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Supply Chain and Digital Transformation of the Automotive Manufacturing Company during the COVID-19 Pandemic: A Case Study of PT. X

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Abstract

As COVID-19 has been on the rise since 2020, numerous aspects of our lives have been changed and impacted, including the economic conditions that have been completely upended. Governments and health officials worldwide have implemented mandatory preventive measures to combat COVID-19, such as the use of hand sanitizers, gloves, and masks to protect people. The entire world is experiencing more severe consequences compared to previous pandemics, such as the Spanish Flu in 1918 and Ebola in 2014. The automotive manufacturing sector, as one of the business practices, is also facing similar challenges, as evident from the decline in production and sales volume. Many companies have had to reduce or halt their production and retail sales during lockdowns, resulting in a loss of income. This research aims to analyze and propose solutions by adopting supply chain and digital transformation for business continuity, thus helping these companies survive amidst the uncertainties. The transformation is expected to change the way businesses interact with customers, aligning with the health protocols for everyone involved.

Keywords: COVID-19, Automotive manufacturing, Supply chain, Digital transformation, Uncertainties, Business continuity.

1. Introduction

As we are aware, the COVID-19 pandemic has had a severe impact on businesses. Most companies are experiencing a decline in their sales volume, which has consequently affected their revenues. In the automotive manufacturing industry sector, this impact has set off a chain reaction that is affecting all associated companies, from the car's original equipment manufacturers (OEMs) to their supporting companies for parts, such as tires, and so on.

This study will specifically focus on the business model canvas of this industry, as outlined by the internal source PT.X (2020), which includes the following components:

1. Value Proposition: The company offers high-quality tires, related products, and services, along with advanced technology and innovative solutions to meet the changing needs of its customers.
2. Resources: The company possesses global manufacturing facilities, research and development capabilities, distribution networks, and advanced technology.
3. Channels: The company employs a variety of channels to reach its customers, including direct sales, partnerships with OEMs, and collaborations with retailers targeting replacement markets.
4. Costs: The company incurs costs related to manufacturing, research and development, marketing and advertising, distribution, and overheads.
5. Revenues: The company generates revenues through its global manufacturing facilities, research and development facilities, distribution networks, and advanced technology.

Based on the aforementioned components, this study will review the business threats faced by the company, analyze the uncertainties and their impact on the companies, and explore potential ideas to improve the situation and sustain businesses, particularly in challenging economic conditions like the COVID-19 pandemic, which can occur unexpectedly.

Since the study will focus on the sector, we anticipate that the findings will have relevance and applicability to other businesses operating in the same sector, offering similar benefits for their business sustainability.

2. Analysis Of Uncertainties

In this chapter, we will conduct an analysis of the uncertainties that may have a negative impact on the business and explore solutions to mitigate these impacts and ensure the sustainability of operations. We will first identify the uncertainties and determine the types of uncertainties that the company needs to be prepared to face in order to prevent future issues.

2.1. Uncertainties in Tire Manufacturing Businesses

In the tire manufacturing industry, there are several uncertainties that may arise and significantly affect the businesses, as outlined by internal source PT.X (2020):

1. Raw material costs: The costs of rubber, petroleum, and other materials used in tire manufacturing can be volatile and subject to significant fluctuations based on market conditions.
2. Competition: The tire manufacturing business is currently highly competitive, with numerous companies vying for market share. The entry of new competitors, innovations, and pricing pressures can impact a company's position in the market, either leading to success or loss in the competition.
3. Economic conditions: Tire sales are closely linked to the overall health of the economy. During periods of economic downturn, consumers may reduce discretionary spending, including expenses on new tires.
4. Changes in consumer preferences: Shifts in consumer preferences towards more fuel-efficient or environmentally friendly vehicles can influence the demand for certain types of tires, even within the product offerings of the same

company.

5. Regulatory environment: Changes in regulations pertaining to safety standards, environmental regulations, and trade policies can also impact the tire manufacturing business.
6. Natural disasters and weather events: Natural disasters like hurricanes and floods can disrupt supply chains and affect tire production and distribution. Additionally, extreme weather conditions can impact the demand for specific types of tires, such as winter tires.

From the aforementioned list, it is evident that economic conditions and the regulatory environment have become the most uncertain factors influencing the current situation, particularly in light of the COVID-19 pandemic.

3. Analysis of Impact from the Uncertainties

An essential aspect of managing uncertainty is to identify as many sources and factors of uncertainty as possible (M., A., Wazed, et al., 2009). Given the rapid changes experienced during the Covid-19 pandemic in industrial markets, it is crucial to develop an understanding of how industrial firms have adapted and what the new normal might entail (Matthew, R., et al., 2022). To take successful action, it is important to analyze all the relevant uncertainties, including their impact on our businesses. Since we have identified economic conditions and the regulatory environment as our uncertain factors, we will now analyze each business model component mentioned in the previous section to understand their connection. The details are as follows:

