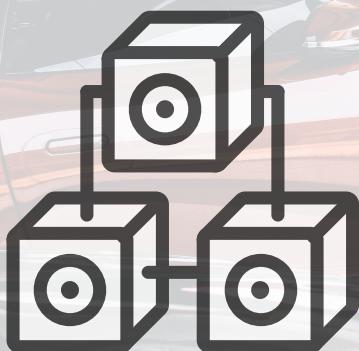


Business Portfolio on Blockchain in Automobility

Emerging Technologies: Blockchain



Submitted To: Dr. Victoria Abboud

Date: 24th November 2021

Submitted By: Team 02

**Anubha Sharma
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**University
of Windsor**

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DECLARATION

We, **Anubha Sharma – 110037181, Nirja Patel - 110058758 and Rahul Banerjee - 110035198**

declare that the content of this portfolio is our own work and everything inside it is compiled by our own selves.

Name	ID Card	Signature	Date
Rahul Banerjee	 University of Windsor ID card showing a photo of a man with glasses and a beard. The card includes the text: "UW CARD", "Rahul Banerjee", "110035198", and "Student".		November 24 th , 2021
Nirja Patel	 University of Windsor ID card showing a photo of a woman. The card includes the text: "UW CARD", "Nirja Patel", "110058758", and "Student".		November 24 th , 2021
Anubha Sharma	 University of Windsor ID card showing a photo of a woman with glasses. The card includes the text: "UW CARD", "Anubha Sharma", "110037181", and "Student".		November 24 th , 2021

EMERGING PARADIGM | INTERNAL MEETING – 1 | TEAM #2 | AGENDA

Monday, September 27, 2021
6:15 PM

Meeting on 27th Sept, 2021.

Agenda

- Discussion about the pointers to be added for the Memo, Agenda, Agreement and MOM.
- Discuss initial findings on the same.
- Divide the sections among the team members

INTERNAL MEETING | MOM | TEAM #2

Monday, September 27, 2021
6:15 PM

The meeting was held on MS teams and all team members were present.

- Anubha: We must decide how we structure the documents.
- Rahul: I will draft the agreement and we will get feedback on the same.
- Anubha: yes, we should include the same in the submission.
- Rahul: Lets go through the rubrics for the same.
- Anubha: Additionally, I will take care of Minutes and Agenda.
- Nirja: I can pick up consolidation for all the documents.
- Rahul: We are all set if we stick to your tasks and finish on time.

EMERGING PARADIGM | INTERNAL MEETING – 2 | TEAM #2 | AGENDA

Monday, October 4, 2021

6:45 PM

Meeting on 4th Oct 2021.

Agenda

- Discussion about the feedback we got on the documents we submitted last week.
- Divide the sections for the presentation among the team members

INTERNAL MEETING | MOM | TEAM #2

Monday, October 4, 2021

6:45 PM

The meeting was held on MS teams and all team members were present.

- Rahul: We need to take the feedback seriously, there were a few major points to concentrate on.
- Anubha: We have to decide how we structure the documents this time around and create a good presentation
- Rahul: I will go through the templates and what we need to have as contents.
- Anubha: I agree, there should be no slips ups on our end.
- Nirja: I can try to make a draft on Canva
- Anubha: Additionally, I will make sure our presentation meets the rubrics requirements.

EMERGING PARADIGM | INTERNAL MEETING – 3 | TEAM #2 | AGENDA

Sunday, October 17, 2021
8:45 PM

Meeting on 17th Oct 2021.

Agenda

- Discussion about Debate Slides and resubmission of Memo and Literature Survey.
- Discuss initial findings.
- Divide the sections among the team members

INTERNAL MEETING | MOM | TEAM #2

Sunday, October 17, 2021
8:45 PM

The meeting was held on MS teams and all team members were present.

- Rahul: The Memo and Literature Survey files are to be updated and we need to discuss the debate content as all of us have pre-existing promises next week.
- Anubha: Yes, I agree, I can update the Memo while Rahul can work on the Literature Survey. Nirja can meanwhile look for debate related topics.
- Rahul: I second that, Nirja can you also look into templates online for the same for reference.
- Nirja: I can try to make a draft on Canva for the debates and you guys can takeover.
- Anubha: Additionally, I'll make sure our presentation meets the rubrics requirements and Rahul can take care of vetting the presentation.
- Rahul: Let's make it happen guys.

EMERGING PARADIGM | INTERNAL MEETING – 4 | TEAM #2 | AGENDA

Wednesday, October 30, 2021

3:45 PM

Meeting on 30th Oct 2021.

Agenda

- Discussion about the feedback we got on the slides
- Discuss initial findings on the business Case submission
- Divide the sections among the team members

INTERNAL MEETING | MOM | TEAM #2

Wednesday, October 30, 2021

1:30 PM

The meeting was held on MS teams and all team members were present.

- Anubha: we got 7/10 for the debate slides. Let us go through the grading and see what went wrong.
- Rahul: We did not present anything related to the autonomous industry; that is why the marks were deducted
- Nirja: yes, we should include the same in the business proposal
- Rahul: Lets go through the rubrics for the proposal and divide sections.
- Anubha. Yeah, I already went through with it, they are 6 sections and each of us can pick up the 2 sections. I can pick up executive Summary and goals
- Nirja: I can pick up solutions and benefits
- Rahul: I will do the execution timeline/ cost and Budget.

EMERGING PARADIGM | INTERNAL MEETING – 5 | TEAM #2 | AGENDA

Wednesday, November 17, 2021

1:30 PM

Meeting on 17th Nov, 2021. During class discussion

Agenda

- Discussion about the feedback we got on the documents.
- Identify the sections we need to add for the final portfolio.
- Divide the sections among the team members.

