**University of Sopron**

**István Széchenyi Economics and Management Doctoral School**

# Strategic analysis of product variety and supply chain complexity in the fast fashion apparel industry

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THESIS BOOKLET

**University of Sopron**

**Sopron, 2022**

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# 1. Introduction

For most consumers, having a diverse selection of products is like a cherry on top of a cake. This fact drives firms to cater to heterogeneous consumer needs by offering more product varieties. Unfortunately, an increase in product variety may consequently enhance the complexities of their operations and supply chain systems. Such a condition creates a dilemma since most supply chain executives expect a wide range of product varieties and excellent supply chain performance to exist simultaneously.

Having excellent performance is one of the main objectives of supply chain operations. However, several studies have discovered that product variety increase negatively affects supply chain performance. Thus, a compromise between product variety and supply chain performance seems inevitable.

This dissertation investigates the product variety-supply chain performance relationship by surveying 485 supply chain executives from different industries worldwide and reviewing existing literature. Its purpose is to supply the research community with empirical findings that may help clear conflicting arguments.

The survey concluded that most respondents perceived product variety drives supply chain complexities. It was intriguing to learn that a 1 to 4 % product variety increase affected slow fashion, fast fashion, and other industries' financial and qualitative performance

differently. However, the difference became less apparent when the increase rose to 5–10%. Another fundamental finding confirms that mutually trusting relationships between firms and their suppliers are crucial for maintaining sustainable practices in the long term.

## 2. Problem Statement and Objectives

The COVID-19 pandemic made it obvious that firms must make smart, forward-looking decisions. They must also be well aware of the possible consequences of those decisions. Unfortunately, the gap in existing literature does not help supply chain executives make such decisions. They need to have adequate field data and information on the latest trends in the market and possible risks and benefits of modifying their product variety. This dissertation outlines the impact of product variety increase on a firm's supply chain performance, with a focus on the fast fashion apparel industry. The fashion apparel industry has significantly evolved. It is characterized by agility, flexibility, short product life cycles, low predictability, short lead times and a demand for product variety considerably higher than in other industries. This business sector may serve as a best practice example for other industries due to their stable performance across different conditions.

In this regard, this dissertation aims to clarify the following research questions:

- How do the key characteristics of respondent´s supply chain systems look like in terms of supply chain complexity, firm´s interaction with supply chain partners, and certain performance-relevant indicators?
- Are there differences between more and less complex supply chains with respect to the impact of an increase in product variety on certain performance-related indicators?
- Are there differences between different types of industries (slow fashion, fast fashion, and other industries) with respect to the effect of a product variety increase at different levels on financial (qualitative) performance in the short and medium run?

Furthermore, the following research objectives guided the study implementation as it sought to become an appropriate source of advice for supply chain stakeholders, including decision-makers, supply chain managers, and industry leaders:

- To get an overview of respondent´s supply chain systems (e.g. reasons why respondents operate in supply chains, how much they agree that their supply chain is complex, their most important reasons for high supply chain complexity, their assessment of own supply chain management).
- To understand the role of product variety as a complexity driver.
- To understand how complex the supply chains in which operations are performed are.

- To determine the extent of the supply chain complexity associated with product variety.
- To understand the effects of product variety increase at different levels on qualitative as well as the financial performance of the supply chain in the short- and medium-time frame for slow fashion, fast fashion, and other industries.
- To determine the extent of different assessment of supply chain performance of fast fashion and slow fashion firms.
- To better understand the role of relationships between supply chain partners (e.g. ongoing partnerships) and their impact on supply chain performance.
- To understand the role of relationships between supply chain partners and the implementation of sustainable supply chain practices, considering performance-relevant indicators.

Unfortunately, the existing literature does not provide any information on which performance measures suffer the most from product variety increases. It could be qualitative performance measures such as customer satisfaction or quantitative performance measures such as supply chain profit.

Another gap relates to the lack of analysis across different industries. In this context, only a few studies have addressed the product variety – supply chain performance relationship in both slow-fashion and fast-fashion industries within the same framework. Moreover, international supply chain management studies relating to product diversity are rare. While most studies

focus on specific countries and regions, the number of studies focusing on developing countries is still minimum (Er, 2004). However, this study found that researchers often emphasize more on the negative effects of product diversity rather than its positive impacts. Therefore, a more holistic approach would be helpful as it also considers the possible benefits of product variety. In addition, the literature review lacked information about the relationship between supply chain partners in spite of the strong connection between the type of their relationship and product variety.

This study developed the following hypotheses based on an initial literature review and insights into respondents' supply chain systems:

**$H1_0$** An increase in product variety does not impact the performance of firms with more complex supply chains and their counterparts with less complex supply chains differently.

