

Exploring the Role of Chip Shortage with the Perception of Management Strategies and Digitalization to the Operational Business Performance of Geely Philippines in the Post-Pandemic Situation

Harvey T. Ong, Gio Sebastian N. Arcebal, Chin Ann N. Jacinto, Kyle Kenjo A. King & Juliana Marie C. Rebong
De La Salle University – Manila Decision Sciences and Innovation Department, 2401 Taft Ave., Manila,
Philippines

Email: harvey.ong@dlsu.edu.ph, gio_arcebal@dlsu.edu.ph, chin_jacinto@dlsu.edu.ph,
kyle_kenjo_king@dlsu.edu.ph, juliana_rebong@dlsu.edu.ph

Abstract

The semiconductor chip shortage significantly impacted the automotive industry, which affected business operations. The automotive sector is one of the businesses that the aforementioned problem has directly impacted. Therefore, the research sought to address the general problem: “How does the chip shortage play a role in the operational business performance of Geely, with management strategies and digitalization as responses in a post-pandemic situation?” A case study research methodology was utilized in selecting respondents for the study, which enabled the researchers to gather two upper-management employees, one branch manager, and one service head. 3 service employees from Geely Quezon Avenue were also included in the said interview. The researchers moderately altered Yin's (1994) case study design because of the unique nature of the research study. The findings of this research indicated that management strategies aided in the improvement of the operational business performance of the company. It is further strengthened by digitalization as acknowledged new possibilities in coping with the effects of the pandemic and chip shortage. Furthermore, the recommendations suggest that other companies hold workshops on how they would respond to and conduct business during the aforementioned crises since it can help the business run efficiently while avoiding significant challenges.

Keywords: Chip Shortage, Management Strategies, Digitalization, Operational Business Performance, Geely Philippines

1. Introduction

The semiconductor chip shortage has emerged as one of the major global crises, resulting in several production decreases, a decline in sales, and other significant changes, with the automotive industry as one of the sectors most severely impacted by the shortage. Over \$200 million in revenues were lost, 11.3 million automobiles were not produced, and the projected increased lead time for the manufacturing of chips is fifty-two weeks as opposed to the typical four-month period (Hamblen, 2022; Placek, 2023; Walsh, 2022). Since the shortage took place, it has been predicted that it will subside by the year 2022, with the demand gradually declining in the coming years and manufacturers gradually adjusting to the changes (Moore, 2021; James, 2023; J.P Morgan, 2023, Sheffi, 2021). Emerging as one of the prominent automobile brands

in the Philippines, Geely's sales peaked in the past couple of years because of its affordable pricing, innovative entertainment system, modern safety features, and spacious and comfortable interior (Carreon, 2023). Thus, this research sought to answer the main problem, "How does the chip shortage play a role in the operational business performance of Geely, with management strategies and digitalization as responses in a post-pandemic situation?" Furthermore, the researchers aimed to answer the following specific problems to delve deeper into the topic: What is the impact of chip shortage on the operational business performance of Geely in the post-pandemic? How does digitalization affect the operational business performance of Geely? What is the impact of chip shortage on the management strategies of Geely? What is the significance of management strategies to the operational business performance of Geely? What is the effect of management strategies on the relationship between the chip shortage and the operational business performance of Geely in the post-pandemic? What is the effect of digitalization on the relationship between the chip shortage and the operational business performance of Geely in the post-pandemic?

The semiconductor chip shortage brought about a global crisis that affected various industries, including the automotive industry. Geely, an emerging automobile brand, easily penetrated various countries, therefore being one of the fastest growing brands with automobiles offered at low price with promising features, however, they are not exempted from the semiconductor crisis. Hence, the research aimed to determine the role of chip shortage to the operational business performance of Geely. In addition, it looked into the lens of the role of management strategies and digitalization on Geely's performance in post-pandemic, and their recovery from the semiconductor chip crisis. Moreover, this addresses the research gap on themes related to the business performance of automobile companies, the lack of Philippine research related to the topic, and to provide a research utilizing primary data collection.

