

Group 4

Project

How the turbulent economic conditions of Pakistan depicted by dollar shortage and import bans are impacting supply chains feeding the automotive industry (mainly assemblers) in the country, and can a redesign of the supply chains might help improve the situation justify your case?

Supply Chain & Logistics Management – DISC 333 – S2

Lahore University of Management Sciences

Suleman Dawood School of Business

Dr. Muhammad Raja Usman Khalid

Group 4

Muhammad Ahmed Ehtisham – 24110167

Muhammad Faseeh Bilal – 24110341

Sania Athar – 24110217

Zehra Batool – 24110233

Rameen Rizwan – 24110160

Table of Contents

Introduction to the Automobile Industry	3
Existing Supply Chain in the Industry	3
Supply Chain Problems in the Automobile Industry	4
Solutions to the Problems	5
Final Outlook of the Supply Chain	6
Limitations & Conclusion	7
References	8
Appendix	10

Introduction to the Automobile Industry

Pakistan's automobile sector has expanded significantly in recent years. The industry saw a 171% growth between 2014 and 2018, making it one of the fastest-growing sectors in the nation [1]. As of 2018, the automotive sector employs more than 3.5 million people and accounts for 4% of Pakistan's GDP [1][2]. Additionally, Pakistan is regarded as the 35th-largest vehicle manufacturer in the world [1][2]. Over the course of 10 years, Pakistan's vehicle sector has received considerable investment totalling more than Rs20 billion (US\$88 million) [3]. With a contribution of roughly Rs. 50 billion (US\$220 million), the sector has also contributed considerably to the national exchequer [1]. The sector, which makes motorbikes, trucks, buses, automobiles, and auto components, has experienced historical growth. However, the sector is experiencing difficulties due to import restrictions and dollar shortage, which severely affects automotive industry's supply chain. This report will examine the effects of dollar shortages and import restrictions on the supply chain and propose solutions to its existing supply chain.

Existing Supply Chain in the Industry

The automotive sector in Pakistan has a complex supply chain involving various tiers of suppliers and manufacturers. The industry is mainly centred around Karachi, Lahore, and Islamabad. Original equipment manufacturers (OEMs) are the main clients of suppliers who provide essential components for vehicle production. The first tier of suppliers comprises raw material providers that produce, steel, aluminium, plastics, etc. for vehicle component production. Tier-one suppliers are responsible for making significant components such as engines, transmissions, and body parts, and have long-term contracts with OEMs and collaborate to improve products. The third tier includes tier-two and tier-three suppliers who provide smaller parts such as nuts, bolts, and electrical components. These suppliers often work on shorter-term contracts with tier-one suppliers on a project-specific basis. In Pakistan, Toyota, Honda, Suzuki, and Hyundai are some OEMs operating in the automotive industry. They work closely with their suppliers to provide top-quality components to meet their specifications. Pakistan government has recently promoted local production of components and parts to improve localization in the automotive supply chain. This has resulted in the expansion of local suppliers, that play a crucial role in the automotive supply chain. (Appendix 1,2)

Supply Chain Problems in the Automobile Industry

Due to reliance on imported raw materials and parts, Pakistan's automotive sector is highly susceptible to changes in external economic factors like exchange rates and import quotas. In the first 10 months of 2020–2021, import bill for the automotive industry rose by 68%, according to the State Bank of Pakistan. This increase was primarily caused by increased imports of car parts and raw materials like steel and aluminium. The supply chain was impacted due to higher tariffs on imported products like tires. In June 2020, the government declared an increase in customs duty on imported new cars and opulent non-essential goods. Mr. Farid Kakar, from “Advanced Automobiles” said, “we are facing two main difficulties i.e., import restrictions, firstly increase in prices due to USD and secondly not meeting the standard processing times”. Subsequently, an ongoing dollar shortage in Pakistan has become a significant obstacle making it challenging for manufacturers to acquire essential raw materials, causing output delays and higher costs. Manufacturers have been forced to use lower-quality materials or rely on local suppliers who are not as dependable or of the same quality as foreign suppliers. Mr. Jehangir Khan from “Car Masters”, stated in his interview that “we can only buy basic plastic components from local suppliers and seat covers, tires, etc.; everything else,

Group 4

engines, transmissions, electrical components are imported”. Therefore, a huge dependency on foreign suppliers disrupts the supply chain frequently. Mr. Kakar went on to state that, “Every material can be manufactured and supplied here locally as we have full potential of producing local manufactured automobiles but due to lack of govt interest bad policies energy crises heavy taxes not providing facilities and infrastructure to this industry we are only limited to assemble automobiles”. Despite initiatives to encourage domestic production and manufacturing, there is a lack of domestic suppliers, further increasing dependence on imports.