INTERNAL MEETING | MOM | TEAM #2

Wednesday, November 17, 2021

1:30 PM

The meeting was held on MS teams and all team members were present.

- **Rahul:** Lets address the environmental issues created by blockchain, because it has been asked multiple times from us and even during the debate
- **Anubha:** We can research and add those in the final portfolio.
- **Rahul:** I researched it, I am not getting anything concrete, but will keep researching
- **Nirja:** We need to create use case diagrams also, for our proposed solution, I can work on those.
- **Anubha:** Lets identify the sections we need to add in our proposed business solution, we can divide and add those. We can also have a look at the rubrics and see if we missed a section.
- **Rahul:** Yeah, I will look at the rubrics and identify the sections we need to add. Will write it in the MS teams' group and then we can take it further.
- **Niraj:** We also need to consider any comments in the business case proposal submission
- **Rahul:** for now, I can work on environmental issues, Anubha can work on risk identification and mitigation plan and Nirja can work on the use cases.
- **Anubha:** Please add your references as we are using them, last time, it became very difficult to add those in the last moments.

PROJECT MANAGEMENT PLAN

No.	Topic	Description	Meeting Date
1.	Document finalization	Updating the teammate agreement, memo, agenda, and MOM.	SEPTEMBER 27, 2021
2.	Presentation and literature review discussion	Start working on Literature review. Divide the sections for the presentation among the team members	OCTOBER 4, 2021
3.	In-class debate	Gather the information for in-class debates.	OCTOBER 17, 2021
4.	Business case discussion	Prepare for business case, make the document based on rubrics	OCTOBER 30, 2021
5.	Business case draft review and Final portfolio	Start preparing for final portfolio document based on feedback on Business Document.	NOVEMBER 17, 2021
6.	Presentation discussion	Based on Final Portfolio, make the presentation.	NOVEMBER 28, 2021

VISION [1]

Consider a world in which automobiles are no longer depreciating assets, but profit-generating machines. That world may arrive far sooner than we expect. Automakers are starting to investigate blockchain, a novel and disruptive technology that might be vital to the development of a mobile environment in which autonomous and linked vehicles are the norm.

A blockchain is a continually growing ledger of lists or blocks of data transactions that are added as new transactions or data sets are added. Each block or transaction is linked to the preceding block, forming a data chain. The lists are immutable, which means that once a transaction is recorded, it cannot be edited or amended.

By lowering the costs of maintaining decentralized ecosystems of exchanges, blockchain technology enables the construction of ecosystems in which the advantages of network synergies and shared digital infrastructure do not come at the expense of inflated market power and data access by platform operators. This decrease in *Automobile Supply-Chain* costs with enhanced security and safety due to implementation of Blockchain has far-reaching implications for the market, allowing initiatives and startups to effectively compete with entrenched established parties through the design of portals where rents from direct and indirect network effects are communicated more widely between many participants such as customers, suppliers, logistic companies, programmers, and venture capitalists, and no single entity has complete control over the infrastructure of crypto assets.

Companies such as Microsoft, Samsung, Overstock, Amazon, UBS, Citi, eBay, and Verizon Wireless, to mention a few, are all experimenting with new and innovative blockchain applications for Automotive Blockchain. *Ford, General Motors, Fiat and Chrysler* which are based out of Windsor-Detroit are also into Decentralized Supply Chain Network and having talked to personnel who works in the higher ranks at FCA Windsor, it has been known that the company is into production of one such technology which will enact something briefly similar to Blockchain solution proposed in this portfolio.

Blockchain supporters include several Canadian financial institutions and government entities. Despite financial players' interest in developing and applying blockchain technology to their goods and services which will in fact disrupt the supply chain domain be it for automotive industry or generalized, once and for all, but Canada has yet to completely create a unified regulatory framework for the effective and secure adoption of these systems. While the creation of such a plan is critical, the policy and regulatory issue is considerable, necessitating a careful balance between supervision and innovation.

CEOs from across the world are predicting that technology will "be tremendously disruptive to automobiles." Blockchain has already changed the banking industry and is already doing so in healthcare. The automotive industry comes next. Jumping on the opportunity, we are proposing a system that will be extremely beneficial to the Windsor-Essex community in the production of automobiles.

EXECUTIVE SUMMARY

The automotive market is constantly evolving. Automobiles of the future will be more interconnected, will provide on-demand and personalized services, including autonomous, shared, and linked vehicles. Blockchain technology has the potential to play a significant role in assisting with the upcoming industry change. [13]

For more than a century, Windsor-Essex has been involved in the creation and production of automobiles. The region, which is known as the origin of Canada's automotive industry and home to the country's largest auto cluster, is now focusing on future automotive trends, such as the research and manufacture of connected, autonomous, and electric vehicles. [7]

Blockchain technology is the foundation for bitcoin and other cryptocurrencies, but it is much more than that. There are numerous opportunities for blockchain to be used in the automotive industry to transform products, services, and processes. It offers a novel approach to data management and transaction execution in situations where accuracy and dependability are critical. We examined blockchain opportunities throughout the automotive value chain and some of them have been listed below. [13]

The automobile industry's blockchain prospects begin with production and supply chain management. It can be used to maintain track of all manufacturing parts, suppliers, and shipping information, making counterfeit parts impossible to enter the supply chain. Additionally, several blockchains might be used to manage the massive volumes of data generated and monitored by automakers and suppliers on a daily basis. [13]

