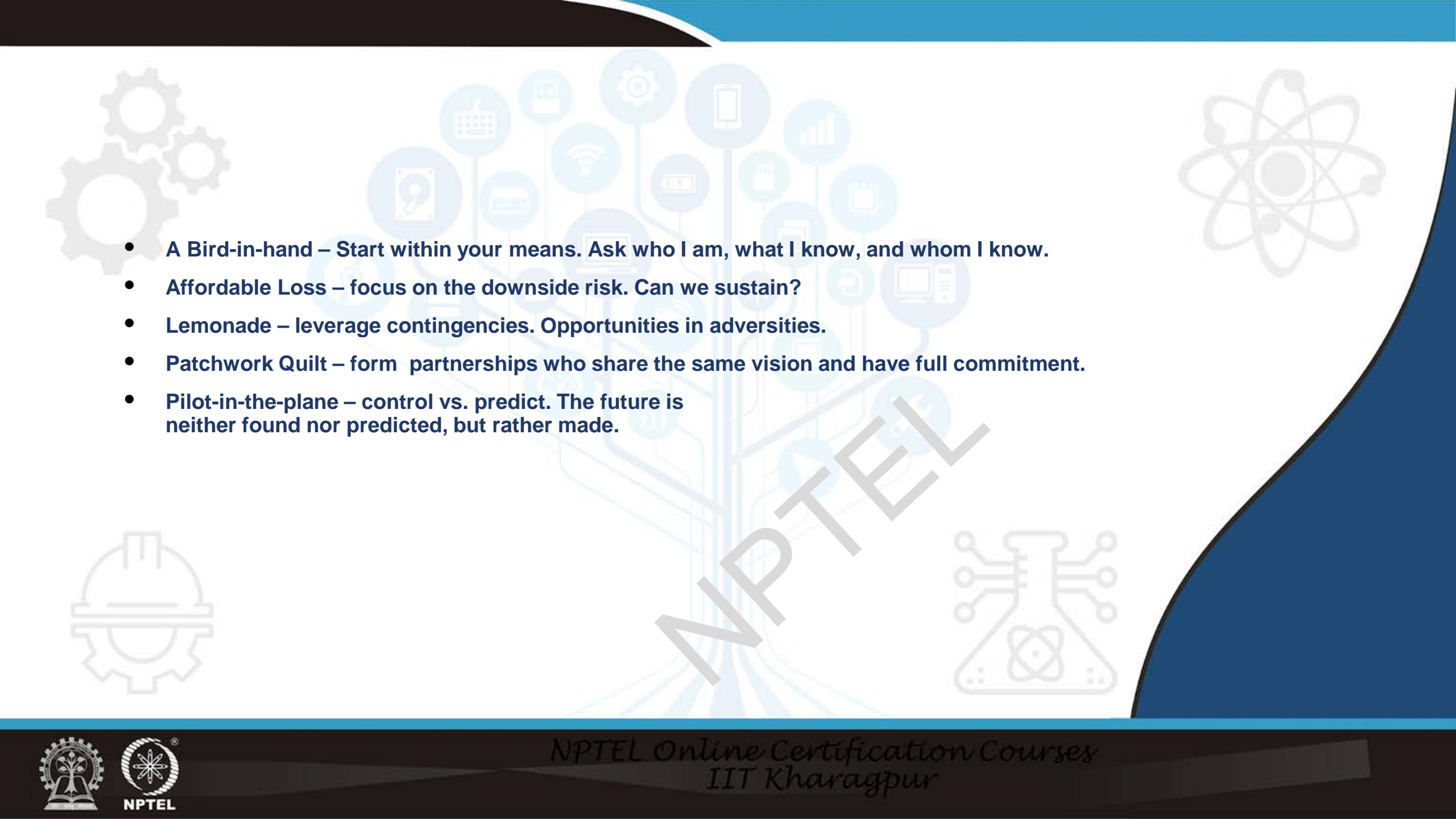
Effectuation: introduced by Saras Sarasvathy in 2001.

Expert entrepreneurs begin their quest to identify suitable business model by taking stock of <u>who they are</u>, <u>what they know</u>, <u>whom they know</u>, and <u>the resources they control</u>, a process referred to as *effectuation*.

Effectuation is a process of thinking that helps entrepreneurs to identify and assess opportunity for new venture creation.

It consists of a set of decision-making principles that experts employ in situations of uncertainty where outcome is unpredictable.

1. Expert entrepreneurs set out to build new venture based on the resources under their control, their skill, and their network: they ask who I am, what I know, and whom I know.

2. They are mindful of the affordable extent of loss. So they choose the opportunity with high upside but limited downside.

3. They appreciate surprises both positive and negative and find opportunities in adversities.

4. They make partnership with people of complementary skills and try to minimize uncertainties in the process.

5. They believe that future is neither found nor predicted but rather made.

- **A Bird-in-hand – Start within your means. Ask who I am, what I know, and whom I know.**

- **Affordable Loss – focus on the downside risk. Can we sustain?**

- **Lemonade – leverage contingencies. Opportunities in adversities.**

- **Patchwork Quilt – form partnerships who share the same vision and have full commitment.**

- **Pilot-in-the-plane – control vs. predict. The future is neither found nor predicted, but rather made.**

Contrarian view

- **Start small, leave your comfort zone, challenge the status quo, and try new things. – Salone Sehgal, TrulySocial**

Some Important Thoughts

- **The Two-minute Rule: Most people suffer from inertia in starting something. To overcome such inertia set target to do it in two minutes. You will begin to do it and eventually finish it.**

- **The 70 per cent Rule: Do not wait for 100% information. Start when you have about 70% information, 70% resources and 70% confidence. You don't need more than that for a successful start.**

- **The Pomodoro Technique: Build tasks that take 25 minutes each. Set a timer for 25 minutes, accomplish a task and take a 5-minute break. Repeat. This allows you to have a single-minded focus when you are working at a task. If you want to learn more about the technique, you would find a lot of material and apps for the same online.**

- **The 6 Most Important Tasks: At the close of the day, make a list of the six most important tasks that you need to complete on the next day. Now, simply follow the list the next day to complete one task at a time. Do not start the next task until you have finished the previous one on the list.**

REFERENCES

➢ Sarasvathy, S. D. (2001). What makes entrepreneurs entrepreneurial?

⬜ **https://www.linkedin.com/pulse/challenges-pursuing-blue-ocean-strategy-gerardo-a-dada Icons from**

⬜ **Kim, W. C., & Mauborgne, R. (2014). Blue ocean strategy, expanded edition: How to create uncontested market space and make the competition irrelevant. Harvard business review Press.**

⬜ https://techcrunch.com/2018/09/14/airware-shuts-down/

⬜ **https://www.flaticon.com/**

⬜ **https://techcrunch.com/2018/09/14/airware-shuts-down/**

⬜ **Icons made by Freepik from www.flaticon.com**

CONCLUSION

- **Business model canvas explains how a business creates and delivers values.**

- **Clear understanding of business model is critical for success of a business.**

- **Business model canvas is almost like a ready reckoner for conceiving various aspects of the business.**

- **However, business model canvas is only a part of the understanding of challenges and opportunities of a business.**

Course Name: Entrepreneurship Essentials

Faculty Name: Manoj Kumar Mondal
Rajendra Mishra School of Engineering Entrepreneurship
IIT KHARAGPUR

Module 05:

Lecture 23 : Lean Startup - 1

CONCEPTS COVERED

❑ **Product adoption curve**

❑ **Crossing the chasm**

❑ **Traditional linear process and lean process of product development**

Adventuresome, usually highly educated, inquisitive, innovative mind, risk takers.

Leaders in respective segment, educated and knowledgeable, ok with risk.

Socially active, take calculated risk, need a lot of validation to trust a new product.

Look for validation and revalidation, concerned for value for money. Averse to new experiment.

Complacent, averse to try lesser known product, risk averse.

Moore, G. A., & McKenna, R. (1999). Crossing the chasm.

Innovator 2.5%

Early Adopters 13.5%

Early Majority 34%

Late Majority 34%

Laggards 16%
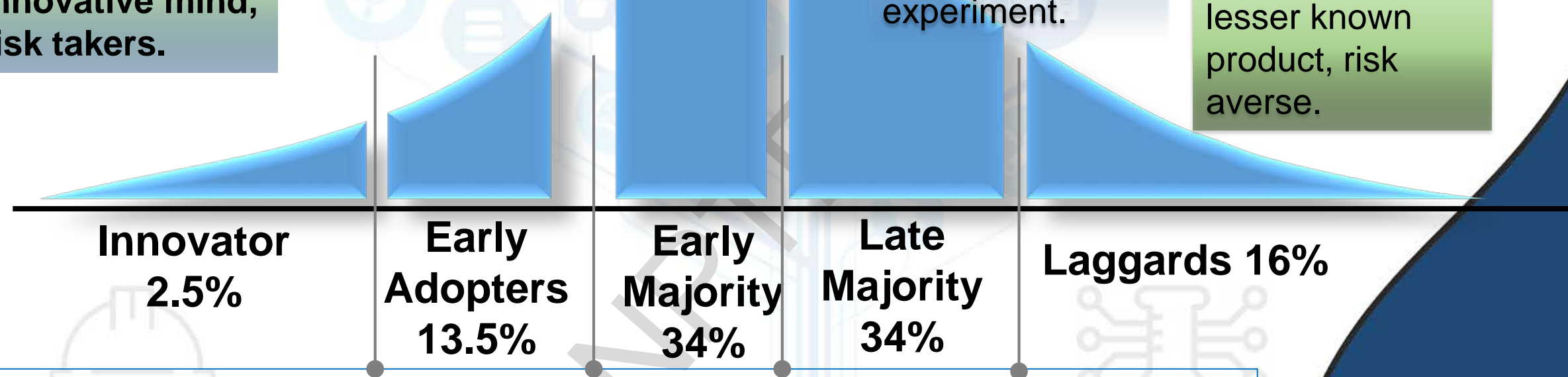
Product Adoption Curve

Types of consumers from new product adoption perspective

Adventuresome, usually highly educated, inquisitive, innovative mind, risk takers.

Leaders in respective segment, educated and knowledgeable ok with risk.

Socially active, take calculated risk, need a lot of validation to trust a new product.

Look for validation and revalidation, concerned for value for money. Averse to new experiment.

Complacent, averse to try lesser known product, risk averse.

Geofrey Moore: Crossing the chasm.

Innovator 2.5%

Early Adopters 13.5%

Early Majority 34%

Late Majority 34%

Laggards 16%
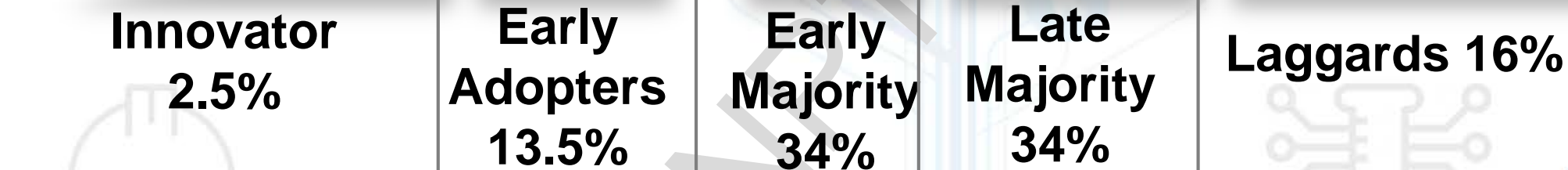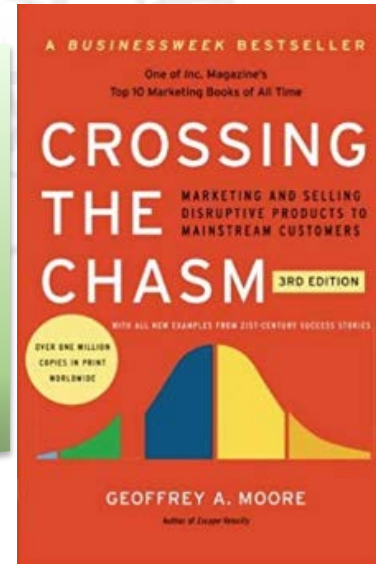
Product Adoption Curve
Types of consumers from new product adoption perspective

How to Successfully Cross the Chasm

- As you grow, onboard some early majority customers. Get a fair idea of what will attract the early majority.

- Preemptively arrange fund to meet growing need

- Have a manpower plan and take action in time.

- Think of hiring professionals to take care of key business areas, including a CEO.

- Think of perfecting the product instead of diversifying.

- Plan the logistics, alert suppliers & the warehouse facility.