1. Value Proposition: Overall, the value proposition remains unaffected by these two uncertainties. The company continues to offer high-quality products to its customers, even during the Covid-19 pandemic, as affirmed by PT.X.
2. Resources: The distribution networks are facing difficulties in sourcing supplies from vendors or suppliers, as well as delivering products to customers in various destinations such as OEMs, replacement markets, and exports. This is primarily due to the implementation of regulatory measures, including social distancing, work-from-home schemes, and lockdowns in certain countries. These factors have resulted in imbalances in container availability at ports and delays in vessel schedules.
3. Channels: Prior to Covid-19, the company primarily operated through direct selling channels, allowing for easy interactions with customers and product deliveries to distributors, TOMO (Toko Model), and direct customers. However, with the implementation of social distancing and other regulations to safeguard public health, the traditional approach is no longer feasible. Many stores have had to close during lockdowns, customers are reluctant to visit TOMO outlets due to concerns about the spread of Covid-19, and various other barriers have hindered our operations. Resolving these challenges is crucial.
4. Costs: As the sales volume declines, it inevitably has an impact on overall costs.
5. Revenues: Building upon the previous point, the increase in total costs will lead to a reduction in revenues, directly impacting the company's financial condition. A worsening financial report could ultimately lead to bankruptcy.

To ensure the company's survival, it is imperative to minimize or eliminate the impact of uncertainties, particularly those

affecting resources and channels, after conducting a thorough review of the business model.

4. Design of the Changes

The next step involves designing the necessary changes based on the previous analysis of the impact of uncertainties on PT.X, our chosen sample from the automotive industry sector. It is crucial to resume critical processes or functions following any disruptive event to ensure business continuity (BC). A vital component of a business continuity management system (BCMS) is the business impact analysis (BIA), which assesses an organization's key products/services, critical functions, and their respective BC-related indices (Seyed Ali Torabi, et al., 2014). Therefore, we will establish connections between each critical factor, its impact, and the design for improvement. The details are as follows:

Table 1. Changes for Business Continuity of PT.X

Most affected Business Model Factors	Original Condition	Uncertainties Impact	Design of The Changes
Resources	Importing most critical raw materials.	Falling into a critical situation/shortage of raw material supply. Lack of supply for containers and facing long delay for Export.	Optimize resource localization (Pujawan, et al., 2022).
	Experiencing a lack of container supply and significant delays in exporting.		Adopt a flexible container usage strategy and review contracts.
Channels	Direct selling to customers through Distributor / TOMO.	Difficulty in selling products during lockdowns, social distancing, etc., resulting in reduced opportunities for direct selling.	Optimize digital transformation and supply chain processes, including e-commerce and social media, to expand the market and comply with health protocols.

A review of the supply chain and digital transformation are our suggestions to improve the situation and minimize the impact of uncertainties caused by Covid-19.

The details of the plans and their references are as follows:

Area	Big Items
Supply Management	<ul style="list-style-type: none"> ▪ Multiple, flexible, and alternative suppliers (van Hoek, 2020) ▪ Near or local sourcing (van Hoek, 2020) ▪ Source local substitutes (Xu et al., 2020) ▪ Localizing the supply base/supply chain (Sarkis et al., 2020; Zhu et al., 2020; Cai and Luo, 2020)
Inventory Buffering	<ul style="list-style-type: none"> ▪ Inventory buffering (van Hoek, 2020; Belhadi, et al., 2021) ▪ Lean resilience (Ivanov, 2021)
Supply Chain Flexibility	<ul style="list-style-type: none"> ▪ Supply chain flexibility (McMaster, et al., 2020; Končar et al., 2020) ▪ Capacity redundancy (Xu et al., 2020)
Information, acquisition, processing, and visibility	<ul style="list-style-type: none"> ▪ Supply chain visibility (Messina et al., 2020) ▪ Improve information visibility (van Hoek, 2020) ▪ Active information sharing throughout the supply chain (van Hoek, 2020) ▪ Information processing capabilities (Yang et al., 2021)
Digital Transformation	<ul style="list-style-type: none"> ▪ Supply chain digitalization (Belhadi et al., 2021; Kumar et al., 2020; Sarkis et al., 2020; Cai and Luo, 2020; Karmaker et al., 2021; Nandi et al., 2021) ▪ Digital twin (Ivanov and Dolgui, 2020)

5. Project Execution Plan

In this section, we will discuss the plan for executing the changes that we have reviewed in the previous section. It is crucial to execute the plan effectively in order to derive any benefits from it. Therefore, PT.X will allocate resources to implement this plan, as detailed below:

- Establish the Project Management Office (PMO) and define its structure.
- Determine the priority of each item and create a more detailed schedule for each phase, clarifying roles, responsibilities, methods, and duration as project targets. Set milestones to track progress.
- Allocate funds (expenses and capital investment) across fiscal years based on project requirements.
- Decide on the reporting line and frequency to monitor project progress.
- Incorporate annual reviews into the company's annual plan and policies to ensure the continuity of the project until its completion.

6. Conclusion

Disruptions and uncertainties are inevitable in the business world. As we have witnessed, these challenges can arise unexpectedly, such as the recent Covid-19 pandemic. Therefore, the agility and resilience of our company are key to maintaining sustainable business operations in the future.

This study has demonstrated that analyzing the business model in conjunction with uncertainties provides a valuable approach to finding ideas and solutions for improving our company and transforming challenges into opportunities. It is also important to protect ourselves from the risk of obsolescence.

Furthermore, we acknowledge that there are still untapped opportunities that could be explored further, but were beyond the scope of this article due to time and resource limitations. Future collaborations or research endeavors may bring additional value to our endeavors.

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