The next opportunity comes in the form of safeguarding vehicle data and data security. The data contained within the blockchain is protected from reverse engineering and cannot be modified, even in the event of a deadly cyber-attack, thanks to the strong cryptographic roots within the blockchain. As more automobiles become connected, they become more vulnerable to hacker attacks. The vehicle's sensor data can be securely and transparently stored in a decentralized network using blockchain. As a result, the concept of a "blockchain black box" can be used to determine the circumstances of an autonomous vehicle crash. Finance, payments, and insurance can all benefit from blockchain technology. Blockchain technology may be used to generate customized insurance contracts, connect parties when leasing a vehicle, manage and automate payments, and much more. [5]

The opportunities for blockchain in the automotive industry are limitless and the interest of businesses in implementing and integrating blockchain with the automotive industry is bound to grow within the next 2-3 years. According to a report, automotive blockchain applications are expected to create a profit of 104 billion pounds by 2030 and failing to make this a priority is a missed opportunity, since many other organizations are investigating how to use blockchain to service customers and generate profit. Customers all over the world are willing to pay for blockchain solutions, and automotive blockchain applications will improve the consumer experience since they offer increased security, performance, and accuracy. It is up to the enterprises to put the models into action and reap the benefits. The report goes on to discuss the solutions, benefits and schedules that will be required to combine blockchain technologies with existing technology. [1]

GOALS

AUTOMOTIVE SUPPLY CHAIN WITH BLOCKCHAIN MODERATION

When it comes to production and supply chains, having the capacity to monitor authenticity and designate anything as authentic is critical. Counterfeit components in the automobile sector not only depreciate the value of vehicles, but they also jeopardize driver safety. While the criminal justice system is doing its duty in the battle against counterfeiting, automotive manufacturers might take further efforts to guarantee that the components used are authentic. Authenticity may be traced throughout a vehicle's life cycle, from production to disposal, by assigning unique RFID tags to each individual component and then registering this ID on a blockchain. In addition to reducing fraud, the ability to trace parts allows for more openness in supply chains. The same RFID tag that is used to verify the legitimacy of an automotive part may also be used to track its whereabouts as it travels through the supply chain. Manufacturing firms may be able to simplify production procedures because of the increased openness. [13]

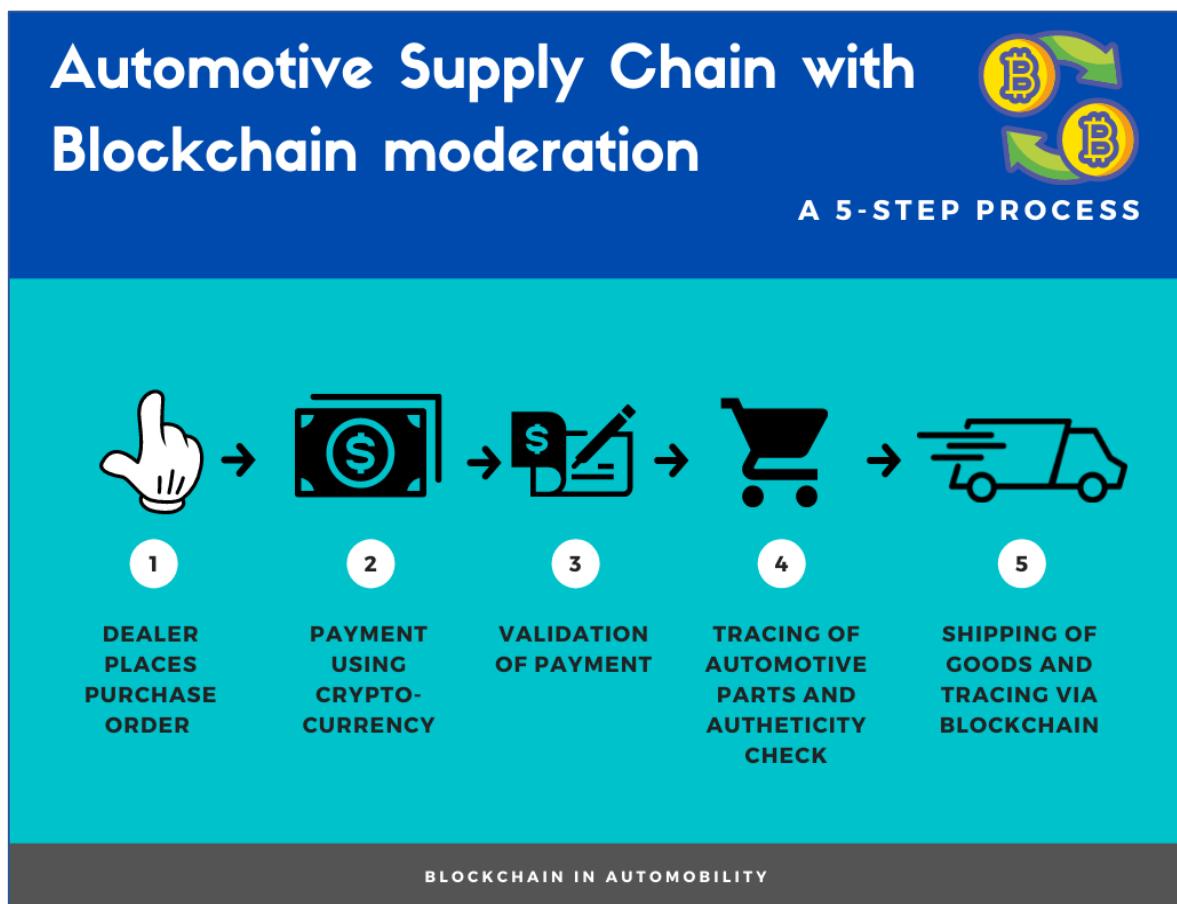


Figure 1: Figure depicting the 5-Step Process Automotive Supply Chain follows in moderation of Blockchain (All the figures are self-made)