- Understand business process management and handling customers complaints

Frugality is perhaps the single most important factor of success

Crossing the Chasm

- Moore's concept is about diffusion of innovation and is essential element of tech entrepreneurship.

- Early adopters of a product are mostly technology enthusiasts and visionaries and the early majority are the pragmatists. The stimulation does not work for both. So, there exists a chasm.

- Visionaries and pragmatists have different expectations.

- Techniques to successfully cross the "chasm":

- deep understanding of the product concept, position, build marketing strategy, choose the most appropriate distribution channel and price attractively.

Things are changing too fast. Survival is getting more difficult by the day.

Change Itself Is Accelerating:
Trends Driving Market Turbulence

1) The dual transformation through digital disruption in retail.

2) The rising dominance of digital technology platforms continues to shift market value in a big way.

3) Disruptive change through business model innovation across industries. [Trivago, Ola, Byju's, Paytm]

4) Cleantech and the downward pressure on energy prices has created new winners and losers in some of the world's biggest industries.

5) The rapid explosion of private "decacorn" companies signals accelerating turbulence in the years ahead.

Changing Perspectives

Uncertainty

- **Shareholders' demanded incremental improvements**
- **Financial capital is dominant**
- **Innovation was steady**
- **Prices reflected costs**
- **Customers were loyal**
- **Investors and regulators ignored ethical standards**

- **Shareholders demand "best-in-class" performance**
- **Intellectual capital is dominant**
- **Innovation is rapid**
- **Globalization is driving prices down**
- **Customers are fickle**
- **Investors and regulators are demanding higher ethical standard**

1960

2030

Life Span of S&P500 Companies Reduced from 61 Years in 1958 to just 18 Years in 2017

Average life of S&P 500 in years

Average life of S&P 500 in years
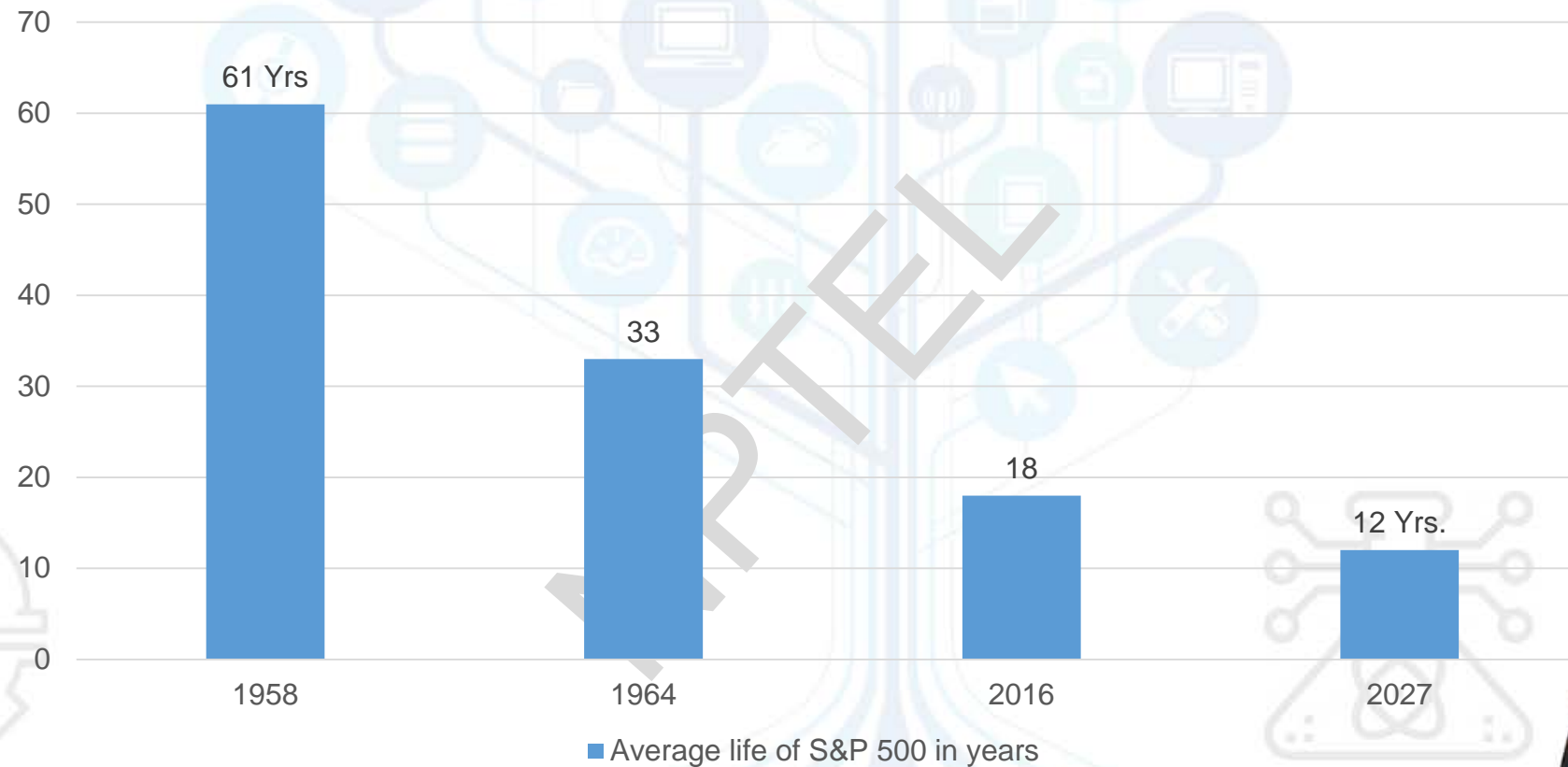
Over the past five years alone, the companies that have been displaced from the S&P list include many iconic corporations

Table 1: Sample Companies Exiting and Entering the S&P 500 (2013-2017)

EXITED THE S&P 500 (TENURE)	ENTERED THE S&P 500
Yahoo! (18 years)	Facebook
DuPont (50 years)	Incyte Corp
Urban Outfitters (7 years)	Foot Locker
Staples (19 years)	Regency Centers
Dun & Bradstreet (9 years)	Gartner Inc.
Starwood Hotels (16 years)	Hilton Worldwide
DirecTV (9 years)	Dish Network
Auto Nation (14 years)	Alliant Energy
Murphy Oil (12 years)	Under Armor
Transocean (4 years)	PayPal
Ryder Systems (35 years)	Activision Blizzard

https://www.innosight.com/insight/creative-destruction/

5,000,000,000 - five billion years

Agrarian 10,000 Industrial 200

240,000

Beginning of the solar system

Paleolithic era: Hunter gatherer

Agrarian

Industrial

- Our universe has been expanding starting from 5 billion years ago. And it has been expanding faster and faster ever since.

A different kind of acceleration has been happening here on earth. For humans, acceleration means that the rate and scale of cultural change is increasing.
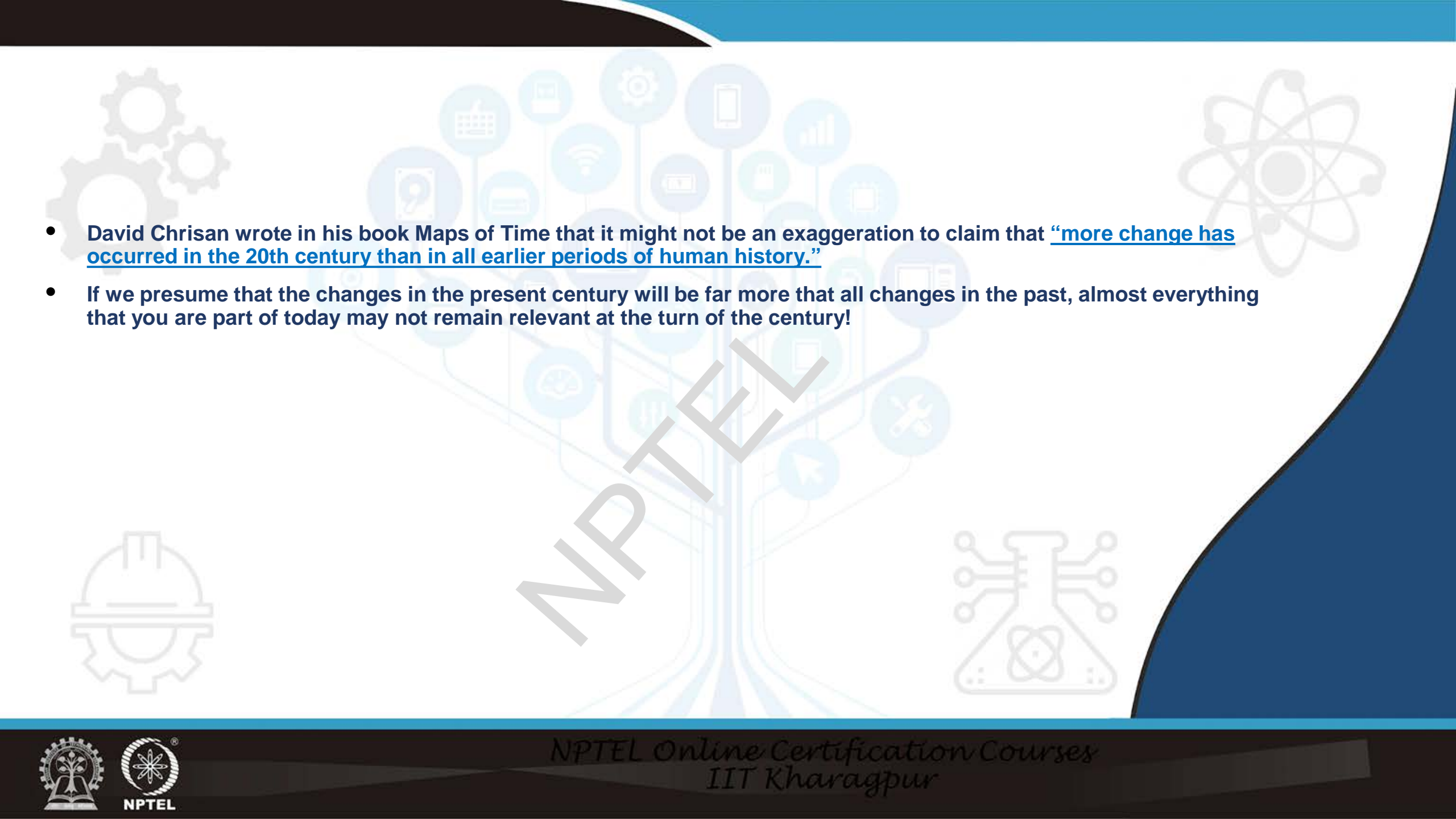
1990	World Wide Web
1991	First hydrogen fuel cell
1992	Digital cell phone
1995	DVDs
1997	Toyota hybrid car
1998	HD TV
2000	Nano-Text fabrics
2001	Artificial heart & lever
2004	Facebook
2005	YouTube
2007	High efficiency in solar cells
2010	iPad
	Autonomous vehicle
	Virtual reality
	ML, AI

Autonomous vehicle, human traveling and settling down in other planets, **Hyperautomation, blockchain, AI security, distributed cloud and autonomous things drive disruption,** **scientists could augment the brain to increase memory storage, or implant a chip to decode neural patterns.** Exoskeletons may become a standard uniform for autoworkers, enabling them to lift superhuman weights. Doctors may implant sensors to track how drugs travel inside a body. Technology is now on the cusp of moving beyond augmentation that replaces a human capability and into augmentation that creates superhuman capabilities. .