General Problem. *"How does the chip shortage play a role in the operational business performance of Geely, with management strategies and digitalization as responses in a post-pandemic situation?"* To determine the role of the chip shortage in the operational business performance of Geely with management strategies and digitalization as responses in a post-pandemic situation. Specific Objectives: *To know the influence of chip shortage on the operational business performance of Geely in the post-pandemic. To determine the effect of digitalization on the operational business performance of Geely. To identify the impact of chip shortage on the management strategies of Geely. To assess the significance of management strategies to the operational business performance of Geely. To identify the effect of management strategies on the relationship between the chip shortage and the operational business performance of Geely in the post-pandemic. To determine the effect of digitalization on the relationship between the chip shortage and the operational business performance of Geely in the post-pandemic.*

The researchers determined the impact of chip shortage on operational business performance, with management strategies and digitalization as responses to the said shortage, which benefited the company Geely Philippines, existing automobile companies in the Philippines, semiconductor chip manufacturers, and future researchers.

Geely Philippines. The research mainly revolves around the management of Geely Philippines and how they perform with the chip shortage as a factor. Conducting this research would benefit them by understanding how the chip crisis affects their operational business performance. With management strategies and digitalization as the selected variables as a response, it would help them to know the strengths and weaknesses of their strategies, to determine how to incorporate digitalization in their management strategies for them to have a more conducive and appropriate strategy as a response to the chip shortage, to improve their operational business performance.

Future Researchers. With the chip shortage impacting more than 100 industries, future researchers can benefit from the research to find the effects on the Philippines, the automobile industry, and other related industries. This can help add more knowledge to the Philippine aspect of the chip shortage, and serve as a foundation to look into other variables related to the study.

The research focused on the operational business performance of Geely as a dependent variable, chip shortage as an independent variable, management strategies and digitalization as responses. The study collected primary data by conducting interviews with the employees of Geely, as well as secondary data through scholarly journals and articles. The study was done in two (2) phases, the first phase during the researchers' third term of AY 2022-2023, and the second phase during the succeeding period. The study was limited to Geely Philippines, particularly the Quezon Avenue branch. Other branches of Geely, and other automobile companies will not be included in the study. Respondents of the study were limited to the employees of Geely Philippines - Quezon Avenue branch only. The findings of the study does not generalize the impact of the chip shortage and the effect of management strategies and digitalization on the automobile industry due to the selected automobile company. The research solely focused on the business performance of Geely as a dependent variable, chip shortage as an independent variable, management strategies and digitalization as responses, thus did not look into other variables beyond this research.

2. Literature Review

Chip Shortage. The global supply chain issue known as "chip shortage" has impacted over 169 sectors, including computers, electronics, and automobiles. These industries depend on semiconductor chips for their products to operate (Ashcroft, 2023). It significantly impacted the auto industry, extending delivery times and reducing production capacity. The perspective on the conflict between China and Taiwan, which is by far the world's largest semiconductor production, is another factor to consider. Over 60% of them, including over 90% of the most advanced ones, are made there (Euronews, 2023). Taiwan plays a significant part in the scarcity of semiconductor chips, which began in 2020 with the release of COVID-19 and has affected several different goods and industries.

Management Strategies. Business leaders and theorists have studied "strategy" for years, yet there is no precise definition for it, Bukhari (2019). Strategies employed by businesses in the corporate sector are also known as management strategies. Management strategies are also methods for leading and managing a company to accomplish its goals.

Operational Business Performance. Pathiranage (2019) defines business performance as a company's output or results, which includes growth, productivity, and profitability. The firm's results are typically a direct result of its workforce. To sum up, operational company performance is influenced by various factors, including staff motivation, customer relationships, service quality, management styles, and incentives. The performance of employees affects growth, productivity, and profitability.