BLOCKCHAIN TO MONITOR AUTHENTICITY

The use of blockchain for monitoring authenticity can assist to greatly reduce costs associated with recall efforts. When a manufacturer detects a problematic auto item, the firm should issue a recall to alert car owners that they need to take it to a repair center and have it checked out or replaced. To determine where the problematic item belongs, the manufacturer must examine certain automobile models supplied during a given manufacturing year. This can equate to thousands of vehicles, not all of which are necessarily packed with such a component. It causes thousands of automobile owners to be inconvenienced, with no apparent necessity and extra money wasted in the process. Blockchain technology should aid in automating the process and allow a manufacturer to inform only relevant proprietors. [6]

The suggested architecture is built on an overlay network that includes smart automobiles, service centers, vehicle assembly lines, cloud storages, end-user devices, and other components. To prevent concerns associated with a single point of failure, smart car networking should use a decentralized architecture that is a blockchain network. Because blockchain technology is irreversible and distributed, storing data on it, or implementing decentralized apps can assure data security and dependability.

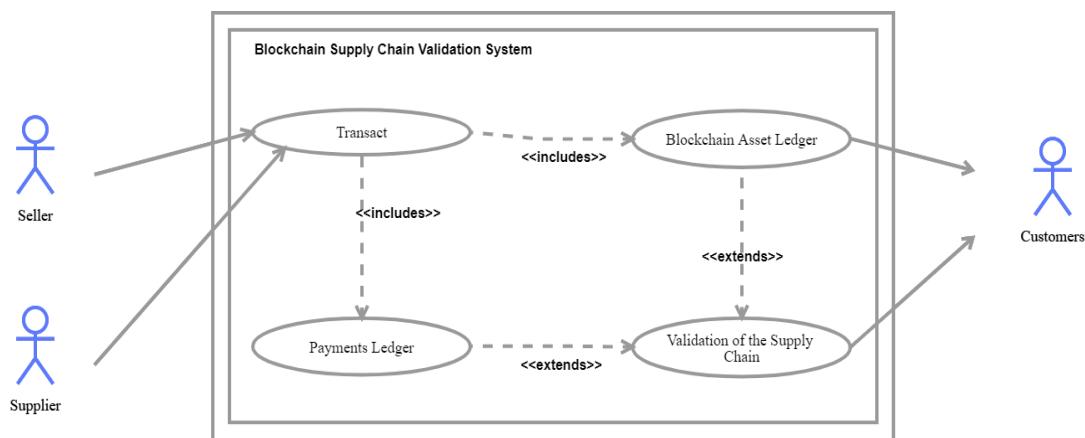


Figure 2: Use Case Diagram for the Decentralized Blockchain Supply Chain Validation System (All the figures are Self-made)

The picture above shows how Sellers and Suppliers will have to go through a rigorous verification and validation procedure in order to participate in the Automotive Supply Chain, and how they will use several decentralized ledgers to handle various spare components for the vehicle industry. Payments and the Assets Ledger are built so that each vehicle spare item has its own node on the decentralized network and can be tracked for market movement as well as authenticity. Without the same, there would not be an automatic way to determine whether the said supply chain is trustable or not. This in turn takes out the chance of any fraudulent activities as all the steps in the process are thoroughly verified.

The proposed system is supposed to be effective to the best of our knowledge based on the research we have carried out for the same. It also goes without saying that there is a whole lot of scope left when it comes to further development in the same field.

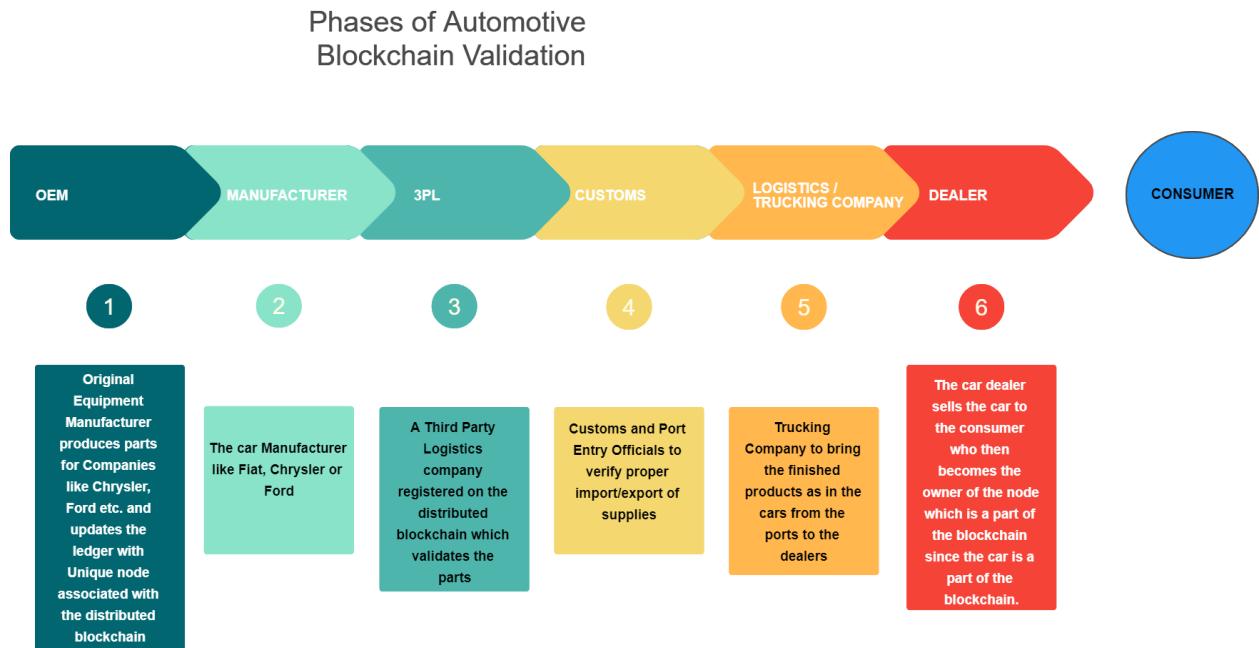


Figure 3: Proposed system for Automotive Blockchain Validation (All the figures are Self-made)

