Application Of Omni-Channel Strategy in Optimizing The Supply Chain Digitalization Process In Indonesia (Case Study: PT X)

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Abstract: PT X is a staple food producer company that employs a make-to-stock (MTS) production strategy. In the implementation of MTS used by PT X, customer needs are met through the sale of ready-made product stocks. The advent of the digitalization era has introduced new strategies that can be applied in the development of the supply chain, particularly in Indonesia. To achieve success in the digitalization process, the omnichannel function involves integrating online and offline channels and providing real-time information and services to customers to enhance their engagement. A profound understanding of omnichannel implementation is required, and this research utilizes a game theory approach as a tool to assess the success of omnichannel. Subsequently, a comparison of the best strategies generated in the game theory modeling needs to be conducted. The aim of this research is to enable companies to have a strategy in digitalization implementation to be more responsive to market changes and meet the increasing expectations of customers. However, to achieve success in omnichannel implementation, companies need to invest and commit to facing challenges and optimizing opportunities offered by this strategy.

Keywords: Supply Chain, Omnichannel, Game Theory.

INTRODUCTION

Digitalization has transformed the business landscape worldwide, and Indonesia is no exception. In recent years, there has been significant development in Indonesia's supply chain due to the increasing adoption of digitalization processes (Agustina, n.d.). This evolution has led to greater demands on supply chains to become more efficient, responsive, and connected to various distribution channels. A McKinsey study highlighted that in 2016, Indonesia's e-commerce revenue reached USD 6 billion, with 78 percent of internet users making online purchases, and this is expected to grow by approximately 18 percent annually over the next five years (Das, n.d.). Furthermore, in 2021, Indonesia ranked 15th in the world for the highest number of internet users (Agustina, n.d.). The internet has become a tool that facilitates the establishment of businesses and commerce, including the implementation of

omnichannel strategies (Nugroho et al., 2023). Omnichannel strategy is an approach that integrates various distribution channels, such as physical stores, online stores, mobile apps, social media, and others, into a coordinated system through the internet (Chang et al., 2023).

Implementing an omnichannel strategy is crucial in addressing the challenges and opportunities offered by the digitalization of the supply chain (Chang et al., 2023). An omnichannel strategy allows companies to operate their businesses seamlessly across multiple platforms, creating a consistent and satisfying shopping experience for consumers. Omnichannel can enhance service quality, leading to increased consumer loyalty towards the products offered. However, research shows that few online store entrepreneurs fully understand the omnichannel strategy (Putri & Purnama, 2023). Deep understanding is essential to achieve satisfactory results from omnichannel strategies for companies (Palmatier et al., 2019). According to McKinsey, 75 percent of Indonesians make purchases online through digital devices. This statistic far exceeds that of digitally mature countries like the United States, where such media have been advanced for some time (Das, n.d.). Therefore, product sales and distribution using an omnichannel strategy present a significant opportunity due to the rapid digitalization process. The impact of omnichannel can be felt by companies of all sizes willing to implement this strategy. One company that is seen as needing to adopt an omnichannel strategy is PT X.

PT X is a company in the food and beverage industry that employs a make-to-stock (MTS) production strategy. In the MTS system used by PT X, customer demand is met by selling from the inventory of finished products. MTS practitioners, like PT X, must sell all available inventory to achieve product turnover and company goals. PT X, as an MTS player, also needs to open all distribution and sales channels, including implementing an omnichannel strategy. By integrating the omnichannel strategy in providing products or services to consumers, omnichannel helps PT X ensure that the distribution and sales processes are aligned with the company's goals (Adivar et al., 2019). For profitable decision-making, it is necessary to develop, analyze, and compare sales and distribution strategies through omnichannel and pure online/offline channels (Z. Chen & Su, 2021). In the omnichannel strategy, development and analysis are conducted using game theory, where game theory is employed to analyze the supply chain within the omnichannel system. Game theory is a method for the rational analysis of conflict or cooperation (Ahmatang & Indah, 2023).