World Population: Source – Wikipedia
World population is keeping pace with technology development or vis-versa.
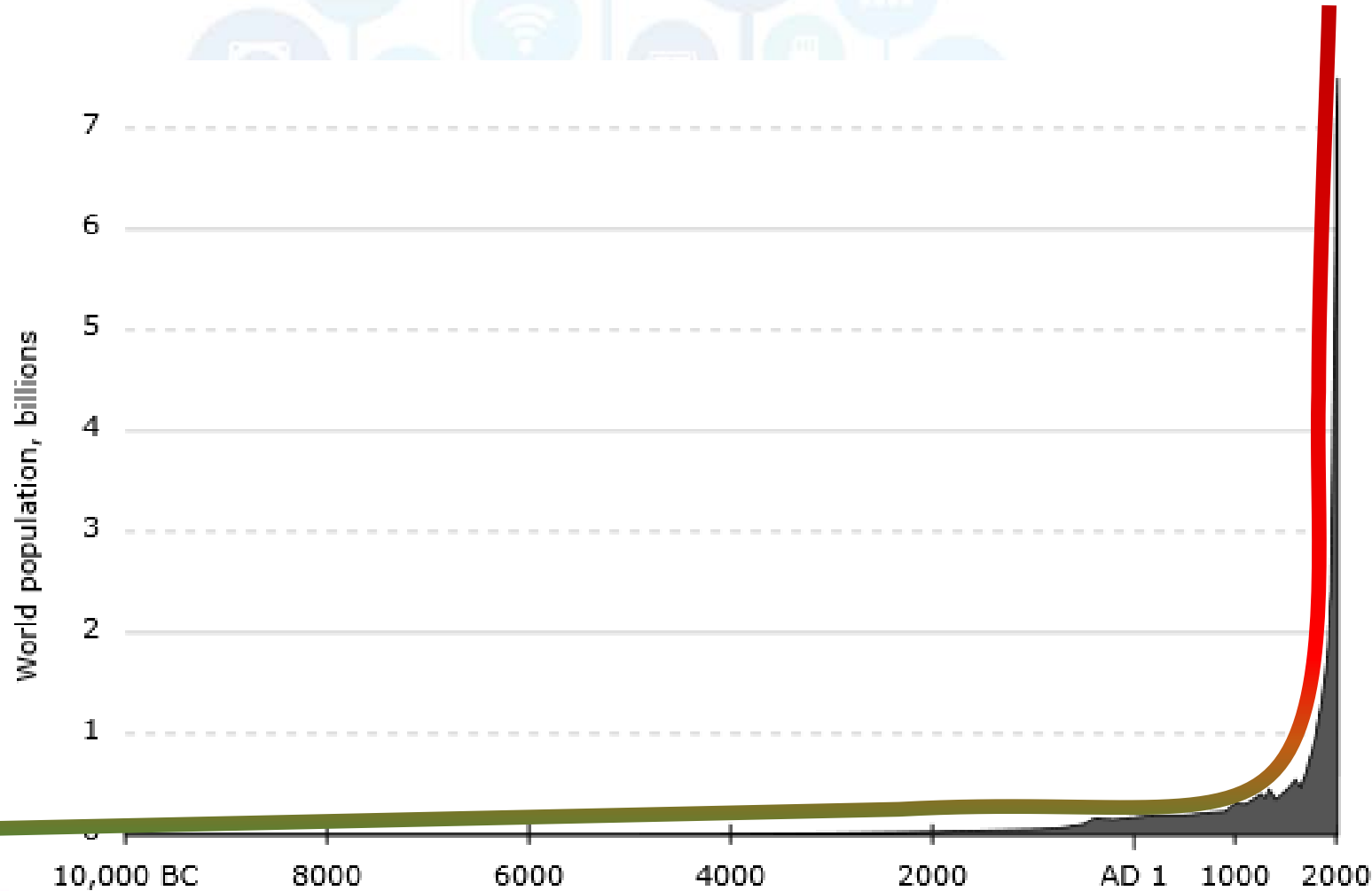
- **David Chrisan wrote in his book Maps of Time that it might not be an exaggeration to claim that "more change has occurred in the 20th century than in all earlier periods of human history."**

- **If we presume that the changes in the present century will be far more that all changes in the past, almost everything that you are part of today may not remain relevant at the turn of the century!**

Product development life-cycle should essentially reduce as we move forward. Else the hypothesis itself will change.

It is absolutely unaffordable to spend years in developing a product.

Because it would become obsolete or irrelevant by the time it would be ready.

Quick validation, redesign and rebuilding based on learning is the answer.

Intugine - smart ring called Nimble. The company has now been revolutionizing the logistics sector of India, which is still at its nascent stage as compared to its foreign counterparts.

"If the rate of change on the outside exceeds the rate of the change on the inside, the end is near" – Jack Welch

The quotation has been acquiring increasing significance with each passing day because of the continuing rapid pace of change in technologies.

Reducing product development lifecycle and ensuring that customers would buy what you produce is central to success.

Lean product development method that applies customer validation process at every stage of product development is an answer.

Waterfall Approach of Product Development
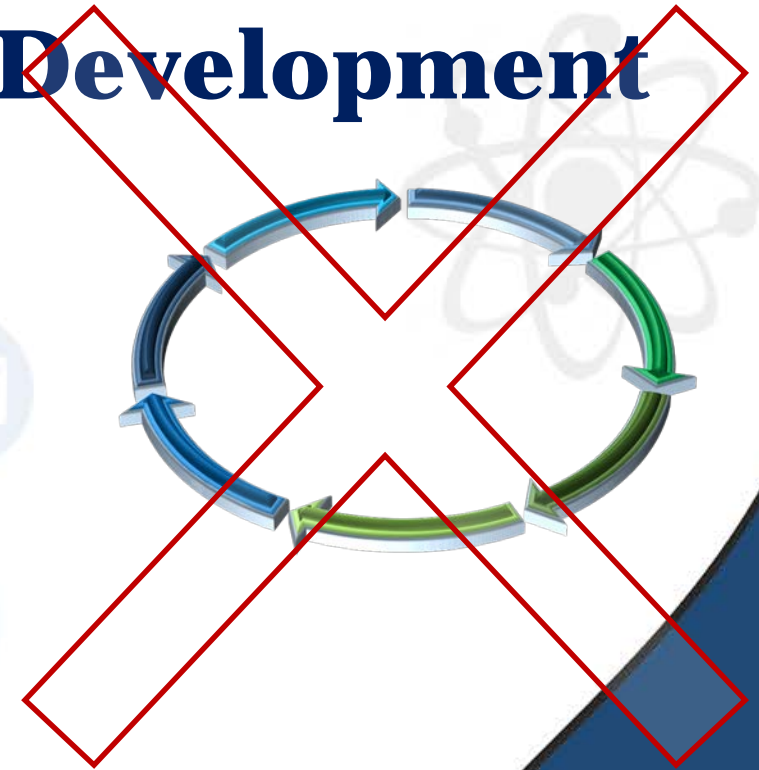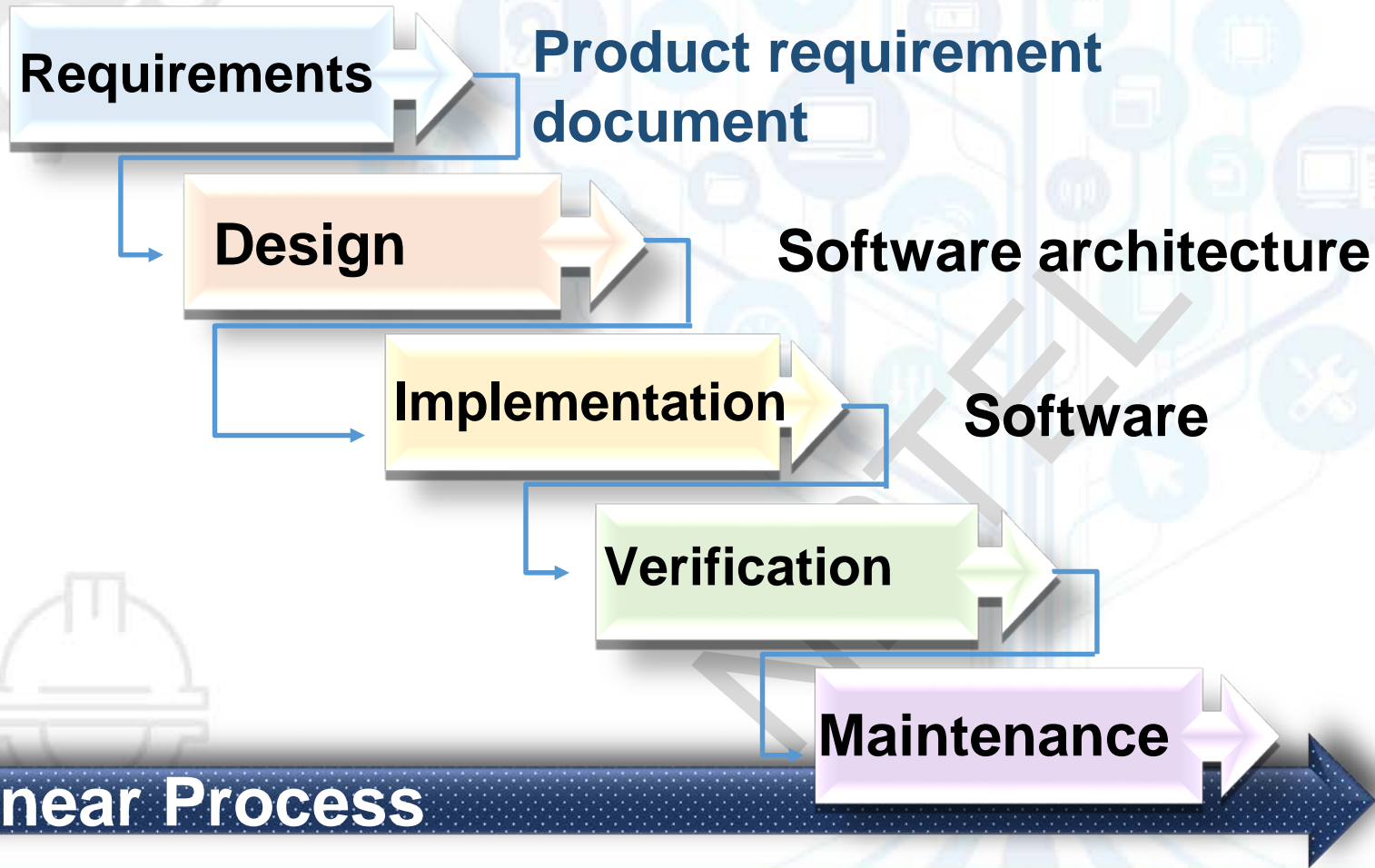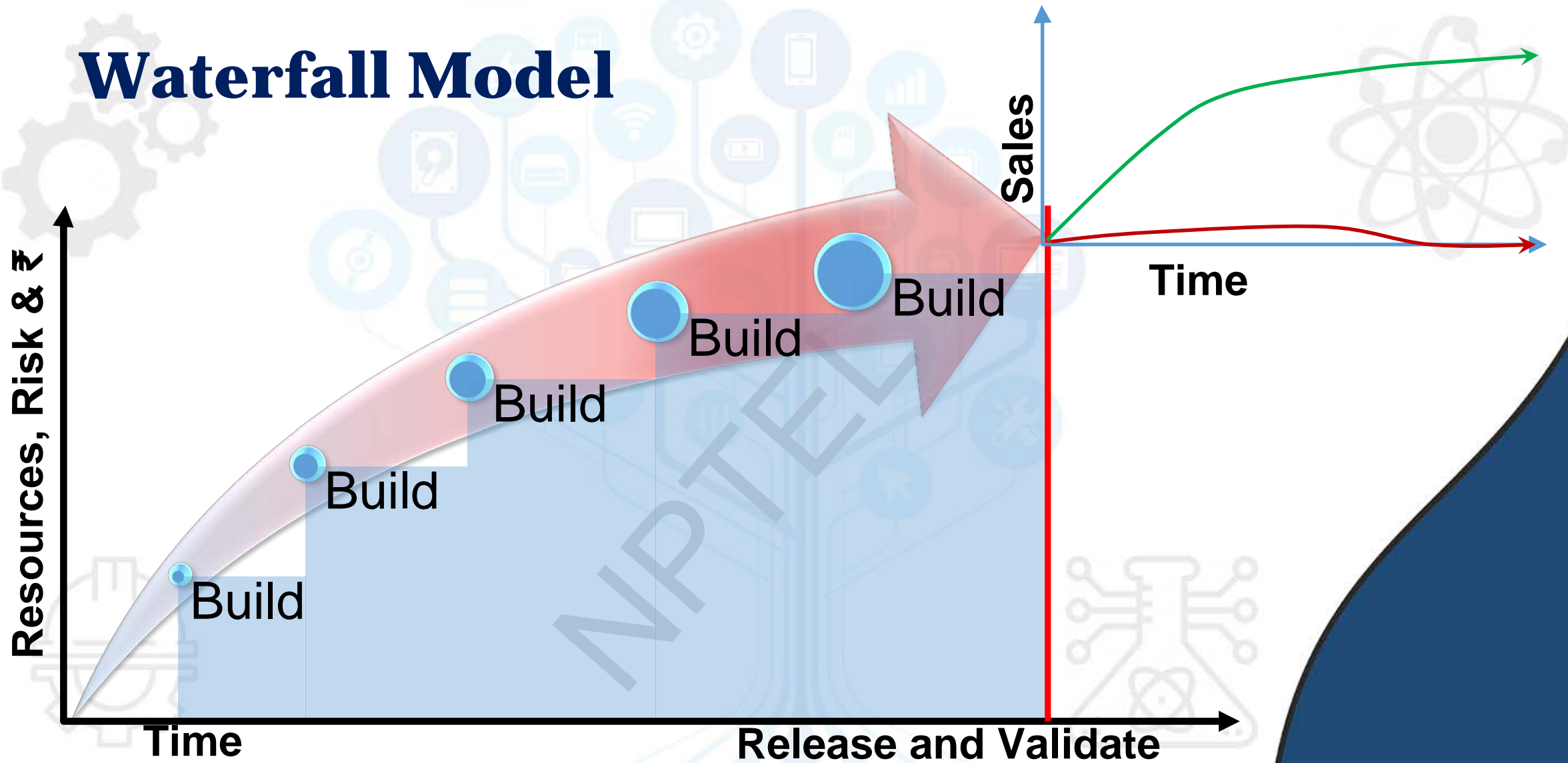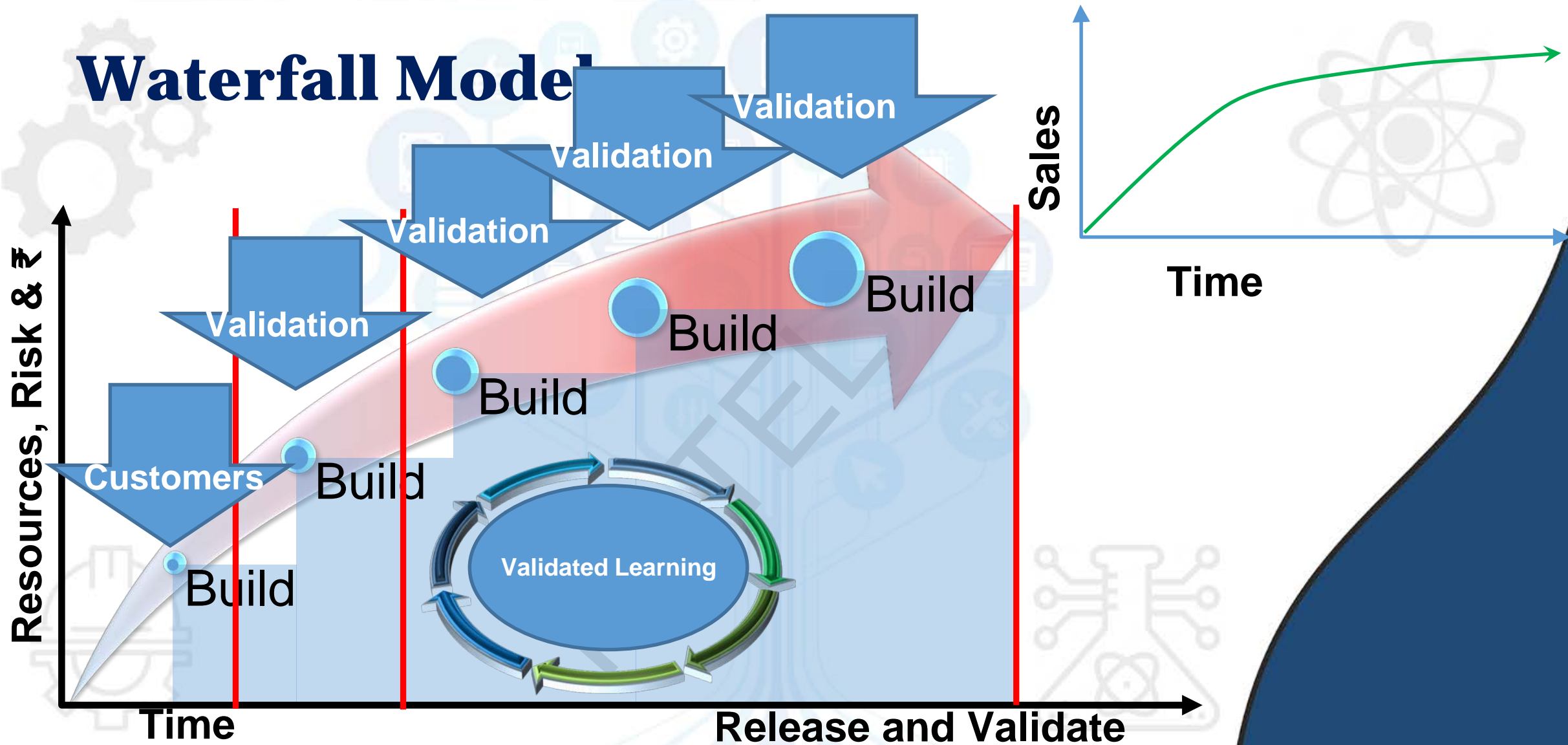
Requirements