There is a lack of vertical integration in the industry. The industry experiences stockouts and output delays due to ineffective inventory management. Pak Suzuki had to stop manufacturing in 2020 due to lack of parts. The business claimed that delays in the delivery of parts from their suppliers were to blame. These problems have been further exacerbated by ineffective supplier relationships within the industry. According to a study by PAMA, there is little information sharing between suppliers and assemblers, which results in a lack of transparency in the supply chain. Inefficiencies, delays, and quality problems are brought on by the supply chain's stakeholders' lack of cooperation and coordination, including assemblers, suppliers, and logistics providers. The absence of supply chain visibility and data analytics is another factor which limits the understanding of performance and chances for improvement. Coupled with uncertain demand, consequently, the industry frequently experiences stockouts and excess inventory. Obsolescence, higher inventory holding expenses, and decreased sales hence are imminent. The lack of infrastructure and reverse logistics, like recycling and remanufacturing, results in higher costs and decreased optimization. The inability of Pakistan's supply chains to adapt to shifting market conditions and consumer demands also impedes the automotive sector. Lengthy lead times and rigid manufacturing procedures contribute to this lack of agility.

Solutions to the Problems

In light of the context built around the automotive industry, it is clear that the supplier and demand uncertainty are both high. As a result, the redesign should involve moving towards an agile supply chain, combining the characteristics of responsive and risk hedging supply chains. Our solution focuses on Supplier Relationship Management (SRM) and green logistics to make the supply chain flexible yet robust. Within Pakistan, a glaring SRM issue is that the process of selecting suppliers in the Pakistani automobile industry is outdated and archaic. The only criterion considered is price, which is already plagued by a bullwhip effect due to data invisibility in the industry. Automotive companies can employ an Analytic Hierarchy Process (AHP) model through which supplier selection can minimise risk, increase consistency and offer firms flexibility in terms of choosing between reliable suppliers (Abbasi). The process ensures that criteria other than price are evaluated when selecting suppliers, including criteria such as strategic fit, operational compatibility, assessment of current manufacturing capabilities, and financial stability. In the article “Defining Supply Chain Management”, Mentzer et al., also explain the importance of viewing SCM as a philosophy and integrating cooperative efforts and synchronising operational and strategic capabilities. This opens up the possibility of long-term focus and relationships based on shared risk/rewards and solid cooperation and integration. This strategy of choosing suppliers minimises the purchase risks for manufacturers, which is one of the top factors that hinder local manufacturing. Implementing such a process would also reduce information asymmetry for the manufacturers, as they will be evaluating suppliers on a holistic set of criteria that is not heavily influenced by the volatility of upstream price changes working towards a more flexible and resilient supply chain with the ability to withstand turbulent economic conditions.

Group 4

Redesign in the supplier relationship management should also include betterment of information sharing systems. In the industry, tier 1 and tier 2 suppliers have poor information management systems. As reported by Honda Atlas, Gandhara Nissan and Dysin automobiles, their suppliers have almost no documentation, and zero adoption of communication technologies (Abbasi). Automotive suppliers should put in place Supply Chain Management Information Systems such as SAP APO (Abbasi). Pakistan has the talent and resources to deploy this software, however adoption of technologies on the end of the industry itself is lacking. Overall, betterment of information sharing would allow manufacturers flexibility as data will be readily available to make important decisions, and help navigate disruptions such as import bans. This would also strengthen local manufacturers by decreasing information asymmetry with tier 1 and tier 2 suppliers. An economic system in the automobile industry can be developed for when the imported parts of cars are disposed off, they can be reused and regenerated becoming a means of continuing production in a sustainable way. This is a good way to deal with already imported parts and to justify the imports to a certain extent. Circular economy requires data integration and transparency, aligning the values and targets with other stakeholders and partnership and collaboration among members of supply chain which we would have (Appendix 3). An automotive value chain with high circularity can increase the ratio of vehicle life cycle revenues to sales price by 15 to 20 times. Application of circular economy can generate new revenue streams and significantly reduce material sourcing, production, and fleet servicing costs and volatility. Advanced recycling infrastructure has the potential to unlock a significant supply of secondary materials according to the automotive grade quality. This requires modular vehicle redesign and vehicle data transparency. Eventually tackling the issues of economic conditions and a sustainable supply chain for automobile industry.