Analyzing the omnichannel system using the game theory approach can help connect various sales methods that PT X can implement with comprehensive integration. Several studies have also noted that in 2021, customers more frequently searched for product information through digital media and made purchases offline (Bai & Jiang, 2022; He et al., 2020; Y. Li et al., 2019; Mahboob Ghodsi & Zaccour, 2022). The omnichannel strategy can bring significant changes to the supply chain field and transform the retail landscape on an unprecedented scale and speed. Research related to the development of omnichannel has found that omnichannel can result in a single pure strategy or mixed strategy related to offline and online sales and distribution (Ahmatang & Indah, 2023; Bai & Jiang, 2022; Z. Chen & Su, 2021; Ji et al., 2022; Momen & Torabi, 2021; Xu et al., 2023). It not only provides benefits to large companies but traditional and simple online retailers also gain insights into market status and the range of profits that can be achieved (Momen & Torabi, 2021). Several other parameters also need to be considered in the development of omnichannel to ensure that the results align with a company's goals (X. Chen & Zhou, 2021; Z. Chen & Su, 2021; Momen & Torabi, 2021).

In this research, omnichannel will be analyzed using game theory, which will result in a mixed strategy. The mixed strategy approach in game theory is used to analyze the most profitable strategies (Game Theory 1, Basic Concepts, 2018). This research is also highly

urgent as it can provide inputs and suggestions to PT X in optimizing the supply chain using the omnichannel strategy. In this study, game theory will generate the best strategic patterns that PT X can implement to maximize the benefits of the omnichannel strategy. Therefore, using omnichannel as a strategy for digitalization is beneficial for companies that want to expand their marketing sector further.

METHODS

The method to be used in this study is game theory, applying game theory calculations. This research adopts a quantitative approach, where data is transformed into simple game theory calculations and then analyzed through existing game theory results to reach a solution. The data sources for this research include both primary and secondary data. Primary data is obtained through direct observation and monitoring conducted at PT X. Meanwhile, secondary data is collected through observation and literature review of existing reports. The gathered data will be calculated and arranged in a game theory matrix format. Once the data is organized, the next step involves processing it using game theory methods with the support of the Stackelberg model. This process can result in either a single pure strategy or a mixed strategy.

The data and software discussed in subsection 3.2 comprise the datasets and software tools to be used in this research. This subsection will include demand data, sales data, distribution, and sales strategies that will be utilized in the study. The data used in this research is tailored to the needs of the designed game theory, detailed as follows: demand data, sales data, and sales strategies.

By applying this data in game theory calculations, this research can effectively analyze and optimize operational processes and the supply chain using the game theory method. The following is a list of software used to complete this research:
a. Microsoft Word: Used for processing and editing text documents.
b. Microsoft Excel: Used for processing and analyzing data in table format.
c. Microsoft PowerPoint: Used for creating slide presentations.
d. Microsoft Visio: Used for creating diagrams and visualizations.

The use of this software is supported by compatible hardware, specifically standard programmer computers. With these software tools, researchers are expected to conduct their studies efficiently and achieve the desired accuracy in data collection, result analysis, and presentation of findings in an appropriate format.

Data collection techniques encompass various methods used to gather the necessary information or facts for research. The data collection techniques in this study can be divided into two categories: Observation and Interviews.

In the strategy analysis phase, an omnichannel strategy analysis is conducted to determine whether the modeling used aligns with the omnichannel integration process at PT X. This analysis is also necessary to find the correspondence between the established game theory model and the omnichannel strategy being studied.

In the fourth phase, the researcher will begin incorporating the game theory model results into the game theory calculations. The modeling incorporated into the game theory calculations includes the mathematical modeling of game theory, constructed from variables related to the object under study.

In the next phase, the fifth stage, the researcher will optimize the data used with game theory calculations and proceed with a sensitivity analysis. In this stage, the researcher will also check the data from the optimization results to determine if the game theory calculations have yielded outcomes that align with the researcher's expectations.

During this phase, a comparison will be made between the strategies currently implemented by PT X and the omnichannel strategy to be introduced. This comparison is

conducted to achieve optimal results and identify the highest potential gains from the optimization of the strategy under study.