Product requirement document

Design

Software architecture

Implementation

Software

Verification

Maintenance

Linear Process

Waterfall Model

Resources, Risk & ₹

Build

Build

Build

Build

Build

Time

Release and Validate

Sales

Time

Waterfall Model
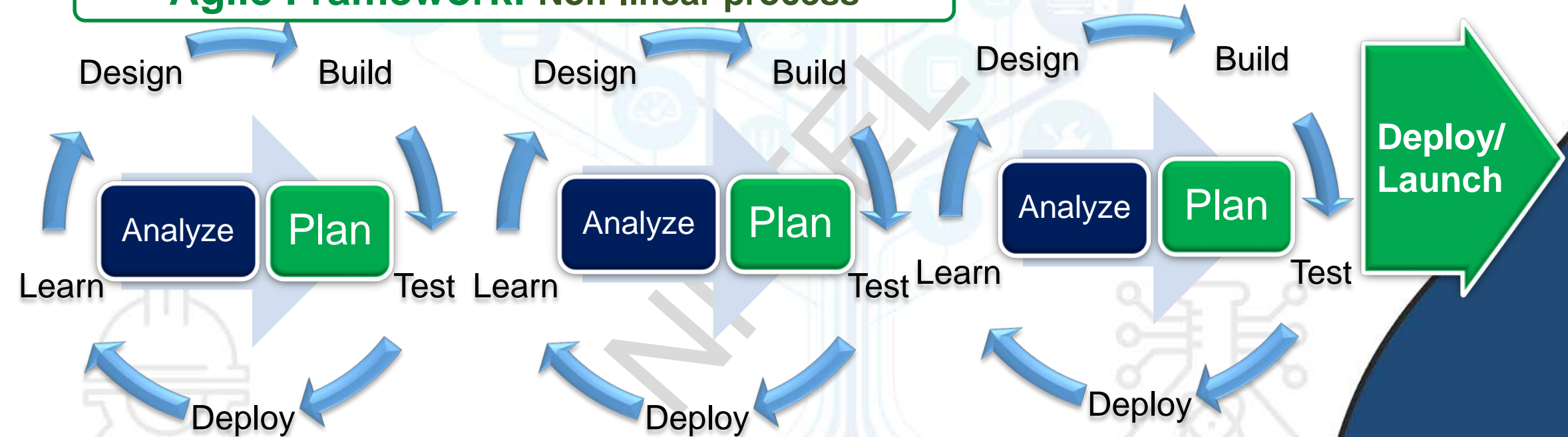
Agile System

An enabling factor in an agile manufacturer is that it allows the marketers, the production personnel and the designers to share a common source of information so that any correction in product can originate from the design itself.

A small initial problems may have larger downstream effects. It is a general proposition of manufacturing that the cost of correcting quality issues increases as the problem moves downstream.

It is cheaper to correct quality problems at the earliest possible point in the process.

The Lean Start-up Process

- Identify a suitable business model around a compelling pain (people are crying for a better solution).

- Identify essential components for customer to appreciate.

- Build a Minimum Viable Product (MVP).
  - An (MVP) is a product with just enough features to give the customers the sense of value proposition. It helps early customers evaluate the core functionalities and to provide meaningful feedback for future product development.

- Validate your hypothesis and thus the business model.

- Use the data and learning to repeat the process.

- Add more features and reduce some and repeat the process.

- Optimize and avoid waste.

- Gather data

Lean and Agile

- Lean recommends elimination of waste of all kinds of resources and waste is defined as the use of that part of resources, which does not add incremental value to customers.

- Agile requires processes, tools and training so as to quickly and economically respond to customers' needs and market changes.

- Applying both Lean and Agile can ensure better success of business.

Lean Startup

- Eric Reis seems to have combined the idea of elimination of wastes in lean manufacturing with the validated learning of Agile method, and expounded the Lean startup process.

How to Validate?

- Validation is assessing the possible product-market-fit through user testing.

- Validation is early test of your hypothesis.

- The process, when done early, helps to make faster, informed, and de-risked decisions.

- For validation of early prototype, develop Minimum Viable Product (MVP).

Creating the MVP

- Identify the most critical feature of your product or service that would help the customers make a decision about your value proposition.

- You need to understand the user stories – their pain point.

- **Here is an example**: You are planning to prepare contents for school kids that would engage them in hands-on learning. The user story is that "The school does not have the infrastructure to demonstrate practical experiments for wholesome understanding of many topics."

Example

- You prepare a few tools using which students can learn a small topic.

- Present it to a batch of students, check their response, and evaluate level of learning (ease) and retention.

- Decide on further course of action based on the data.

REFERENCES

- https://unsplash.com/s/photos/background for images

- Ries, E. (2011). The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses. Crown Books.

- Book Summary: The Lean Startup By Eric Ries

- Kander, Diana. *All in Startup: Launching a New Idea when Everything is on the Line*. John Wiley & Sons, 2014.

- http://info.boardofinnovation.com/hubfs/Validation%20Guide%20compressed.pdf

- Various Wikipedia pages

- Moore, G. A., & McKenna, R. (1999). Crossing the chasm.

THANK YOU !

Course Name: Entrepreneurship Essentials

Faculty Name: Manoj Kumar Mondal
Rajendra Mishra School of Engineering Entrepreneurship
IIT KHARAGPUR

Module 05:

Lecture 24 : Lean Startup - 1

CONCEPTS COVERED

- What is minimum viable product?

- How to make minimum viable product?

- Example of minimum viable product

Traditional Process of Product Development

- Epiphany, serendipity, eureka or just a problem.

- Identify product to be developed based on market survey.

- Frequently, the problem is faced by the entrepreneurs. Fanindra Sama of redBus.

- Ideation and idea screening based on technical feasibility and market potential. This phase is also known as Fuzzy Front-End as there is no clarity of the final shape of the product and the market acceptability. Only a few ideas would eventually emerge as a marketable product.

Traditional Process of Product Development ... cont'd.

- **Design & Develop, Test and refine.**

- **Check the design for manufacturability.**

- **Cost & demand analysis, pricing, Go-to-market strategy.**

- **Create awareness.**

- **Launch - manufacture, distribute through distributor network or sell online.**

- **Maintain or improve quality.**

The strategy is to understand the pain, the product/service, the competition, and to create value proposition by evolving solution that serves the customer better than that of the competitors.

The longer it takes for the product to reach to the customers the longer is the time to know whether the product is acceptable by the customers.

If it is not acceptable by the customer, the start-up has to start from scratch depending on the feedback. All money, time and talent used so far goes to waste.

If the startup can get the feedback early one, they can stop moving further and start over, continue with the same product or pivot and develop a <u>new product</u>.

Product-Market-Fit

- It has been established that the maximum number of failures in startups is because customers do not buy what they offer.

- Cbinsight has documented that 42% of the companies fail because their products or services serve no market need.

- They focused only on building and not on the needs and aspirations of the customers

- It is egregiously brutal to build something that nobody wants. Nobody should do that. Strive for Product-Market-Fit at minimum efforts.