BLOCKCHAIN FOR PAYMENTS IN AUTOMOTIVE INDUSTRY

Obtaining user data is the first step toward auto financing and payments. While managers and organizations would like to collect as much data as possible in order to generate individualized contracts, consumers in today's market are becoming increasingly mindful of data privacy and are unwilling to disclose personal information. Both sides can benefit from blockchain technology. The user will build a digital profile and supply all of the necessary starting information for identity management. The information will be validated by a trusted third-party service, which will then supply the user with the identification attribute. The user will seed their identity information with the bank, and instead of supplying their confidential information while making digital payments, they will offer their identity information.^[8]

Now, this digital identity may be set up for both cars and users, and automotive electric cars will be able to settle expenses with people, charging stations, and road tolls, for example, using their digital identities. During car use, more attributes can be added to the identity information, all of which is maintained on the blockchain and is immutable, which can then be used to provide finance offers, insurance offers, and even discriminating fleet access offers. For example, inexperienced drivers and serial car wreckers will be unable to access high-end fleet vehicles.^{[4][9]}

To avoid being confined to the position of hardware providers, some car firms have already reacted and are growing their activity in the fleet management environment. In the end, the organizations who can deliver a seamless customer experience at a low cost will be the victors in this battle for customer relationship using the proposed blockchain solution.

The addition of a wallet actively embedded in the car will have a major impact on the success of future business models: the car may be able to independently purchase services during utilization,

whether for roadways tolls or for drive-ins and on-demand insurance such as "pay per use" and other on-demand services. Furthermore, the competitive and affordable transaction fees associated with blockchain use can allow for the exploration of new marketing strategies based on a new, cost-effective idea of micro-payments, such as in-car sales of media content or additional perks.

Blockchain technology has the potential to enable automobile businesses to achieve this aim while still maintaining a crucial role as a direct provider of mobility services to end consumers.

PROJECT TIMELINE

The plan is to finish the project in a span of 2 financial years and the two years are divided in 4 quarters of 6 months. There are several stages for the project starting with the Planning stage and Research stage which we already are in and although the process will have a formal restart if given the chance by Invest EssexWindsor. The subsequent processes are supposed to be completed over the span of all the various quarters as seen in the diagram as follows.

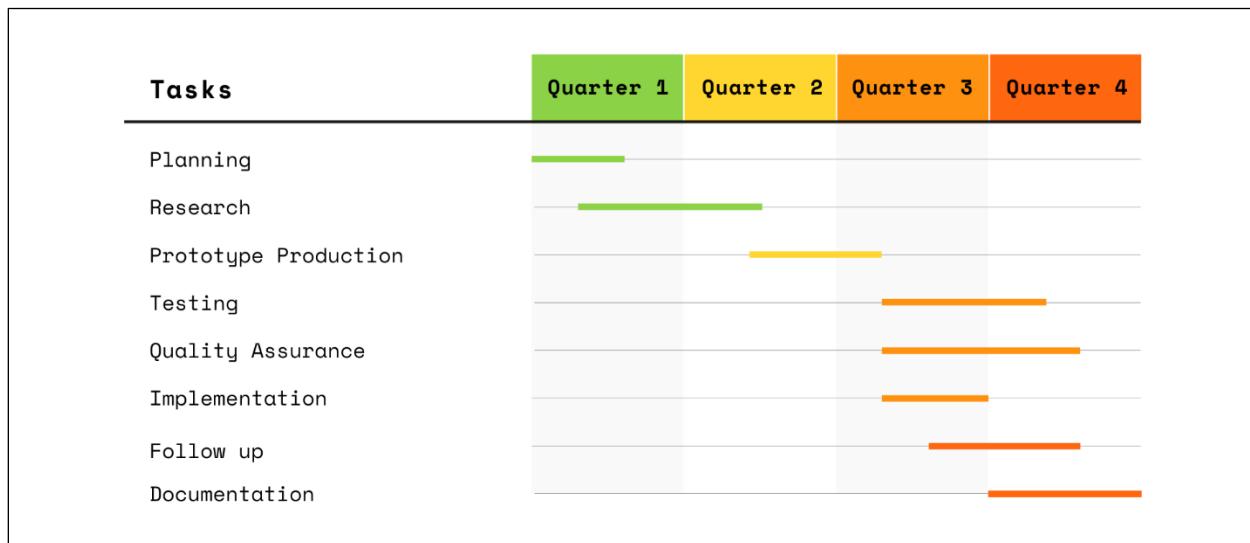


Figure 4:Project Timeline spread across 2 years (All the figures are self-made)

CHALLENGES [10][11]

- **DATA QUALITY**
The blockchain stands apart from other data processing platforms because of its immutability. However, data is submitted by individuals into supply networks, and people make mistakes.
- **SMOOTH INTEGRATION**
Blockchain connects many parties who use various platforms; however, not every third party uses blockchain. Integrating blockchains with all of the tools is a significant undertaking.
- **SUSTAINABILITY AND SCALABILITY**
Because blockchain transactions are immutable, the blockchain is append-only, which means it will continue to expand and become too vast to sustain because every node must store a copy of it.
- **LACK OF BLOCKCHAIN DEVELOPERS**

While the need for experienced blockchain workers is expanding quickly, the blockchain environment is experiencing a severe scarcity of sufficiently educated, talented, and qualified individuals for designing and managing the complexities of peer-to-peer networks.