Digitalization. As more and more products, methods, and other things become digital, our generation evolves, and technology progresses. In greater detail, digitalization is the transition to a digital business; it is the application of digital technology to alter a business model and provide fresh opportunities for generating income and adding value (Gartner Information Technology Glossary, n.d.). Digitalization can be included in a different context as it affects individuals, businesses, and society.

Geely. Following the distribution partnership and after-sales service agreement with the Japanese company Sojitz Corporation, Geely Auto debuted in the Philippine market in July 2019. As a result, Geely climbed up one spot in the industry sales ranking overall, taking the eighth place with a 2.6% market share (Geely Auto Group, 2023).

The conceptual framework shown below illustrated the occurrence of chip shortage (independent variable) on management strategies as a response while also taking into consideration digitalization as a response which therefore resulted in operational business performance (dependent variable). The researchers were able to look for studies that showed the relationship between chip shortage and digitalization, operational business performance, and digitalization. However, the researchers were unable to find studies that linked the four variables. The framework shown above had been used as a reference by the researchers in order to demonstrate if chip shortages are correlated with management strategies and operational business performance which was caused by digitalization.

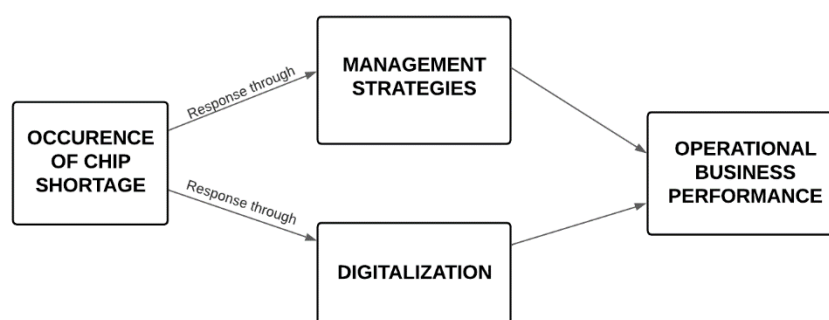


Figure 1. *Conceptual Framework*

During the pandemic's peak, the chip shortage directly hit the Automobile Industry (Wu et al., 2021). Pachhandara (2022) highlighted that business operations were affected by halting operations, worsened by the rising demand for automobiles.

To reduce the effects of the crises, Montoya et al. (2022) researched the impact of management strategies, showing that it reduced the shortage's logistic concerns. Wang et al. (2016) utilized operational efficiency as a measure of resource maximization, resulting in a complementary relationship between effectiveness metrics and efficiency measures. Omhonria & Needorn (2022) recognize that efficiency is also associated with capacity, particularly production. Therefore, manufacturing companies operate efficiently with a higher capacity rate.

Wang et al. (2023) support digitalization's impact on a business, finding that it improved the company's performance. Cloud applications are also a part of digitalization, as mentioned by Bez-vi and Lufman (2022), with the utilization of the online space to work collaboratively. Through these studies, the researchers determined the variable measures to understand further the relationship between the chip shortage and operational business performance.