RESULTS AND DISCUSSION

This research will utilize the Stackelberg game model optimization as the basis for calculations. This calculation determines that retail services, demand growth, and consumer loyalty significantly influence pricing strategies for manufacturers and retailers. The model calculations will employ functions from previous studies (Bai & Jiang, 2022; G. Li et al., 2019). Obtaining a deep understanding of these calculation findings can yield new insights into how digitalization processes affect business profitability. This study will compare two findings and calculations, where sales through retail and online channels yield notably different results. Various scenarios will be numerically analyzed as functions of parameters α, γ, and t. It is crucial to repeatedly verify the numbers involved to ensure positive pricing and service levels.

Retail Store Analysis Run as Own Store

After conducting several calculations on the raised cases, it was found that the profit results between retail and online sales differ significantly for companies. This difference is influenced by shipping financing and transportation costs, which reduce profits from offline sales. In contrast, online sales can ignore shipping and transportation costs, thus reducing company profits depending only on online sales investments. Below is the graph of the case where retail sales as an own store against sales through retail and online media:
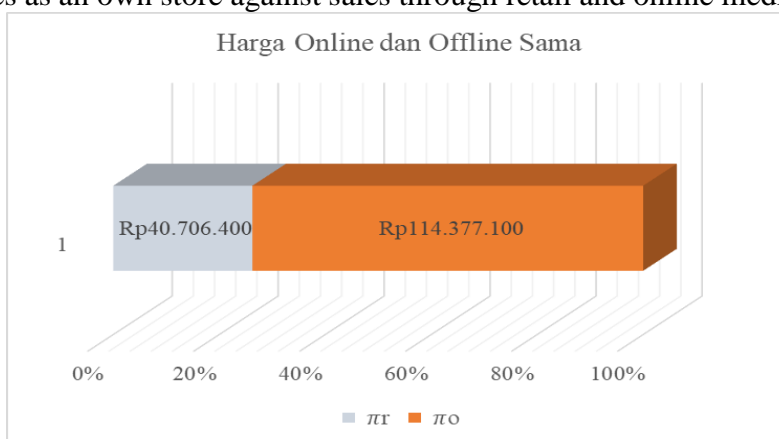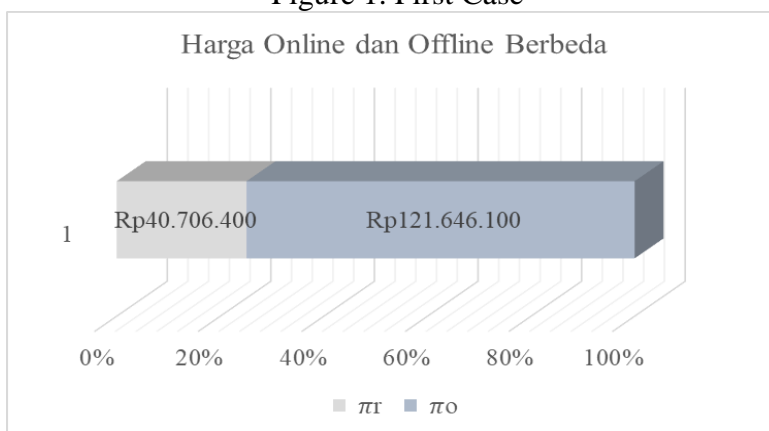

Figure 1. First Case

Figure 2. Second case

In Figure 1 and Figure 2, it is shown that, for reasonable parameters, the profit in Case Two is greater than in Case One. We conclude that, for own-store operations, implementing

non-uniform pricing results in greater profits for the e-tailer compared to uniform pricing. Figures 1 and 2 illustrate how market share and webrooming affect the profit of the O2O system when the e-tailer establishes their own store.