Fuzzy Front-End Phase of Innovation Process

Phase –I Ideation

Phase –II Concept development

Phase III Product planning

Phase IV Prototyping

Phase V Prototype testing

Phase VI Go-to-market and grow
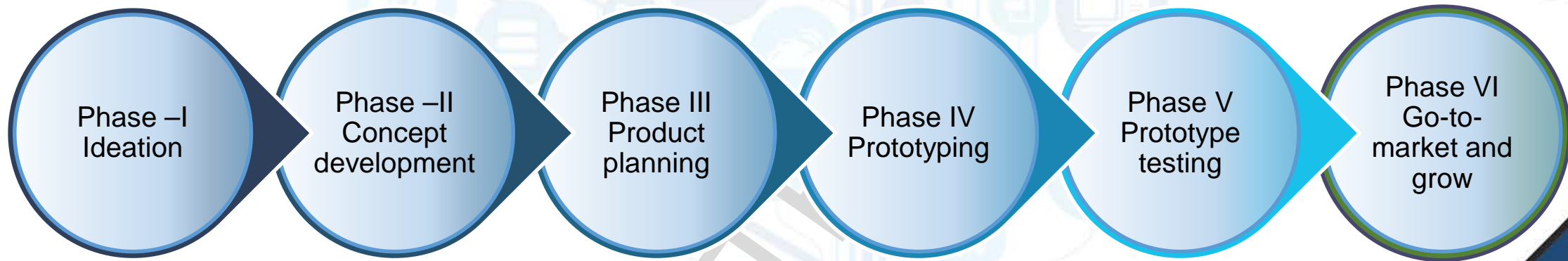
The Fuzzy Front End
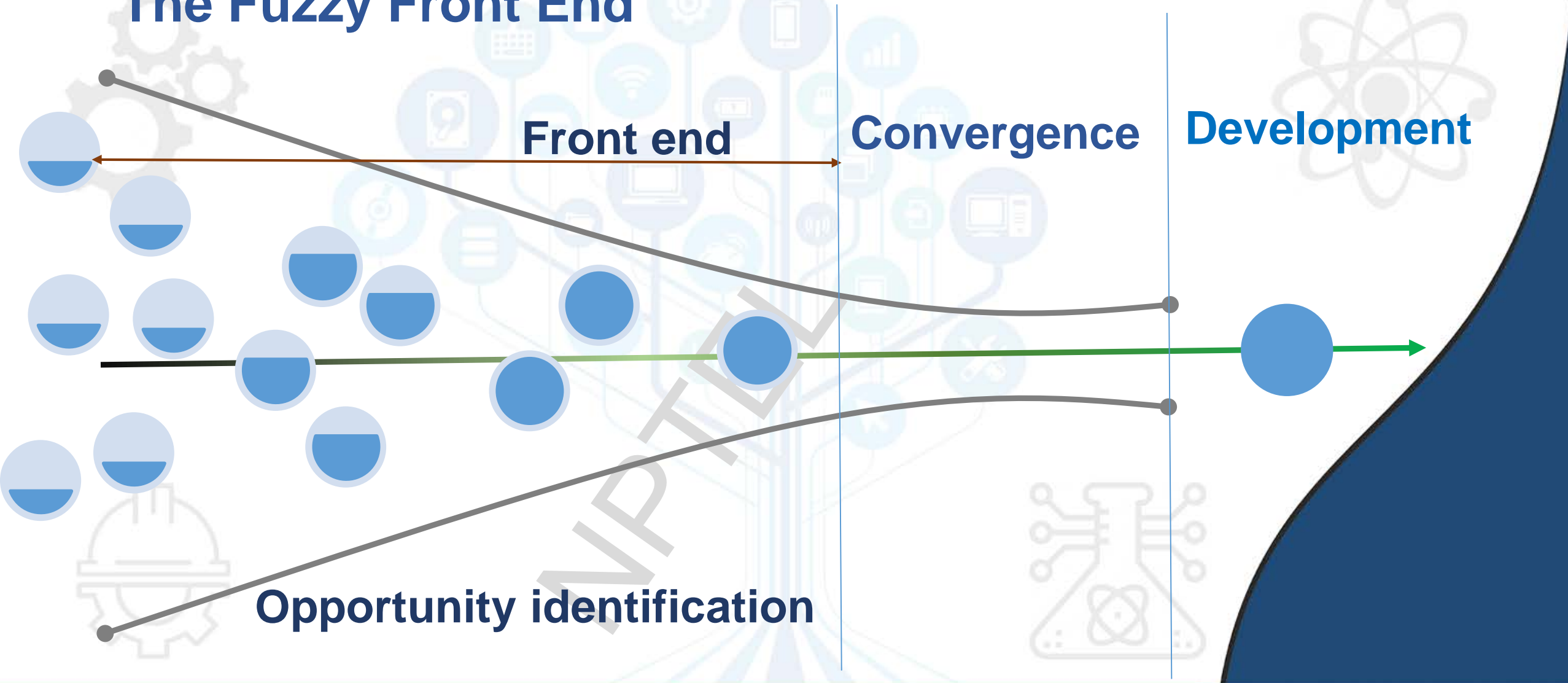
The Lean Startup – by Eric Ries

- **How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses**

The Lean Startup – by Eric Ries

Define

01 | **Lean thinking:** shrinking batch sizes, just-in-time inventory & production management, and acceleration of cycle times.

02 | **Progress measure:** through validated learning.

Productivity: Make things that people like and pay profitable price and do it fast and economic way.

03 | **Build-measure-learn feedback loop:** instead of building based on lot of assumptions, keep adjusting with a steering wheel called build-measure-learn. Through this process we can learn if and when to make a sharp turn – a pivot.

04 |

The Lean Startup – by Eric Ries
Start

01 | **Innovation factory:** Use lean startup technique and continuously create disruptive innovations.

02 | **Culture and systems:** Empower people to think out of the box without risk and innovate at the speed of the experimentation system.

The Lean Startup – by Eric Ries

- ❏ **Learn**
- ❏ **Experiment with two hypothesis**
  - ❖ **Value hypothesis**
  - ❖ **Growth hypothesis**
- ❏ **Leap-of-faith assumptions**
- ❏ **Steer**
  - ❖ **Minimizing the total time**
  - ❖ **Minimum Viable Product**
  - ❖ **Learning milestones**

Ideas > build > product > measure > data > learn > ideas > and so on (circle)
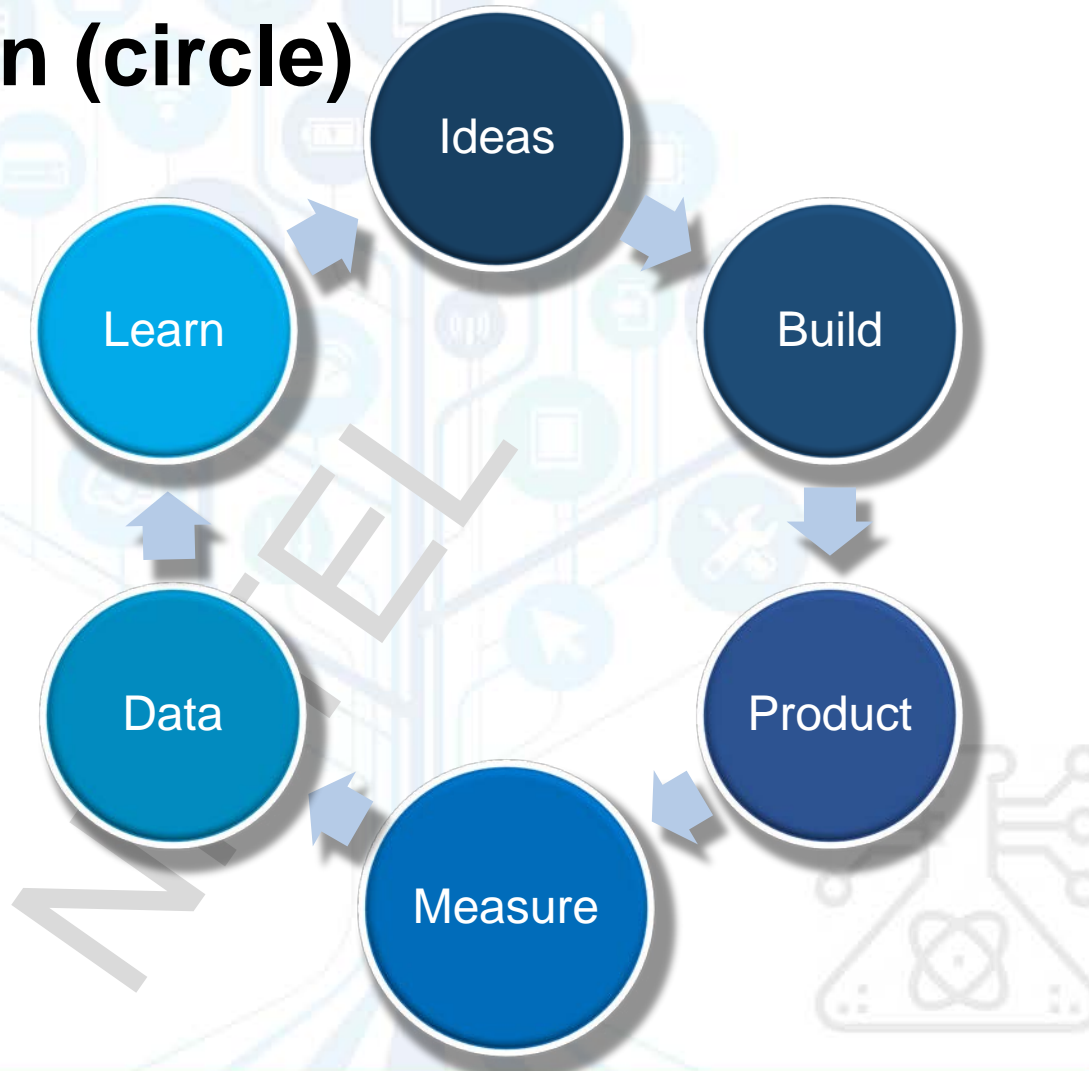
The Lean Startup – by Eric Ries
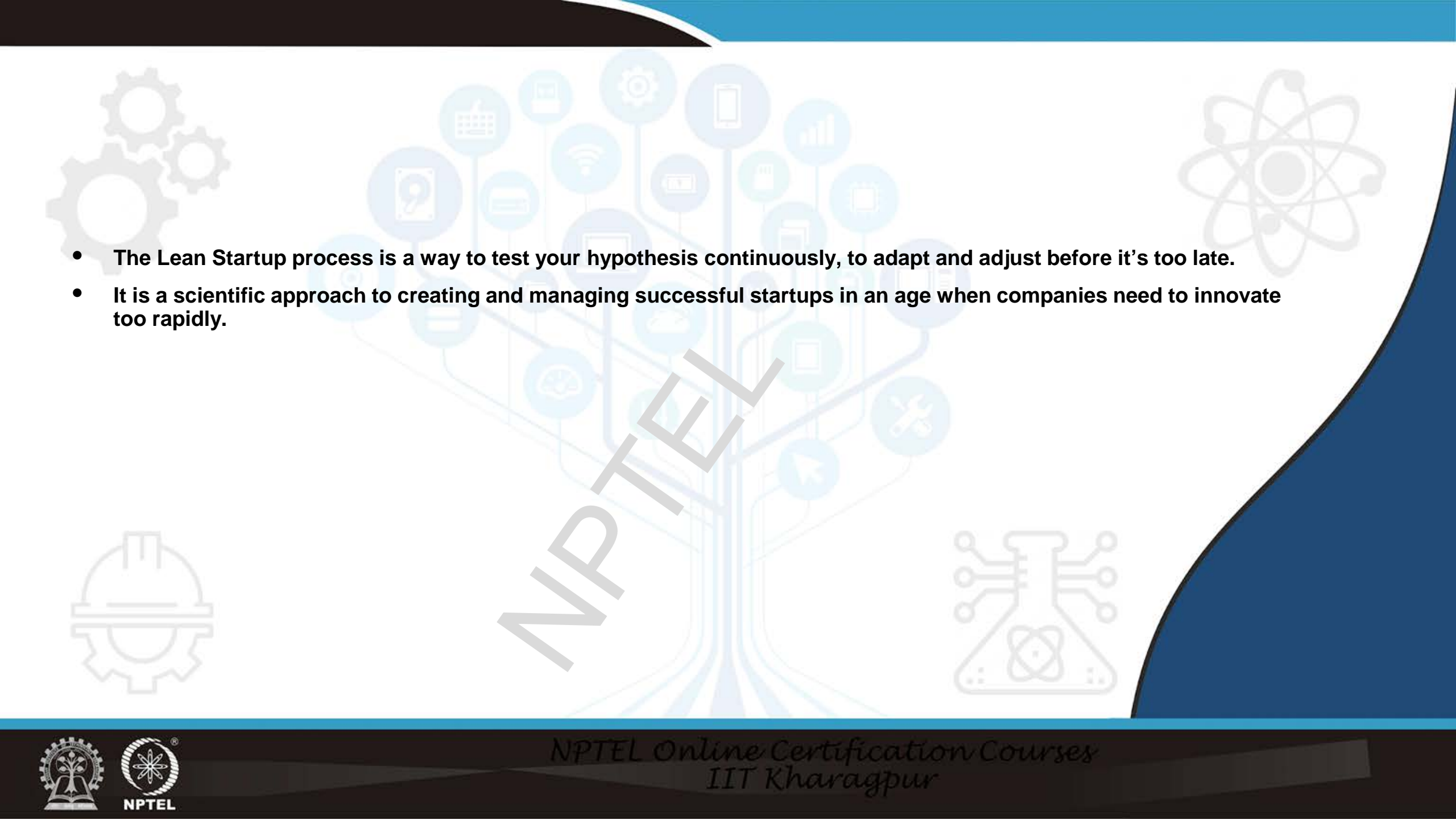
- We must always ask: what if the user doesn't care about the design in the same way we do?