- **ENVIRONMENT ASPECTS**

The main unintended consequence currently with Blockchain is associated with Environmental Aspects. Blockchain in general requires a lot of computing power which a lot of electricity is also required. Bitcoin miners establish this “mining warehouses” where in a lot of systems are wired-in to perform mining which consume a lot of power, need high-grade cooling systems which in turn contributes to environmental pollution and higher energy consumption. As a ledger of a blockchain grows, more and more of these mining warehouses are required.

- **FINANCIAL RESOURCES**

Implementing Blockchain is not free, and for many organizations it imposes a considerable amount of financial burden as there is a gigantic gap between the quality of skill developers required and the actual supply that is available.

- **STANDARDIZATION**

There are no uniform standards for blockchain applications due to the large diversity of networks that exist today. Standardization can aid in cost reduction, the development of more efficient consensus procedures, and the implementation of interoperability. The lack of consistency between blockchain protocols exacerbates the problem of onboarding new developers, as well as removing consistency from basic operations like security, making mainstream adoption nearly difficult. For both professionals and investors, this has become a barrier to access.

- **REGULATIONS**

This is one of the most difficult aspects of using blockchain in a company. Many businesses are adopting blockchain technology as a transactional tool. Many products will be dependent on this. However, there are no clear regulations in place right now. As a result, when it comes to the blockchain, no one follows any set regulations.

- **SECURITY PROBLEMS**

There are a few security loopholes in blockchain. Hackers can seize control of the network and use it to their advantage. They have the power to change the transaction process and prevent others from establishing a block.

ETHICAL IMPLICATIONS

Blockchain offers increased efficiency (potentially), security, privacy, and integrity by eliminating the risk (and complexity) associated with reliance on only one or a few hubs of authority. Arguably, at least most of the attractiveness of blockchain stems from its fundamentally anti-authoritarian nature. The very first ethical risk which blockchain proponents must address would be that they do not over-hype the technology's capabilities and then over-promise regarding what this would provide. Blockchain systems that are open to the public and have no permissions can be misused for illegal purposes. This is mostly because they enable pseudonymous, or in some cases entirely anonymous, cryptocurrency transactions across international borders without any intervention by the government agencies.

However, the issues are not limited to the permissionless blockchain. The permissioned blockchains can be influenced by those in power and there are cases when the power of “agents

of influence" was demonstrated in the Ethereum blockchain. The infamous DAO hacker on the Ethereum platform exploited a weakness in 2016 to steal nearly a third of the \$160 million in Ether acquired by the fund. Ethereum's seven core developers responded by proposing a hard fork to undo the transaction and restore the funds. However, when a developer named Parity left a bug in its smart contracts on the Ethereum platform, allowing a user to take control of hundreds of wallets containing millions of dollars' worth of Ether by accident, Ethereum's core developers decided against a hard fork, instead opting to keep the \$300 million locked. Solution in the case of permissionless services, we must strike a balance between anonymity and public security, i.e. imposing some sort of obligation on the user and system to crosscheck for the individuals involved and bringing the transaction under taxing systems.

The bigger issue occurs in situations of power imbalance (bargaining leverage, data, kinetic coercion, and so on) - when blockchain may permit 'transactions' that are the result of force, terror, and fraud. The 'dark web' demonstrates what may occur when there is no arbitration. Confidentiality of data may be an issue. Data written to blockchain, for example, is "public" data on Ethereum. Blockchains are newer technological combinations (previous technology merged), and as a result, there is a substantial knowledge gap in many organizations. The blockchain itself may be safe, but it is the application of the blockchain that exposes all its flaws. Because the software that powers blockchain is publicly available [and is duplicated on hundreds of servers across the world], someone with malicious intent might leverage a software defect they discover before everybody else discovers and patches it. To limit the abuse of Blockchain, all nodes must agree, and action must be taken immediately if something goes wrong.

The following are a few methods for preventing the abuse of blockchain technology:

- Keeping your company's data safe.
- Policy on Data Governance
- Comply with Compliance Requirements
- Repair Vulnerabilities in the Network

The other unintended consequence currently with Blockchain is associated with Environmental Aspects. Blockchain in general requires a lot of computing power which a lot of electricity is also required. Bitcoin miners establish this "mining warehouses" where in a lot of systems are wired in to perform mining which consume a lot of power, need high-grade cooling systems which in turn contributes to environmental pollution and higher energy consumption. As a ledger of a blockchain grows, more and more of these mining warehouses are required. Another repercussion will be with the ability of both parties to agree over a contract. Blockchain is known as a smart contract. But it is a "smart contract" not a 100% one wherein every future possibility can be predicted. Therefore, a parties will have to negotiate to agree over a particular clause and sometimes there might be a clause which both the participating parties may not intend to execute which will again cause problems as another problematic iteration will be required by both the parties.

The problem of increase in number of mining warehouses for meeting computational power needs can be solved by using Holo-chain method. Here, everyone will have their own individual blockchain instead of a central one and only the metadata needed to validate the chains will be shared thus resulting in less amount of computational power being used.

SOLUTIONS [10][11]

- **GRANTING DATA ACCESS TO THE RIGHT PEOPLE**

It's crucial to share your sensitive data with the right people and under the proper circumstances to avoid data leaks and financial losses. Determine multiple levels of data confidentiality so that unauthorized users, such as third parties, do not have access to information they should not.

- **PLANNING THE ARCHITECTURE**

We must carefully plan the architecture of your system, considering all APIs (Application Programming Interface), containers, and microservices. Pay particular attention to data security, both in transit and at rest.