**$H1_1$** An increase in product variety impacts the performance of firms with more complex supply chains and their counterparts with less complex supply chains differently.

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**$H2_0$** A 1 to 4% product variety increase does not affect slow fashion, fast fashion, and other industries' financial (qualitative)

supply chain performance in the short (1-year time-frame) and medium run (3-year time-frame) differently.

**$H2_1$** A 1 to 4% product variety increase affects slow fashion, fast fashion, and other industries' financial (qualitative) supply chain performance in the short (1-year time-frame) and medium run (3-year time-frame) differently.

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**$H3_0$** A 5 to 10% product variety increase does not affect slow fashion, fast fashion, and other industries' financial (qualitative) supply chain performance in the short (1-year time-frame) and medium run (3-year time-frame) differently.

**$H3_1$** A 5 to 10% product variety increase affects slow fashion, fast fashion, and other industries' financial (qualitative) supply chain performance in the short (1-year time-frame) and medium run (3-year time-frame) differently.

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# 3. Methodology

This study undertook a cross-country and cross-sector study that benchmarked 485 respondents from different countries and industries. They took a survey consisting of 13 questions where most of which adopted the Likert-scale format. Participants were identified via professional business networks or LinkedIn. This approach allowed the author to add professionals with roles in supply chain systems and supply chain networks or associations to

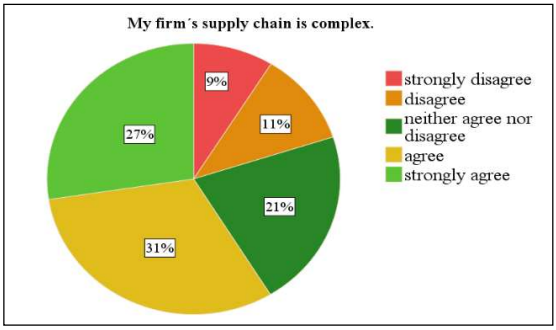
its list of respondents. The data collection procedure involved the process of gathering filled-out questionnaires that respondents sent by post. This study also employed conceptual models which clarified the connections between product variety and supply chain performance.

A total of 485 respondents came from a rich and extensive database. Their responses were further analyzed using SPSS version 29. Non-parametric statistics, i.e., Chi-square, Mann-Whitney, and Kruskal-Wallis tests were used to evaluate the association of variables related to their supply chain systems with respondents' perceptions towards performance-related indicators.

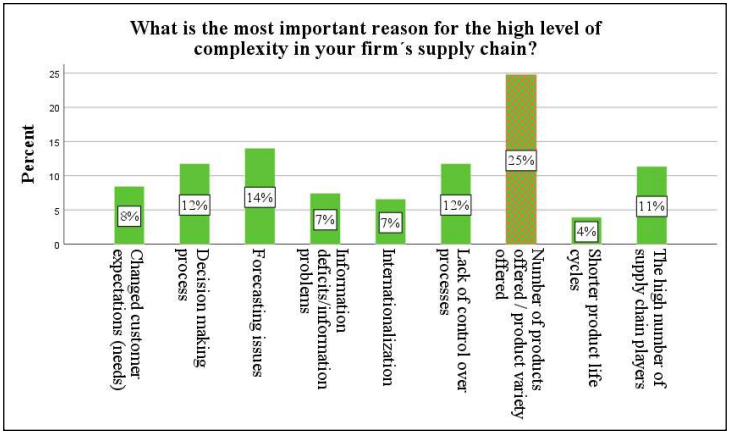
# 4. Results

Results show that the majority of respondents:

- operated in a global supply chain to increase customer satisfaction.
- thought their firm´s supply chain is complex (27% of respondents answered the question "my supply chain is complex" with "strongly agree", 31% with "agree" 21% with "neither agree nor disagree". The rest of the respondents answered "disagree" or "strongly disagree") as shown in the below graph:




- believed that product variety offered is the most important reason for the high level of complexity in their firm´s supply chain (25%) as seen in the figure below:




- believed product variety increased the complexity of their firm's supply chain.
- performed joint planning with other supply chain members.
- argued firms can quickly introduce new products to the market.

- agreed with the statement “my firm can modify its product features quickly to meet customer requirements.”
- could deliver value-added after-sales services.
- regarded their supply chain management as successful.
- claimed they maintain relationships with both streams of the supply chain (downward and upward stages of the supply chain).
- measured their supply chain in qualitative and quantitative terms.