The Lean Startup – by Eric Ries

- **Pivot and Preserve**
- **Pivot – course correction based on learning. Pivot early if you have to. Vanity metrics prevent pivoting.**
- **Preserve resources**
- **Charge early**

Useful Metrics

- **Actionable - when cause and effect is clearly understood.**

- **Accessible - Understandable and measurable.**

- **Auditable - meaningful to understand real performance, employees get insight of the output of their efforts.**

- **The Lean Startup process is a way to test your hypothesis continuously, to adapt and adjust before it's too late.**

- **It is a scientific approach to creating and managing successful startups in an age when companies need to innovate too rapidly.**

Long Before You Are Ready with a Product Ask These Questions

1. Are consumers crying for the solution you are trying to develop?

2. Would they prefer your solution over existing ones?

3. Would they buy at the price and through the channel you propose?

4. How prepared and capable are we to develop the solution and how soon can we do that?

Success is not developing a nice product even if it appears nice to the customers; success is developing something that customers buy.

Lean and Agile Process

- **Lean startup process derives the waste reduction ideology of the lean manufacturing and the validated learning process of Agile method.**

- **Lean manufacturing is about cutting wastage of all resources as far as possible and continuously creating better value for customers.**

- **In Agile process, execution moves forward with validated learning and handles uncertainty on the way.**

- **Agile is directly in contrast with the traditional linear models such as waterfall model.**

Vision - as espoused by Eric

A startup is a human institution designed to create a new product or a service under conditions of extreme uncertainty. Success under such scenarios requires rapid experimentation. – Eric Ries writes in his book "The Lean Startup"

The stepping stone is the Minimum Viable Product (MVP).

Minimum + Viable
Product that help users discover and evaluate the value proposition

Minimum

Viable

MVP
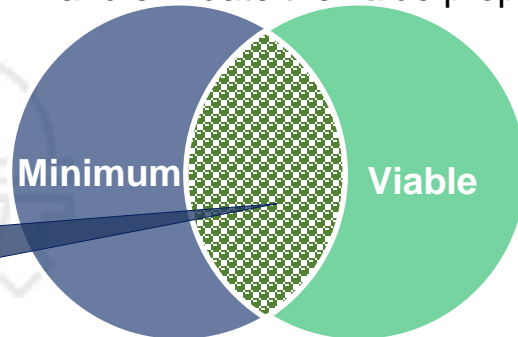
Eric Ries, defined an MVP as that version of a new product which allows a team to collect the maximum amount of validated learning about customers with the least effort.

NPTEL

MVP

- A key premise behind the idea of MVP is that you produce a product with essential features, say a landing page with minimum features or a product with no aesthetics, that your customer can use and give you feedback.

- Sometimes, just seeing what people do with on a product is much more reliable than asking people what they would do.

Align Pricing with Personas

- **The MVP helps to understand the eventual cost of the product.**

- **Get a chance to understand affordability by target customers.**

- **Understand the price- competitiveness.**

Learn

- Learning through failure is an integral part in a startup journey.

- However, validated learning can accelerate the process of product development and help achieve success with minimum resources.

- The goal is to quickly evolve a marketable product that is an absolute product-market-fit with minimum possible cost.

The Solution is to develop Minimum Viable Product and put it through validated learning, following the Build-Measure-Learn cycle – the lean product development process formally explained by Eric Ries in his book "The Lean Startup".

The goal is also to discover the minimum features that customers definitely want and eliminate those they do not.

Charge Early

- Start with a prototype of essential but minimum features.

- Try charging customers early, preferably from day one.

- Some early cash inflow goes a long way.

- If customers are paying for the MVP, that is the real validation.

The MPV Can have Many forms

Be aware that the MPV is not necessarily the smallest product imaginable (minimum usable product).

It can be a simple video, a concierge model, a smoke or split test, or an early prototype and many more.

Make sure the MVP helps you to learn and keep it as simple as possible.

The faster you can start testing, the better.

After analysing the results you have to decide to pivot or to persevere.

Variation in MVP to Cut Cost of Building It

- Frequently one can use an existing product and add or subtract features to get a feedback from the niche users.

- Suppose, you want to make a special cell phone for farmers with some rugged buttons that would add convenience to persons of any literacy level. [writing pad for contractors]. [Open source]

- Ideally, you should identify an available and suitable phone, add the desired features and get it tested.

- There is always a cheaper ways. Discover that.

- Your capability to do it cheaper at the inception itself may eventually make or break the startup.

Caution

- The term MVP has become a jargon.

- Teams use it without properly understanding the objectives of MVP and end up building just a low-quality semi-finished products that do not elicit the right feedback from users.

- You need to help the users to help you.

"If you are not embarrassed by the first version of your product you've launched too late"- **Reid Hoffman, LinkedIn**

That is what is a Minimum Viable Product. It is the initial step to building a new enterprise using a concept of validated learning and build-measure-learn feedback loop.

Minimum Viable Product

- Minimum Viable Product or MVP is a development technique (?) wherein a new product is introduced to early adopters with basic features, but **enough for the consumers to test its usefulness**. It may be a step by step process with validation of incremental developments.

- By introducing the basic version to the consumers, firms aim to gauge the fitness of the product to customers' need and make further development strategies depending on the feedback.

- You also on-board some early customers.

- **Eric Ries made 3-D avatars as Instant Messaging (IM) add-ons.**

- **During the user testing phase, he realized that users are not so particular about add-on.**

- **He also realized that heavy IM integration is a waste of effort since they do not particularly make the customer excited.**

- **After this, Eric and his team tried to test what works and what doesn't.**

- **Result is that many of the IMs were discarded and some particular types were created new.**

Build-Measure-Learn Cycle

Test your hypothesis about product-market-fit. Pivot or persevere

Build with minimum key features so that customer can comprehend usefulness and comfort.

Analyze data on customer feedback.

Usability.

Experience. Performance for each feature.

Learn | Build | Measure

Accelerate: Accelerate this feedback loop

Minimum viable product

Concierge: start with one

Simulate with people

The five whys: Find & fix root causes

Which activities create value?
Which are waste?

Build
Turn ideas into products

Measure
See how customers respond

Learn
Pivot or Persevere

Experiment to move numbers closer to plan

Go and see for yourself

Split-test to find cause and effect

Zoom in
Zoom out
Customer segment
Platform
Business architecture
Value capture
Engine of growth
Channel

Recreated from: The Summary of the book 'Lean Startup' by Kim Hartman

Lean Product Development

- **Building a product or service starts with a hypothesis.**

- **A value hypothesis states that the product/service will deliver some desired value to its users.**

- **A growth hypothesis assume that new customers will be able to discover the service.**

- **The job of an entrepreneur is to test the value hypothesis by finding some customers to use the product or service.**

- **Ideally, the customers whose needs are mostly accurately served should be the initial target.**

Build the Product

- Next is to build a product that has bare minimum features while they are sufficient to define its capability to serve the desired purpose.

- Try early adopters. They are excited to use new technology and are less concerned about aesthetics. They are forgiving of the look of the product, though their feedback is useful to know if it fulfills the needs.

- If users complain about a missing feature and they're on your roadmap, that implies that the team understands the customers. If there is a feature on your roadmap but the user does not complain about it being missing, that's an indication to forget about that feature.

- The results will guide you to validate the hypothesis.

A Real Experiment

- Nick Swinmurn had a hypothesis that people will buy shoes online.

- Rather than buying inventory upfront, he took photos of shoes from local shoe stores, and showed them to potential customers

- Customers expressed willingness to buy and he shipped it to them. A company by the name Zappos was born. The photograph is the Minimum Viable Product.

- This absolutely minimum product tested customer demand as well as many other business issues like payments, returns, and customer interaction.

- Amazon acquired Zappos for $1.2 Billion in 2009.

Nick Swinmurn: the journey

- Majored in film studies at U.C. Santa Barbara and graduated in 1995

- First job salary: $ 1,000 a month.

- He joined a online car selling company and tried to do all jobs that no one wanted to do in order to learn everything necessary to run a online business.

- After 11 months, he started 4Students.com, where you could e-mail other students and get deals on shopping. Shut it down promptly.

- He could not find a particular pair of shoes in a mall and thought an online portal would give him lot of options that is not possible in a brick-mortar store.

Zappos

- So, he started Zappos in 1999.

- In spite of growing fast, they were struggling to breakeven.

- His investor became partner, sold many of his properties to continue to fund Zappos.

- Nick even quit Zappos in 2006 but held the shares.

- He started several startups. He never quit.

- Difference is that he always had a lean way of doing things.

His Advice: [Reproduced from https://fortune.com/2012/09/05/nick-swinmurn-zappos-silent-founder/]

- **Respond to the customer's needs.** If a customer called and wanted to buy a certain shoe and we didn't have it, we'd search the web and send him a link to a place where he could get it. We created free shipping as an incentive — both outbound and return –in response to the question "What if it doesn't fit?"

- **Don't let other people put a ceiling on what you do.** When I worked for the San Bernardino Stampede, they told me it'd take years to work my way up through the minor leagues before getting hired for the majors. I ignored them, applied anyway, and immediately got hired with the San Diego Padres.

- **Don't have a big ego.** At Zappos everyone saw themselves as equal, all working for the same goals. I called myself CEO only because I gave myself the title. You've got to relate to everyone because it's a team effort.

Let Us Take a Hypothetical Case

- It has been established that manual spray of pesticide causes various types of serious illness.

- Although developing countries use only 25% of the pesticides produced worldwide, they experience 99% of the deaths.

- You identify that as a pain point and aim to find a solution.

- You have gathered information on how it is done in the developed world.

- It is revealed that they spray pesticide using manned aerial vehicle (their landholding is large).

Drone-Based Pesticide Spray - DBPS

- You are knowledgeable about drones as part of your hobby but never really thought of applying it in real useful purposes.

- You start connecting the dots and it dons on you that drone may be used to spray pesticide.

- You decide to go forward and experiment if the idea is feasible.

- You try to imagine what all features the drone could have to make it a useful tool for the cause.

Drone-Based Pesticide Spray - DBPS

- So you jot down features such as payload, vertical take-off and landing, autonomous control of movements and GIS based land boundary demarcation, automatic sensing of incidence of pest attack using image processing, discharge control of nozzle, Control of drone using RF and many more.

- As you break up the use cases and prepare the inventory of things you realise that there is need for people of different domains such as a quadcopter technologist, an electronic engineer for control module, a software expert for image processing and integrating with the controller, and such.

Drone-Based Pesticide Spray - DBPS

- Traditionally, people start developing a complete product, test for various desired operations, stability, and performance.

- It may entail crores of Rupees of investment and years of development time.

- Once satisfied, they put up infrastructure to manufacture them.

- They may not have much idea if the market will accept the product.

Drone-Based Pesticide Spray - DBPS

- Alternately, you can source off the shelf quad copter and other essential components to assemble a simple but workable prototype that is good enough for demonstrating the main function.

- It would cost you in thousand or a lakh of Rupees.

- You can now demonstrate before a group of farmers with medium landholding – something like 10 acres or so – and get their feedback.

- You may draw your further course of action depending on the feedback.

- The product with such minimum but essential component is referred to as minimum viable product

REFERENCES

➢ Ries, E. (2011). The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses. Crown Books.

➢ Book Summary: The Lean Startup By Eric Ries -- Summary by Kim Hartman

▢ https://ashishb.net/book-summary/book-summary-the-lean-startup-by-eric-ries/ Text 4

CONCLUSION

Minimum viable product is a useful tool for testing new ideas with minimum efforts and cost. It can prevent huge resources including cash at the early stage of the startups and avert many failures.

NPTEL ONLINE CERTIFICATION COURSES

Course Name: Entrepreneurship Essentials

Faculty Name: Manoj Kumar Mondal
Rajendra Mishra School of Engineering Entrepreneurship
IIT KHARAGPUR

Module 05:

Lecture 25: Lean Startup - 3

CONCEPTS COVERED

- Genesis of lean philosophy

- Identifying innovator type of customer for early validation

- Examples of lean startup

- Simplicity and lean philosophy

Evolution of Lean Strategies

- Profound understanding of the core philosophy of 'Lean' may impact our performance in almost everything we do.

- Though it sounds intuitive, many of us do not practice it even in a make or break situation.

- We take it for granted as if it is taken care of.