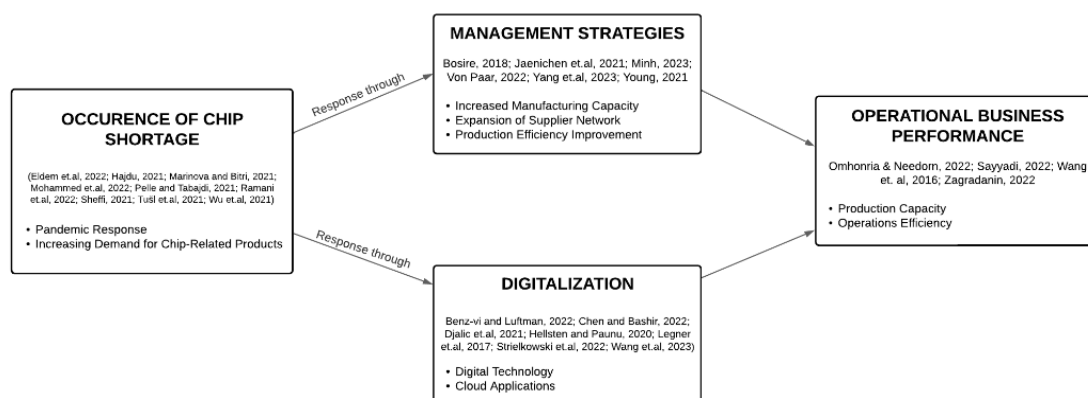


Figure 2. *Operational Framework Looking through the lens of Management Strategies and Digitalization on the Impact of Chip Shortage on the Operational Business Performance of Geely Philippines*

Hypothesis Testing / Proposition

P1: Chip shortage negatively affects the operational business performance of Geely.

P2: Implementing management strategies will improve the operational business performance of Geely.

P3: Digitalization will mitigate the negative impact of chip shortage on the operational business performance of Geely.

Operational Definition of Terms

Business Performance - "refers to a company's output or outcomes; it is comprised of profitability, efficiency, and development, most of which generally have originated from the company's employees" (Pathiranan, 2019).

Chip Shortage - “significant worldwide scarcity of semiconductor supplies” (Mohammad et al., 2022).

Cloud Application - “are software applications that could be accessed online and operated on cloud computing infrastructure. Cloud applications are stored on distant servers preserved by cloud service providers, as opposed to conventional applications that must be installed on specific computers or servers” (Somogyi, 2020).

Digitalization - “has developed to be a significant catalyst behind business innovation and it also provides organizations additional possibilities to generate new ideas as well as producing value” (Wang et al., 2023).

Digital Technology - “refers to a variety of devices, software, and applications which analyze, communicate, store, and manage data using communication and information” (Somogyi, 2020).

Expansion of Supplier Network - “refers to the action of expanding the variety of suppliers that a business or an organization collaborates with” (Von Paar, 2022).

Increasing Demand for Chip-Related Products - “pertains to the increasing demand of numerous technological devices and advancements that depend upon electronic components or semiconductor chips in the market” (Voas et al., 2021).

Increased Manufacturing Capacity - “pertains to the development or improvement of a company’s ability to manufacture goods at a higher quantity or pace in a particular time period” (Young, 2021).

Management Strategies - “are methods for guiding and regulating a business so that it can accomplish its goals” (Oboloo, 2023).

Operations Efficiency - “pertains to how well a company or organization can manage its operations, resources, and procedures to maximize output while minimizing input” (Yang et al., 2023).

Pandemic Response - “emphasizes the precautions that institutions, governments, and people take to lessen the effects of pandemics and safeguard the well-being of the public” (Voas et al., 2021).

Production Capacity - “refers to the maximum quantity of products or services that a business or organization may produce over a particular period of time while functioning at its optimal capacity” (Omhonria & Needorn, 2022).

Production Efficiency Improvement - “refers to the manner of improving a manufacturing or industrial process’s efficacy and productivity” (Minh, 2023).

3. Research Method

Research Design. A qualitative research design was utilized in this research to gather the data that the researchers need. A qualitative approach typically involves gathering and investigating non-numerical data collected from focus group discussions, interviews, observations, and either

visual or written resources. It intended to offer a comprehensive and in-depth comprehension of complicated procedures, processes, and experiences. This study utilized a descriptive, exploratory, and single case study research design. The researchers identified that the dependent variable was “business performance” while the independent variable was “chip shortage” with a “digitalization” and “management strategies” as responses. Descriptive, exploratory, and single case study research design mainly focuses on describing and explaining why such an issue occurs. To add, it also involved repeated measures and manipulation of the independent variable. It helped the researchers identify problems and how to solve them, as well as what had succeeded and what failed, and enabled an in-depth investigation of events by the researchers to produce detailed descriptions and understanding.