There is a positive correlation between product variety and

- efficiency of information flow in the supply chain
- efficiency of materials flow in the whole supply chain
- the reliability of supply chain actors
- the ability to rapidly improve responsiveness to changing market needs
- response time
- risk of stock-out
- ability to change the quantity of orders to suppliers
- on-time delivery

There is a negative correlation between product variety and

- delivery of zero-defect products

There is no effect between product variety and

- product quality

There is a connection between the firm's interactions with suppliers and/or customers and the

- efficiency of information flow in the supply chain
- reliability of the supply chain actors

The respondents regarded the performance of their supply chain to be about the same, or even a little better on average than that of their competitor's supply chain systems.

In summary, this study's findings confirm all of the alternative hypotheses, There is a difference between firms with more complex supply chains and those with less complex supply chains regarding the impact of an increase in product variety on the following performance-related indicators:

- Efficiency in flow of materials in the whole supply chain
- The reliability of the supply chain actors
- Risk of Stock-out
- Customer complaints
- Product quality

This section outlines new scientific results gathered from the survey.

- Different industries perceive the increase in product variety's impact on performance differently.
- Fast fashion firms rate their performance better on average than slow fashion firms.

- Most performance-related indicators develop
- favorably for the supply chain with increasing product variety.
- More complex supply chains have a different way of dealing with product varieties than less complex supply chains.
- A 1–4% increase in product variety does affect slow and fast fashion supply chains' qualitative or financial performance differently.
- There is a significant relationship between performance measure used and success of supply chain management.

# 5. Summary

This dissertation aims to investigate the product variety increase-supply chain performance relationship. This topic of discussion has sparked debates among researchers as they have yet to agree on the impact of increasing product varieties on a firm's supply chain performance. The supply chain performance variable encompasses variable components from customer satisfaction to logistic costs. This study reviewed the literature on product variety, supply chain management, and the fast-fashion industry. Fast-fashion firms were selected because they offer unique characteristics and dimensions due to their short lead times and life cycles. The study confirmed prevailing assumptions and provided

new insights resulting from the analysis of the responses of 485 supply chain practitioners.

The author offered the perspectives of diverse supply chain practitioners who come from various countries, allowing the study to benchmark the supply chain performance of various international firms. Moreover, this study's empirical findings help close the gap in the area of research. Its research goals are: to determine the impacts of product variety increase on the supply chain's qualitative and financial performance and to determine if supply chain practitioners prioritize the success of their systems.

This study's results indicate that many supply chain practitioners regard product variety as an essential driver of supply chain complexities, suggesting that they were aware of its negative impacts on supply chain performance. The study further discovered that the product variety increase affects certain supply chain areas, such as the flow of information and materials. It further found that the relationship between supply chain members influences the success of supply chain systems, as positive collaborations foster better supply chain performance regardless of the level of product variety it manages.

Overall, respondents were aware of the risks of product variety on supply chain management. This study's hypothesis testing procedure further confirmed the existence of the product variety increase-supply chain performance relationship both in the short term (1-year-time-frame) and medium term (3-year-time-frame)

with different impacts for fast-fashion and slow-fashion firms. This study also discovered a significant relationship between performance measure used and success of supply chain management.

The final finding would be that product variety influences both supply chain complexity and supply chain performance. Thus, supply chain executives shall address product variety issues and carefully determine the most appropriate product variety level for their firms.

## 6. New scientific results

The following table shows an overview of the new scientific results:

| Investigation | Key finding |
|---|---|
| Type of industry ←→ product variety's impact on performance | Different industries perceive the increase in product variety's impact on performance differently. |
| Type of industry ←→ performance rating | Fast fashion firms rate their performance better on average than slow fashion firms. |
| Product variety ←→ performance-relevant indicators | Most performance-related indicators develop favorably for the supply chain with increasing product variety. |
| More (less) complex supply chains ←→ | More complex supply chains have a different way of dealing with product |

| | |
|---|---|
| performance-relevant indicators | varieties than less complex supply chains. |
| 1–4% increase in product variety ←→ supply chains' qualitative or financial performance | A 1–4% increase in product variety does affect slow and fast fashion supply chains' qualitative or financial performance differently. |
| Performance measure ←→ success of supply chain management | There is a significant relationship between performance measure used and success of supply chain management. |
| Product variety ←→ supply chain integration | There is a significant relationship between product variety and supply chain integration (measured over the type of relationship with supply chain members, e.g. collaborative or ongoing partnership). |
| Supply chain sustainability ←→ ability to increase product diversity without sacrificing performance | There is a significant relationship between supply chain sustainability and the ability to increase product diversity without sacrificing performance. |
| Supply chain sustainability ←→ Supply chain integration | There is a significant relationship between supply chain sustainability and supply chain integration (measured over the type of relationship with supply chain members, e.g., collaborative, or ongoing partnership). |

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