- It does not entail investment though outcome can be revolutionary.

- Implementation of lean startup strategies could avert failure of many startups.

Evolution of Lean Strategies

- The core philosophy of 'Lean' had been there since time antiquity. But only a few individuals usually realize its enormous power to enhance efficiency and profit.

- Even today, people ignore it for their own peril.

- It is imperative to ingrain the philosophy and criticality of leanness among all across the organization.

- The concept of lean is not at all new. Let us see some historical perspectives.

Benjamin Franklin (1706 – 1790) and Lean Strategy

- Some scholars believe that the most of the basic goals of lean manufacturing and waste reduction were derived from the documented examples by Benjamin Franklin.

- In his annual publication 'Poor Richard's Almanack' he said of wasted time, "He that idly loses 5s. [pence] worth of time, loses 5s., and might as prudently throw 5s. into the river."

- He also wrote that avoiding unnecessary costs could be more profitable than increasing sales: "A penny saved is two pence clear.
  A pin a-day is a groat [three silver pence] a-year. Save and have."

"Watch the little things; a small leak will sink a great ship" – **Benjamin Franklin**

Frederick Winslow Taylor and Lean Strategy

Frederick Winslow Taylor, regarded as the father of scientific management, wrote in Principles of Scientific Management, (1911), "And whenever a workman proposes an improvement, it should be the policy of the management to make a careful analysis of the new method, and if necessary conduct a series of experiments to determine accurately the relative merit of the new suggestion and of the old standard. And whenever the new method is found to be markedly superior to the old, it should be adopted as the standard for the whole establishment."

Charles Buxton Going, an American engineer, author, and editor wrote in 1915 about lean manufacturing in Ford:

"It exhibits in higher degree than most persons would have thought possible the seemingly contradictory requirements of true efficiency, which are: <u>constant increase of quality, great increase of pay</u> to the workers, <u>repeated reduction in cost to the consumer</u>. And with these appears, as at once <u>cause and effect</u>, an absolutely incredible <u>enlargement of output</u> reaching something like <u>one hundredfold</u> in less than <u>ten years</u>, and an enormous profit to the manufacturer."

Salary

Materials cost

Overhead

Other operating cost

profit
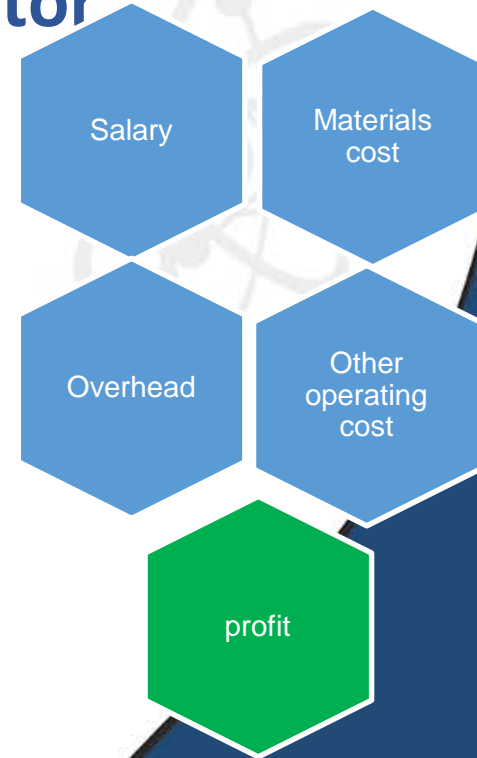
Henry Ford and Lean Strategy

- Ford, in 'My Life and Work (1922)' described what encompasses the entire concept of waste and will remain relevant for all times to come:

- "I believe that the average farmer puts to a really useful purpose only about 5% of the energy he expends.... Not only is everything done by hand, but seldom is a thought given to a logical arrangement. A farmer doing his chores will walk up and down a rickety ladder a dozen times. He will carry water for years instead of putting in a few lengths of pipe. His whole idea, when there is extra work to do, is to hire extra men. He thinks of putting money into improvements as an expense.... It is waste motion— waste effort— that makes farm prices high and profits low."

The History of Lean Product Development

The formal association of the term 'Lean' with any business operation appears to have originated in Toyota (particularly, Toyota Production System) and may have started at the turn of the 20th century in a **textile factory** with looms that stopped themselves when a thread broke.

In the context of manufacturing, 'Lean' means **keep only what adds value** and **reduce or eliminate everything that does not**. It is focused on waste reduction to improve customer value.

Evolution of Toyota, from a small company to the world's largest automaker, is attributed to, among many other things, Lean Manufacturing.

The History of Lean Product Development

After World War II, Eiji Toyoda and Taiichi Ohno at the Toyota Motor Company in Japan **pioneered** the concept of **lean production**. The rise of Japan to its current economic pre-eminence quickly followed, as other Japanese companies and industries copied this remarkable system.

Just-In-Time and Kaizen as Part of Lean Manufacturing

Toyota's journey with just-in-time (JIT) may have started back in 1934 when it moved from textiles to produce its first car.

In 1936, they faced serious problem of quality when Toyota won its first truck contract from the Japanese government. Towards solving this, they developed the "Kaizen" improvement team. The idea of "Kaizen" is that there is always possibility of further improvement
 of quality.

Some people are naturally lean focused.

Though Lean Manufacturing is commonly perceived to be combination of tools, the Toyota's view is simple. It is the method of elimination of three types of wastes:

muda (non-value-adding work: futility; uselessness; wastefulness),

muri (overburden: preventive maintenance, safety, and optimum operation),

mura (unevenness: openness in the supply chain, change product design and create standard work for all operators).

They are not formula but rather philosophies: reduce waste and create value for customers in the process by all means. Optimization, adaptability and flexibility are the core focus. To reduce unnecessary operation (including optimizing workflow), materials, energy and time.

- **The following steps should be implemented to create the ideal lean manufacturing system:**
- **Design a simple manufacturing system**
  - **Decrease cycle time**
  - **Less inventory**
  - **Increased productivity**
  - **Increased capital equipment utilization**
- **Recognize that there is always room for improvement**
- **Continuously improve the lean manufacturing system design**
  - **Overall equipment effectiveness is a set of performance metrics that fit well in a lean environment.**

DoorDash

- **DoorDash arranges logistics services to offer food delivery from restaurants on-demand. Founded in 2013.**

- **Has raised more than $700 million.**

- **DoorDash was valued at $1.4 billion in 2018.**

Source: Screenshot from http://startupclass.samaltman.com/courses/lec08/
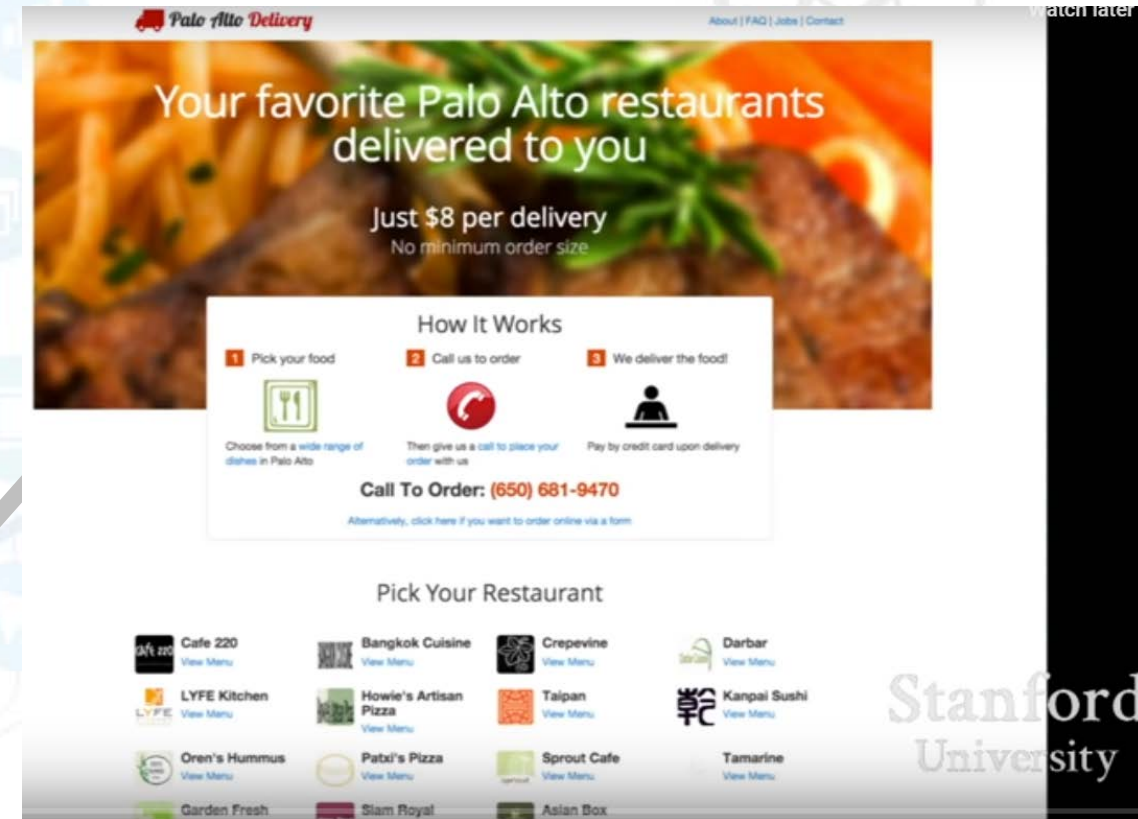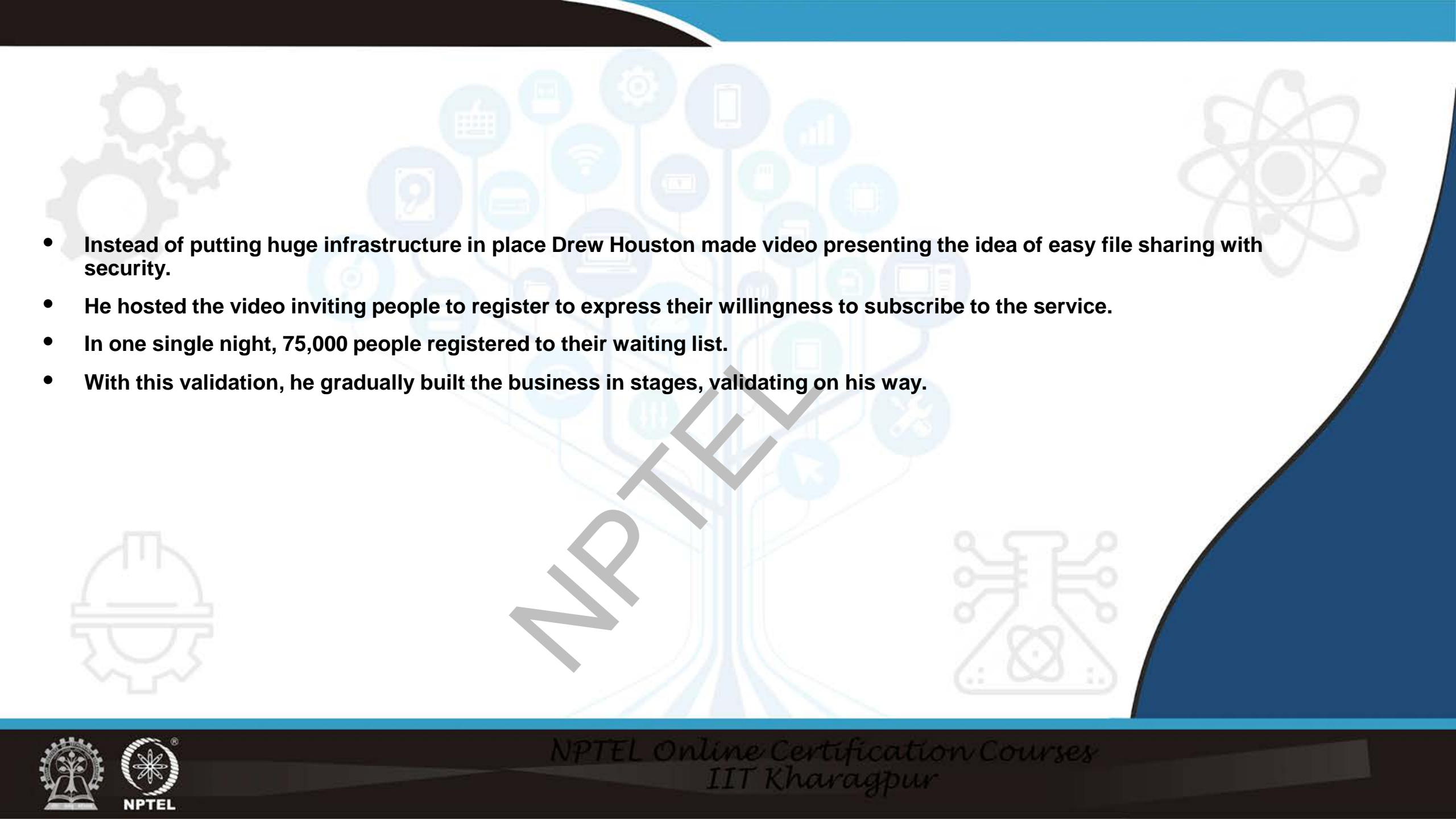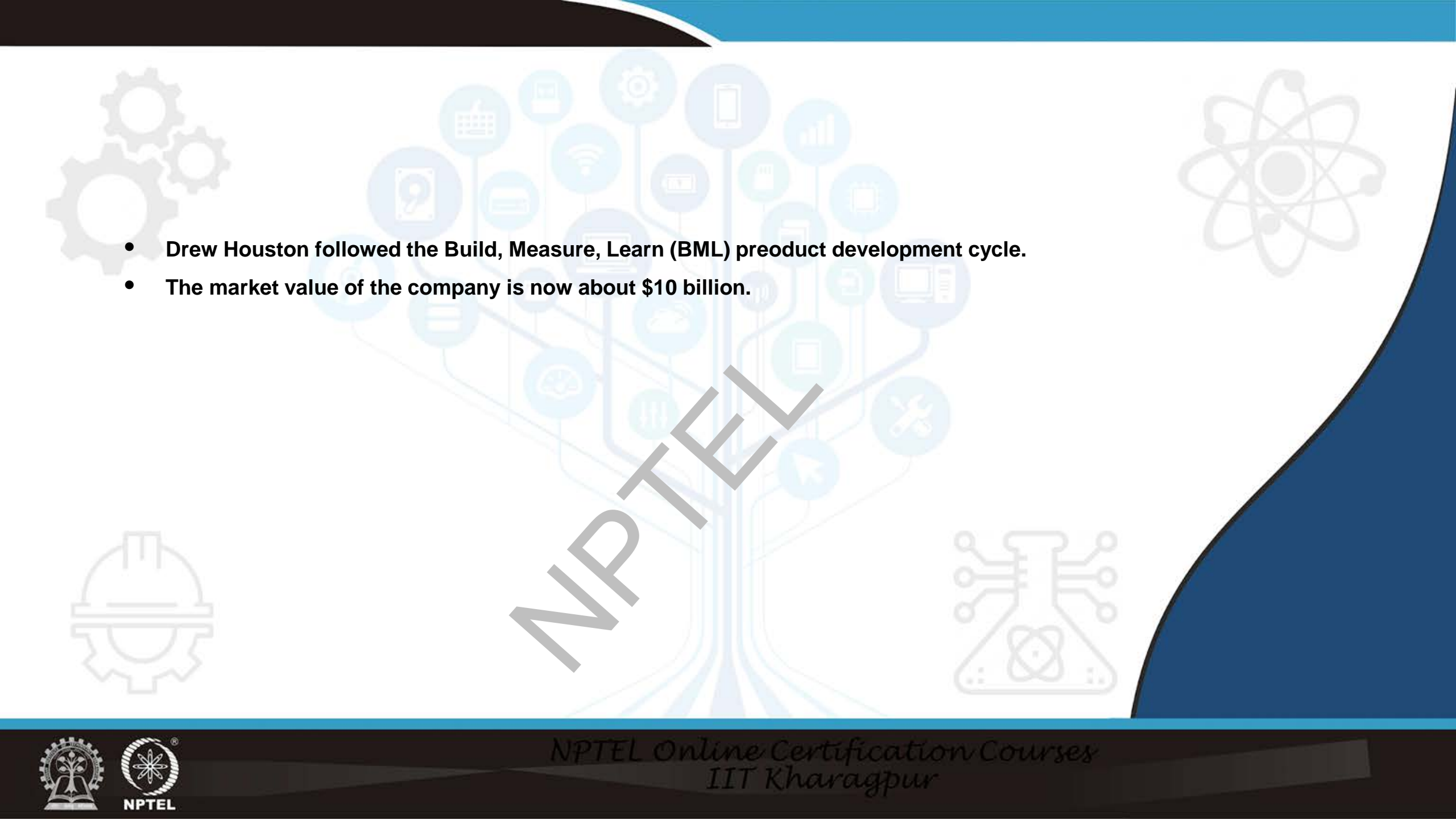
Dropbox