- **DIVIDING THE LEDGER**

Bitcoin-NG attempts to resolve the issue of sustainability and Scalability. It addresses this by separating the ledger into two parts: a small block for transaction storage and a key block for leader election. In layman terms, it divides the system into a Key-Value pair.

- **TRAINING**

We need to train our developers to adapt to the blockchain technology and allocate some resources towards their training.

- **ENVIRONMENTAL ASPECTS**

The problem of increase in number of mining warehouses for meeting computational power needs can be solved by using Holo-chain method. Here, everyone will have their own individual blockchain instead of a central one and only the metadata needed to validate the chains will be shared thus resulting in less amount of computational power being used.

- **SECURITY ASPECT**

The protocol layer will need to be more secure to deal with this. Only a few instances, however, have adequate protocols in place to deal with this. As a result, no one knows if they are safe to use for an extended period of time.

- **REGULATION**

To get over these challenges, governments and extremely controlled sectors may need to create regulations for blockchain.

BENEFITS [4]

- **CUTTING COST**

Streamlining the supply chain and increasing responsibility throughout the network of suppliers will allow the company to save money across the spectrum. By enabling more efficient resource utilization, a more efficient supply chain will also increase the manufacturing process and output capacity. Improved verification and traceability will increase regulatory compliance while

decreasing the need for human intervention and control. As a result of better compliance, the danger of fines and other penalties from the regulator will be reduced.

- **IMPROVING END USER EXPERIENCE**

Better products at cheaper costs will result from a more efficient and transparent manufacturing process. Direct blockchain applications, on the other hand, can provide users with new ways to track vehicle history, transfer or share ownership, share rides, file insurance claims, and pay for services while on the go.

- **IMPROVING RESOURCE AND ASSET MANAGEMENT**

The blockchain allows us to track the origin of individual car parts, which opens prospects for not only cost savings but also greater asset usage.

BUDGET [2][3][12]

It is important to understand that the Automobility sector has enormous potential with the integration of Emerging Technologies. Blockchain is one of the major innovating forces when it comes to newly innovating the Automotive sector. With the Invest WindsorEssex panel providing a maximum purse of \$CA 7 million, we hereby propose our Budget for the initial 2 years which would include research, market survey, takes up 17 human resources except the team members and CA \$6 Million in funding.

A detailed budget is entailed below.

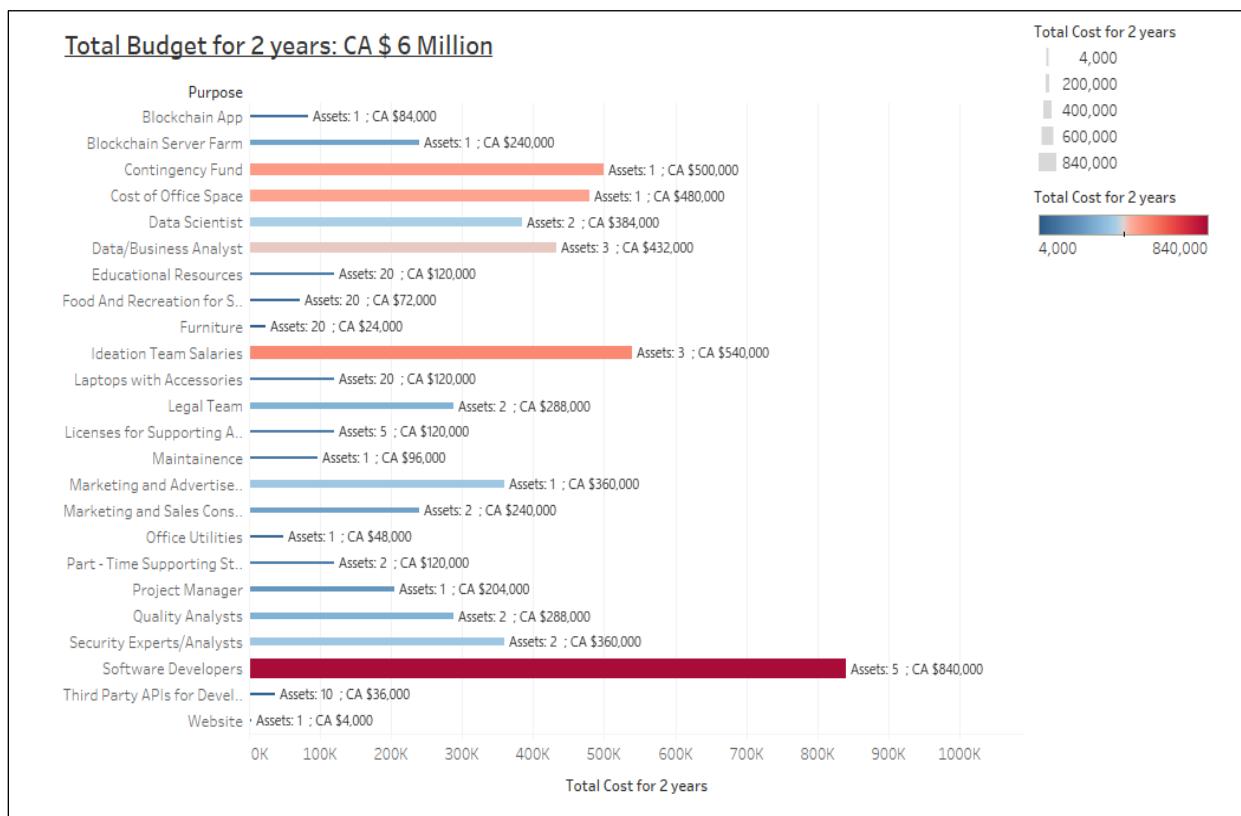


Figure 5:Elaborate Distribution of the budget (All the figures are self-made)