Retail Store Analysis Run as Franchise Store

The company's profit will increase proportionally with the increase in γ. However, the increase in γ does not bring significant changes. Online market share appears to significantly weaken the effect of webrooming, reducing the overall supply chain profit. Meanwhile, in the franchise store scenario, there is a significant reduction in profit as depicted in the following figure:
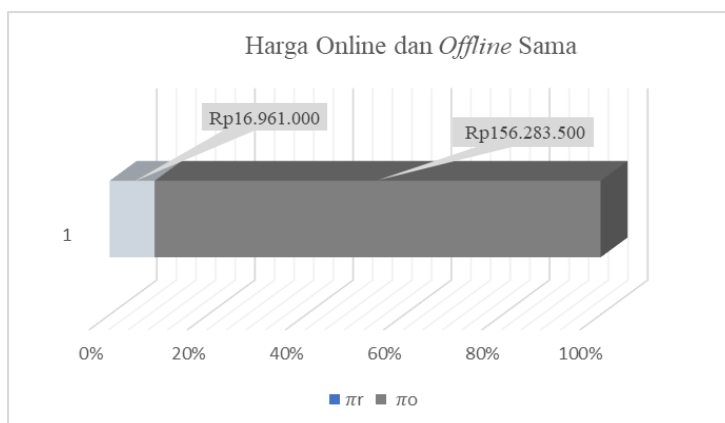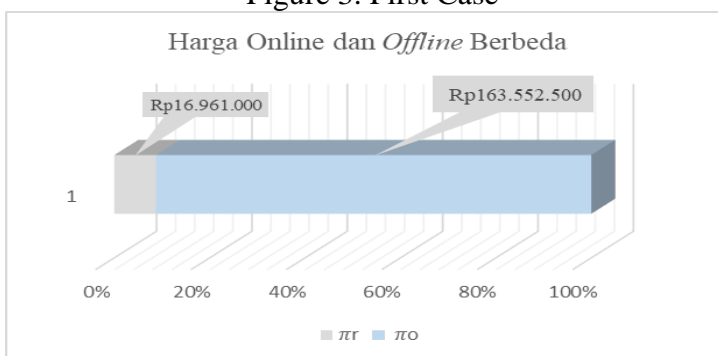

Figure 3. First Case

Figure 4. Second case

Similar to the previous scenario where the store operated as own-store, in the franchise store case, it was also found that profits generated from online sales are higher compared to offline sales. Although webrooming conditions contribute to profit growth, similar to the previous scenario, this case also does not show significant growth as depicted in Figure 4 and Figure 4. Parameter t has a negative impact on profits in Cases 1 and 2. In Case 2, when t is low, γ has a significant positive effect on the e-tailer's profit. However, as t increases, the profit growth rate decreases with increasing γ, indicating that travel costs also weaken the effect of webrooming, which affects the profit of the online-to-offline system.

Profit Sensitivity Analysis of PT. X When Opening a Franchise Store

Sensitivity analysis is a technique used to determine how variations in input or model assumptions affect the outcomes or outputs of the model. Sensitivity analysis in this study occurs when several parameters influence or affect the amount of profit earned by the company. Furthermore, the researcher assumes that PT. X wants to open or collaborate with a franchise store. Thus, specific conditions need to be pursued by the company if they intend to implement the strategy according to this research. Some factors that need to be addressed by

the company include additional costs, approval submissions, webrooming coefficients, and travel expenses when opening a franchise. Below is the profit gained by the company when PT. X intends to open or collaborate with a franchise store:

Keuntungan Perusahaan Sebagai Toko Waralaba

Rp163.552.500

Rp15.761.000

Rp156.283.500

Rp15.761.000

Rp-   Rp50.000.000 Rp100.000.000 Rp150.000.000 Rp200.000.000

■ πo Harga Beda ■ πr Harga Beda ■ πo Harga Sama ■ πr Harga Sama

Figure 5. Company Profits as a Franchise Store
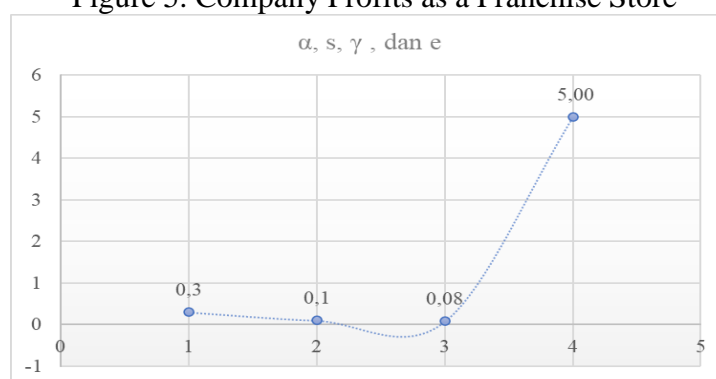
α, s, γ , dan e