Final Outlook of the Supply Chain

The final supply chain outlook is represented by the flow diagram given in exhibit 1. The supply chain will focus on agility and green logistics to ensure flexibility and robustness in a volatile market. The supply chain will be made agile through use of supplier relationship management techniques that improve data visibility, negotiation and strengthen local manufacturers. The specific SRM techniques mentioned supplier selection through AHP and Information Sharing through automation. Additionally, the supply chain will move towards green logistics by implementing circular economy strategies. Both the overarching strategies of making the supply chain agile and green will complement each other to reduce reliance on imports. (Appendix 4)

Limitations & Conclusion

The main limitation of this supply chain redesign is the culture of the automobile industry; it requires a paradigm shift which requires long-term commitment and support. It has established practices that make it resistant to change. The redesign cannot ensure that the solutions will be implemented. Additionally, the redesign involving circular economy does not have prior academic research conducted in the Pakistani context. This means that the application of these methods are not well defined and pilot projects will have to be conducted to determine the practicality of the solutions in the Pakistani automotive industry.

In conclusion, the solutions proposed aim to reduce reliance on imports by improving local supplier firm relationships, improving data visibility, information sharing and introducing green logistics. This would make the industry more agile and better equipped to deal with external issues such as dollar shortages and economic downturns.

Group 4

References

- Abbasi M. N. (2015) *Supplier Selection: Insight from Automotive Industry of Pakistan*. Retrieved April 6, 2023.
- Accenture. (2022, May). *Driving Ambitions: The Business Case for Circular Economy in the Car Industry*. weforum.org. Retrieved April 6, 2023, from https://www3.weforum.org/docs/WEF_Driving_Ambitions-2022.pdf
- All you need to know about the Automobile industry in Pakistan - Pro News*. (2022, August 16). Pro News. <https://pronews.com.pk/automobile-industry-in-pakistan/>
- Blanco, E. & Cotrill, K. (2013), “Delivering on the promise of green logistics”, MIT Sloan Management Review, December
- Cachon, G.P. (2004), “The allocation of inventory risk in a supply chain: Push, pull and advance-purchase discount contracts”, *Management Science*, Vol. 50(2), pp. 222-238.
- Christopher, M. and Towill, D.R. (2002), “Developing market specific supply chain strategies”, *The International journal of Logistics Management*, Vol. 13(1), pp. 1-14.
- Lee, H. & Billington, C. (1992), “Managing supply chain inventory: Pitfalls and opportunities”, *Sloan Management Review*, Vol. 33(3), pp. 65-73
- Lee, H.L. (2002), “Aligning supply chain strategies with product uncertainties”, *California Management Review*, Vol. 44(3).
- Lee, H.L., Padmanabhan, V. and Whang, S. (1997), “The bullwhip effect in supply chains”. *MIT Sloan Management Review*, Vol. 38(3).
- Mentzer, J.Y., DeWitt, W. Keebler, J.S., Min, S., Nix, N.W., Smith, C.D. and Zacharia, Z.G. (2001), “Defining supply chain management”, *Journal of Business Logistics*, Vol. 22(2), pp. 1-25.
- Olhager, J. (2003), “Strategic positioning of the order penetration point”, *International Journal of Production Economics*, Vol. 85, pp. 319-329
- Ostdick, J. H. (2021, December 24). *Automotive Sector Industries in Pakistan (Overview and History)*. PakOption. <https://pakoption.org/automotive-sector/>
- Pagh, J. D. & Cooper, M. (1998), “Supply chain postponement and speculation strategies: how to choose the right strategy”, *Journal of Business Logistics*, Vol. 19(2), pp. 13-33
- Sheffi, Y. and Rice Jr., J.B. (2005), “A supply chain view of the resilient enterprise”, *MIT Sloan Management Review*, Vol. 47(01).
- Wieland, A. (2021), “Dancing the supply chain: Toward transformative supply chain management”, *Journal of Supply Chain Management*, Vol. 57(1), pp. 58-73.