Sampling Plan. The researchers utilized a purposive sampling technique to gather information for the research to determine the eligible respondents for the FGD. In doing so, 4 employees had been determined to participate in the FGD. The following criteria were used to determine the selected respondents: Must be working in the automobile industry for a minimum of 3 to 5 years; A current employee of Geely Philippines - Quezon Avenue branch; Working under the Service Department or Assembly Line; Is a technician or engineer

Method of Data Analysis. The research design aimed to establish a clear approach and outline techniques for gathering and evaluating information (Zikmund, n.d.). Using analytic generalization, the researchers predicted the transferability of evaluation results based on a theoretical study into the components that influence outcomes and contextual effects. This approach was adopted to better analyze Chip Shortage, Management Strategies, Digitalization, and Operational Business Performance. The study’s propositions guided the analysis to draw relevant conclusions:

P1: Chip Shortage drastically affects the Operational Business Performance of Geely.

P2: Implementing Management Strategies will improve the Operational Business Performance of Geely

P3: Digitalization will enhance the impact of Chip Shortage on the Operational Business Performance of Geely.

Following Yin’s recommendation (2008), pattern matching was employed to assess these propositions, comparing predicted patterns with observed ones using specific techniques.

4. Finding and Discussion

Chip Shortage. Through the spread of information from upper management to the staff, the company became aware of and well-informed about the pandemic reactions that have created the scarcity of chips. They knew that the firm would be impacted by an increase in demand for chip-related items. In addition, they mentioned the electronics, gadgets, appliances, and telecommunications businesses.

Management Strategies. Geely stated that in order to reassure customers that the products are in good shape, they constantly inspect and repair the automobiles. Additionally, they provide

excellent after-sales support, which they refer to as 5S (Seiri, Seiton, Seiso, Seiketsu, and Shitsuke). These five Japanese terms have to do with planning, maintaining, creating, and organizing a clean and productive work environment. They ought to keep the area tidy, reassure the client that our after-sales support is up to par, and more.

Digitalization. With an emphasis on digitization, the staff members all agreed that it had a major impact on the department since it allowed them to communicate with each other anytime and anywhere. The branch manager noted that digitization had a significant influence on their branch. The researchers also questioned the respondents how digital technology may be efficiently leveraged to generate business development, enhance operational management, and limit risks. A 40% rise in sales was attributed to digital technologies.

Operational Business Performance. Finally, it is evident that working for various departments has different routines, starting with sales and ending with back door workers.

5. Conclusion

Chip shortage plays a significant role in the operational business performance of Geely Philippines, providing a new challenge besides the pandemic itself. However, management strategies aided in the improvement of the operational business performance of the company. While having one supplier is a barrier to achieving the best operational business performance, Geely Philippines can still provide their client's demands through proper communication, training with the manufacturer, and quality control practices. Digitalization further strengthens it as it acknowledges new possibilities in coping with the effects of the pandemic and chip shortage, straying away from traditional methods. It helped in reaching out to more clients, and promoting remote and contactless interaction with stakeholders. Today, in the post-pandemic, Geely Philippines' was able to recover from the effects of the chip shortage, alongside the pandemic, by having enough car units and car parts, finishing on time, and meeting the demand and quota. With minimal information on the automobile industry in the Philippines, this study provided relevant information, especially on the perspective of chip shortage, digitalization, and management strategies.

The study strongly emphasizes Geely Philippines' management strategies, which enabled them to combat, explore, and mitigate against significant disruptions like the semiconductor chip shortage. Various businesses in numerous sectors can adopt Geely Philippines' business strategies, emphasizing research and coming up with multiple solutions to an identical problem. As a result, the business could evaluate the additional advantages of each course of action by utilizing various cost-benefit analyses and testing procedures. Putting a strong emphasis on research and considering numerous alternatives to a given problem is a strategic approach that enhances risk management, decision-making, and overall business performance. In addition, companies would be able to have a strategic plan on how they can operate smoothly whenever such issues occur again. Businesses would be capable of consistently offering high-quality products and services whenever their operations run smoothly.

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