5,00

0,3   0,1   0,08

Figure 6. Chart of α, s, γ, and e

In Figure 5 and Figure 6, the focus is on how market share and the webrooming phenomenon affect profits when franchise stores integrate with the company's strategy. Figure 5 and Figure 6 show that when the online market share is low, profits decrease in both cases until γ reaches a high level, where the profit point rises slightly. As the online market share increases, both online and offline profits increase rapidly and maximize at the highest level. Additionally, when α is high, the rate of decline in both profits increases with increasing γ. This illustrates how webrooming weakens the positive effect of online market share for e-tailers.

Figure 5 and Figure 6 also show that when prices are uniform, franchise stores have small profits, meaning they exit the market unless α is sufficiently low and γ is sufficiently high. Therefore, we conclude that regarding franchise stores and irrespective of price uniformity, online sales profits have nearly equal dependence on α and γ. However, uniform pricing has a negative impact on franchise stores. When fixed costs F and franchise costs ε decrease, the negative situation for franchise stores can improve.

Figure 5 and Figure 6 demonstrate how customer travel costs and webrooming affect online sales and franchisee profits when online and offline market shares are comparable. They show that when t varies within a reasonable range and is kept constant at Rp 200, online sales profits in Case 2 are significantly larger than in Case 1. The smaller the parameter t, the more advantageous online sales are in Case 2. Moreover, a larger t provides webrooming with a more negative effect on online sales in both Case 1 and Case 2, indicating that increased webrooming activity strengthens the negative effect of travel costs on online sales. Therefore, the researcher can conclude that when t is low, the positive effect of increasing γ

in Case 2 exceeds that in Case 1. Hence, companies need to pay attention to shipping costs to effectively maximize company profits.

Managerial Implications

Managerial implications are the practical consequences of research findings or analysis for management practices. These implications provide guidance to managers in making decisions and taking actions that can enhance company or organizational performance. In this study, managerial implications are realized when several analyzed parameters directly impact the amount of profit generated by the company. This highlights the importance of understanding and applying research findings in the operational context of the company to achieve optimal results.

In the case of PT. X, managerial implications are clearly seen in the strategic choices made. If PT. X does not open franchise stores, the strategy relying on increasing sales through the internet becomes key to boosting company profits. This approach allows the company to leverage the growing potential of the online market and reduce operational costs that may arise from managing physical stores. Thus, the company can remain competitive in the rapidly evolving digital market.

However, if the company desires greater profits, opening franchise stores becomes a highly beneficial option. Based on the analysis, the company's monthly profits can increase by up to 9% with the addition of franchise stores. This demonstrates that diversifying sales channels and expanding market reach through physical stores can have a significant impact on revenue growth. Managers need to consider both strategies based on the company's situation and long-term goals to make the most advantageous decisions.

CONCLUSION

The development and implementation of the latest strategy, omnichannel, have transformed the retail world not only for consumers but also in the development of supply chains, particularly in Indonesia. This study focuses on the application of omnichannel in the supply chain system, comprising both retail and online stores. Online stores can offer easier product information search and comparison services to consumers, while retail stores provide experiential services such as free delivery, as done by PT. X in the Surabaya area. Researchers considered two strategies: the first being PT. X's retail store operated as company-owned, and the second being PT. X running retail stores as franchises.

In both company-owned and franchise strategies, applying non-uniform pricing between online and offline yields different profit levels for the company. With the company-owned store strategy, when prices are uniform, optimal pricing, service levels, and retail profits are independent of webrooming levels. When prices are non-uniform, company-owned stores provide more services than online channels when the online market share is low to maximize company profits.

With PT. X operating as a franchisee and with uniform pricing, the store will provide more extensive services than online channels when the online market share is high. If prices are inconsistent, franchise stores will offer more services than online channels when the online market share is low, and the company can charge higher prices when webrooming activities are high (and vice versa).

Among several strategies and each of the two cases shown, such as uniform and non-uniform pricing, the best company profit strategy is when PT. X operates as a franchisee with differentiated pricing. The profit generated from this case reaches Rp 179,313,500 per month.

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