Appendix

Appendix 1: Existing Supply chain

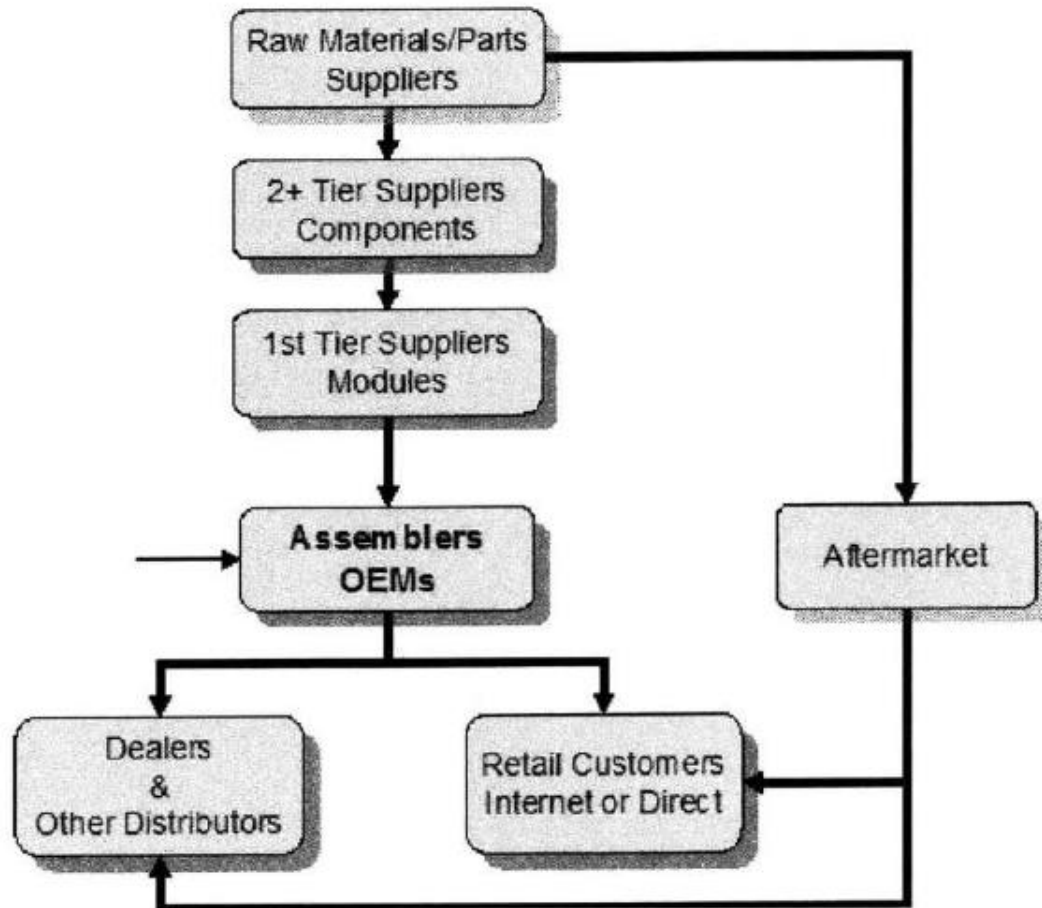
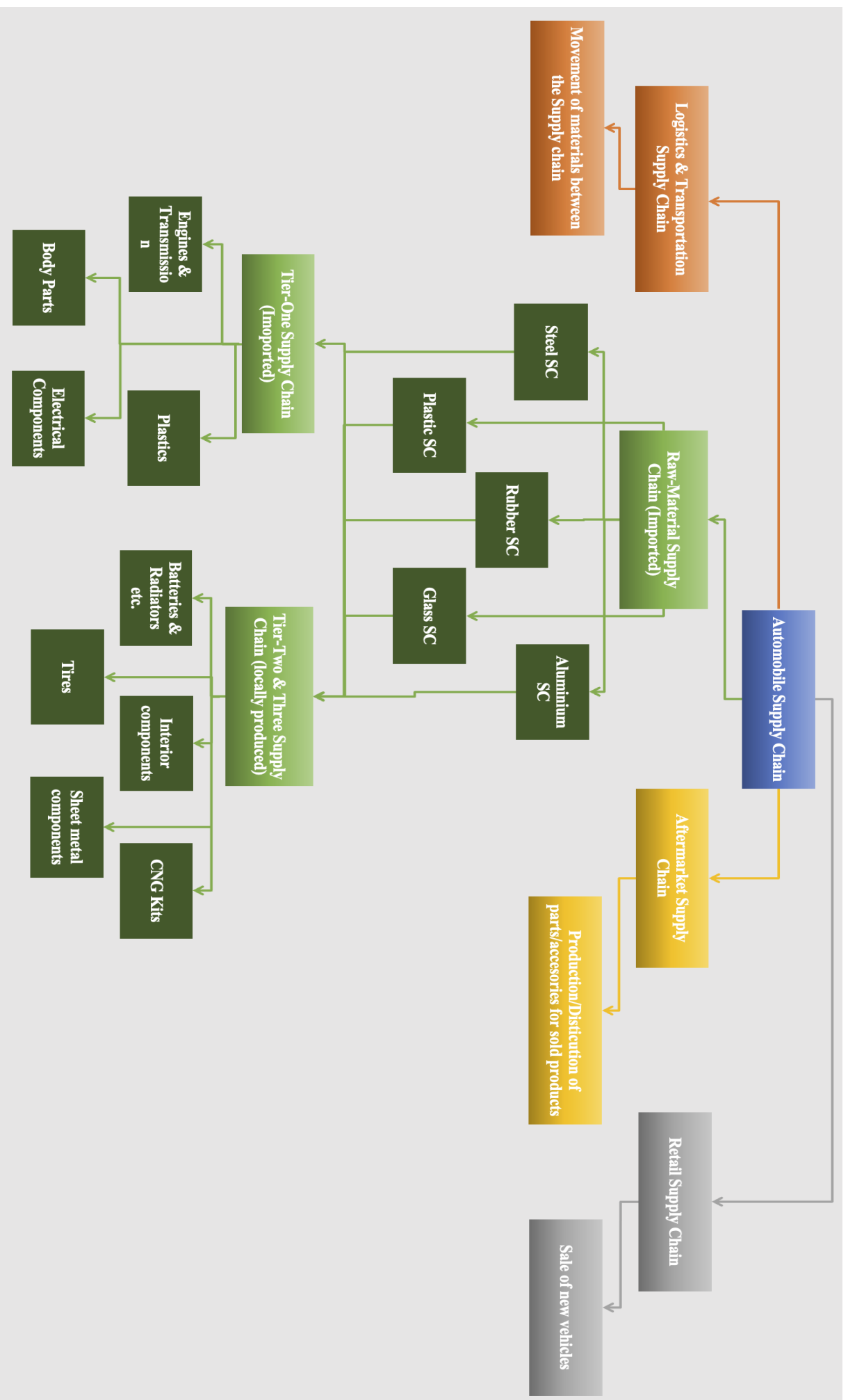
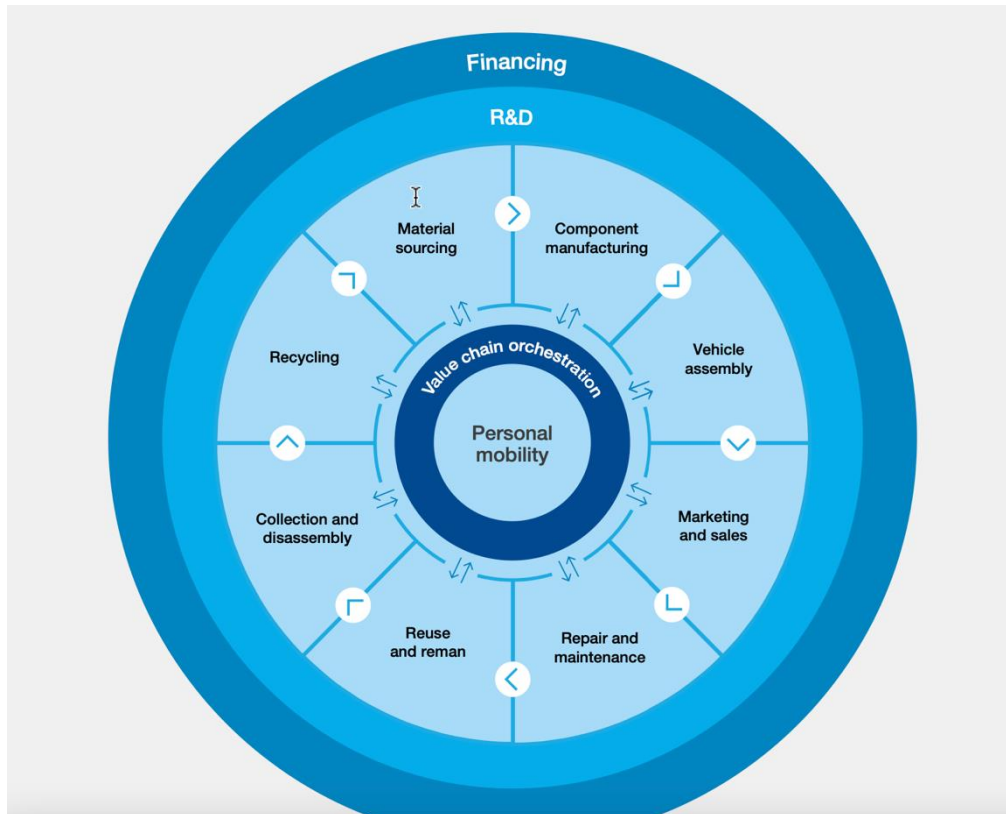


Figure 1
Industry Supply Chain Structure
Source: Standards & Poor market Insight

Appendix 2: Supply chain including ancillary industries



Appendix 3: Circular Economies



Appendix 4: Final outlook of the Supply Chain after a redesign