- **Many startup started file sharing business. Some of them received sizeable funding. But none were doing good.**

- **Investors were unwilling to fund more new venture for similar business.**

- **Drew Houston came up with idea of a file sharing business model that would give unique advantages to the users.**

- **He tried to get feed back from experts including investors. Every one discouraged him saying that it is already a failed model.**

- **But Drew Houston was confident that he has some value proposition that customers will like and that is now difficult for others to visualize.**

-

- **Instead of putting huge infrastructure in place Drew Houston made video presenting the idea of easy file sharing with security.**

- **He hosted the video inviting people to register to express their willingness to subscribe to the service.**

- **In one single night, 75,000 people registered to their waiting list.**

- **With this validation, he gradually built the business in stages, validating on his way.**

- **Drew Houston followed the Build, Measure, Learn (BML) preoduct development cycle.**
- **The market value of the company is now about $10 billion.**

MVP

- **If you are designing an app, you show your app screens and the elements for each screen like buttons, text fields, combo box etc. using wireframing.**

- **Zappos: MVP was images of shoes.**

- **Dropbox: MVP was a video demonstrating how the service of file sharing will work and how is it different compared to others.**

- **DoorDash: MVP was a landing page made in half an hour.**

- **These are referred to as 'Concierge MVP'.**

Image source: edX
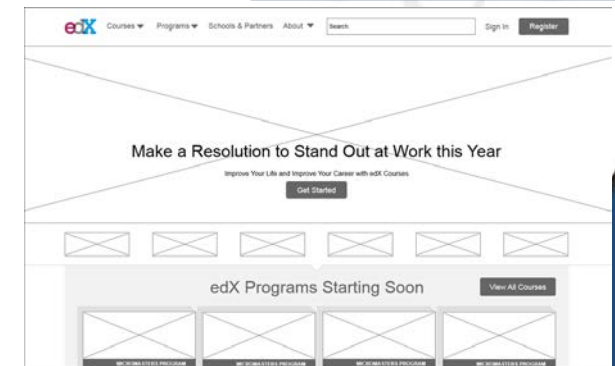
- **Aardvark** was a [social search](#) service that connected users live with friends or friends-of-friends who were able to answer their subjective questions.

- Founded in 2007, service launched in 2008, and opened for public in 2009.

- In between, they pivoted seven times following the Built, Measure, and Learn cycles.

- Google bought it out in 2010 for 50 million dollar.

Aardvark

- Nathan Stoll, one of the four cofounders, says that they could shorten the time span between first VC funding to exit from an average of nine years to three months, purely by following the lean startup method.

- Their business model is about using the knowledge in peoples' head at large for the purpose of people who need it.

- One registered user initiates a subjective question seeking an answer. The question is forwarded to an individual likely to have the answer and who is presently available. If the person does not know the answer, s/he forwards the same to all friends to help answer. Eventually, the answer is made available.

- Their hypothesis was that every individual is a reservoir of knowledge that they hardly get context to share, though they would be happy to.

- Their platform offered that opportunity. So the company makes two entities simultaneously happy: the person needing the knowledge and the person having it.

- They attribute their success squarely to the lean startup strategies they followed.

- You may fail many times and pivot. But the final goal is to prevent the catastrophic failure.

And how they look like today

Caveat: One Size Does Not Fit All

- It is important to understand that there is no simple formula for MVP.

- If you are considering offering content for education, a photograph or a simple landing page may not work. A video showing how easy it is to learn using your content may help.

- If you are considering to develop a new hardware product, perhaps an early physical prototype with key important functionalities may be necessary.

- Then invite innovator kind of customers for early validation.

How to Identify Innovator Customer?

- **You obviously know who the customers are.**

- **You have to go out and learn through real and in-person customer interactions.**

- **Personal interactions will help you to find out if you are addressing a real need and solving a real problem.**

- **You will also gain the insights if your solution actually resonates with your customers.**

How to Identify Innovator Customer?

- The key is to develop your interview scripts in a way that elicits customer stories.

- Brainstorm customers in the segment.

- Identify who are crying for your solution.

- Among them, who can afford and are willing to use an MVP.

- If you find someone ready to pay for the MVP, that is a good validation of your hypothesis.

- Rank the willing persons and target the most suitable ones.

- **Usually, early adopters are suffering from the pain you aim to solve and they are aware of it.**

- **They are likely to have the money to buy one for experimenting.**

- **Early adopters are usually forgiving about the aesthetic look or nonessential features.**

- **If any of them have made some jugaad arrangement as a solution of the problem s/he is the best fit to be your early adopter.**

Smoke Test

- Test the resonance of your elevator pitch quantitatively by capturing customer response.

- You send e-mails or make a simple landing page that states your value proposition.

- You ask people to sign up as a commitment to buy.

- Based on the percentage of people who sign up relative to people visiting the sight, you get a rough idea of demand of your product.

Smoke Text Example

- **Buffer is a social media platform.**
  - **It has a software application designed to manage accounts in social networks, by providing the means for a user to schedule posts and analyze their results.**

- **They wanted to test their hypothesis before committing too much resources.**

- **Before investing a lot of money developing the actual service, Buffer created a simple landing page, pitched their product and measured the interest.**

- **Results was highly meaningful and useful.**

- **They got their model validated and received a list of contacts of high-value potential clients.**

Simple landing page of google.

Complex landing page of Yahoo. It confuses visitors and drives customers away.

A/B testing (bucket tests or split-run testing)

- A/B split-run test is a randomized experiment with two variants, A and B.

- It is a way to compare two version of single product or app which are identical except for one variation. Each version has some embodiment of an unique feature.

- The difference in the single feature may lead to different behaviour of users.

- Based on response of the users you may select the better embodiment.

Example of MVP

- You are building academic contents for students in the secondary level that you want to sell to schools.

- Who are your customers? Students? No! They will not pay you for the product though they will use it. Teachers? No! Headmaster? May or may not be. Administration? Perhaps.
  - ➢ But the problem is tricky in this case. The users are not the customers. But their opinions MAY and MAY NOT influence purchase decisions.
  - ➢ So you need three levels of validations: (i) Feedback by students, (ii) Teachers' comfort based on students feedback, and
    (iii) The management

- **Administrations of which schools would be crying for your solution?**

- **If you can identify competition where one school is losing students to another, the losing one is the ideal target.**

- **If some such schools are in the process of analyzing similar available solutions, that shows that they have the budget and intention to spend the money on it.**

- **Pickup those who are open to use your product for test drive.**

- **Identify some such schools. Ten of them would make a good sample.**

How Do You Define Minimum Viable Product in This Case?

- One option is to build one full course and get it customer tested.

- Alternately you may download some contents, add some critical value that is part of your offerings and present it to your early adopters.

- Before starting to recruit experts and putting in infrastructure, get some school on board.

- Chances are that you will receive invaluable feedback from your early testing and decide a different course of development.

- Do not think you know students better than anyone.

Some Valuable Quotations

"Second Chances Are Rare—Make Sure You Get It Right the First Time Around". Book: Launching a New Idea When Everything Is on the Line by Diana Kander, 2014

"The man who will use his skill and constructive imagination to see how much he can give for a dollar, instead of how little he can give for a dollar, is bound to succeed" – Henry Ford

"I shall try to correct errors when shown to be errors, and I shall adopt new views so fast as they appear to be true views."
 – Abraham Lincoln

REFERENCES

- https://unsplash.com/s/photos/background for images
- Ries, E. (2011). The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses. Crown Books.
- Book Summary: The Lean Startup By Eric Ries
- Kander, Diana. *All in Startup: Launching a New Idea when Everything is on the Line*. John Wiley & Sons, 2014.
- http://info.boardofinnovation.com/hubfs/Validation%20Guide%20compressed.pdf
- Various Wikipedia pages
- Moore, G. A., & McKenna, R. (1999). Crossing the chasm.
- Icons from https://www.flaticon.com/

CONCLUSION

Nothing is perfect and can't be further improved.

Things can always be bettered in terms of cost, time, and efficiency. Strive for

innovation and evolution.

No business model may guarantee success, but identifying a compelling pain

point, ascertaining a competitive solution, validating in a quick and economic way

can eliminate many uncertainties.

THANK YOU !