RISK IDENTIFICATION AND MITIGATION PLANS

Any new technology's effective acceptance and operation is contingent on the proper management of the risks associated with that technology. This is especially true when the technology is more than just an application and is integrated into the organization's fundamental infrastructure. In the near future, blockchain technology has the potential to be the backbone of many important platforms. While blockchain technology has the potential to increase efficiency and cut costs, it also has certain inherent hazards. Firms must recognize these hazards and the necessary protections in order to gain the benefits of this technology. ^[1]

The risks associated with blockchain can be broadly classified into the following categories:

THIRD-PARTY APPLICATION RISK

- Because some part of the technology may be supplied from third-party vendors, firms may be exposed to considerable third-party risks. These risks include assaults through manufacturer source code or product, as well as attacks through vendor remote access. ^[1]

Developers and managers can play important role in mitigation of these risk. Proper analysis and authentication with the third-party applications must be done before integrating it with the blockchain and giving it access to the network.

- **INFORMATION SECURITY RISK ASSOCIATED WITH CREATING WALLETS**

While blockchain technology secures transactions, it does not secure accounts or wallets. Data corruption is avoided because to the distributed database and cryptographically locked ledger. Any account's worth, however, is still vulnerable to account takeover. ^[2]

Because blockchain is a new emergent technology, research on strategies to safeguard these end points in the blockchain is still ongoing. However, by properly identifying and testing threat use cases, we can build and implement mitigation methods in the application. This danger can also be addressed by continually monitoring and regulating network access.

- **RISK ASSOCIATED WITH PUBLIC KEYS**

The entire concept of blockchain or distributed ledger technology is primarily reliant on public and private keys. These keys are a string of characters with distinct security features. One security feature is that it is difficult to guess. These keys are used by blockchain. You simply cannot access the digital material contained within the blockchain if you do not have the correct combination of public and private keys. Hackers are aware of this, and they are also aware that guessing those keys is a waste of time. As a result, they attempt to obtain the keys by attacking the weakest link, namely the user's machine. It might be a mobile device or a PC. ^[2]

To safeguard the devices, we may update your device on a regular basis, use a decent antivirus and firewall, never keep your keys in a Word document, a text file, or any other sort of file that a hacker might easily access, and never transmit or store your keys in email.

- **HIGH ENERGY DEMANDS**

There are several consensus approaches available right now. When all of them are considered, it is simple to conclude that Proof-of-Work (PoW) is the most popular. Each way of reaching a consensus has advantages and downsides. PoW is an efficient method of reaching agreement since it compensates miners for their efforts. The disadvantage is the high energy expense.^[2]

With time, blockchain developers recognize its significance, and they are gradually transitioning to a more energy-efficient consensus technique, such as Proof-of-Stake (PoS).

- **COST AND IMPLEMENTATION STRUGGLE**

The true cost of using blockchain technology is enormous. Despite the fact that most blockchain solutions are open source, they demand massive investment from the company that want to pursue them. Hiring developers, maintaining a staff that specializes at different elements of blockchain technology, licensing charges if you choose a paid blockchain solution, and so on all have costs. One must also consider the maintenance costs connected with the technology. The cost of commercial blockchain initiatives might also exceed several million dollars. ^[2]

- **EXPERTISE KNOWLEDGE**

It is difficult to implement and manage a blockchain project. Going through the entire procedure necessitates extensive expertise from the business. They must recruit a large number of blockchain professionals, which causes a difficulty and is seen as one of the blockchain's downsides. Not only that, but they must also teach their current employees on how to use blockchain and guarantee that the management team understands the complexity and implications of a blockchain-powered firm. ^[2]

- **LEGACY SYSTEMS**

Not every firm has moved away from outdated systems. Many firms continue to rely on old systems to manage their operations. However, if companies want to implement blockchain technology, they must fully abandon their existing systems and switch to blockchain technology, which is not practical for every organization. ^[2]

Following is the Risk Matrix depicting the determined risk and how hefty they can cost to an organization:

Third Party Applications	Security of E-wallets	Public Keys	High Energy Demands	Cost and Implementation	Legacy Systems	Expertise Knowledge
Low Risk	Low Risk	Moderate Risk	Moderate Risk	Moderate Risk	Moderate Risk	Moderate Risk
Moderate Risk	Moderate Risk	Moderate Risk	Moderate Risk	Moderate Risk	Moderate Risk	Moderate Risk
High Risk	Moderate Risk	Moderate Risk	Moderate Risk	High Risk	Moderate Risk	Moderate Risk
Very High Risk	Moderate Risk	Moderate Risk	Moderate Risk	Moderate Risk	Moderate Risk	Very High Risk

Figure 6: Risk Matrix based on the risks determined (All figures are self made)

CONCLUSION

The automobile business has always been at the forefront of technological innovation, with automakers continuously seeking for new ways to capitalize on cutting-edge technologies. After reviewing a variety of potential use cases for the technology, it is clear that blockchain in automotive has the potential to significantly benefit the industry by improving supply chain processes, introducing tamper-proof record keeping, streamlining production, and supporting other innovative technologies and trends. However, its most significant contribution to the industry may be its potential to inspire new sorts of services and business models. ^[3]

While blockchain technology are fast evolving and finding use in a wide range of areas. The proposed solution is reliant on Bid data and are still in the developing phase. Furthermore, the operation of huge systems should be secured from hostile operations, because failures in such systems have disastrous repercussions. Users who are not alert enough, like with other technology employed in the digital era, are the weakest links. This is especially true for the administration of big systems, such as transportation networks. Failure to follow simple rules and guidelines can have major implications, including the collapse of the whole network. Careful considerations by the developers and managers will be the key step towards the successful implementation of the proposed plan. ^[3]

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