

## STRATEGIC FLEXIBILITY, MANUFACTURING FLEXIBILITY, AND FIRM PERFORMANCE UNDER THE PRESENCE OF AN AGILE SUPPLY CHAIN: A CASE OF STRATEGIC MANAGEMENT IN FASHION INDUSTRY

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**Abstract:** The fashion industry is one of the dynamic industries, which undergoes rapid transformation in both the demand and flexibility. The prime objective of the current study is to investigate the relationship between strategic flexibility, manufacturing flexibility, supply chain flexibility and firm performance. In addition to that the mediating role of supply chain agility in relationship between strategic flexibility, manufacturing flexibility and firm performance is observed. The firms operating in the fashion industry of Indonesia are chosen as the sample of the study. Employing the survey-based methodology, the SEM-PLS technique is used to test the hypothesized relationships. So, current study has used SEM-PLS as statistical tool to answer the research questions raised in this study and research objectives envisaged in the current study. The findings of the study have provided support to the theoretical foundation and proposed hypothesis of the current study. Current study will be helpful for policymakers and practitioners in understanding the issues related to supply chain risk, supply chain integration and supply chain performance. In author knowledge this is among very few pioneering studies on this issue.

**Keywords:** Flexibility, Agility, Supply Chain, Indonesia

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### Introduction

Fashion items have gained wide acceptance across the world. These are the consumer products with unique characteristics such as high volatility of demand, short life cycles, impulsive purchases and predictability of low sales (Ngai et al., 2014). The fleeting mood of the moment is captured by a fashion product. Fashion products can be sold for a short period and then it may change because of consumer changing tastes (Chan et al., 2017; Habib and Mucha 2018). There is unstable demand for such products, and they are likely to be influenced by the changing weather, events, choices of celebrities and movies, etc. the industry of fashion is diverse. It is highly fragmented, globalized and dependent on social, economic, political and financial issues. An active role is required by the players in the industry to create a balance of demand and supply.

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Several important challenges are posed to the fashion products because of the distinct characteristics. These challenges come across the practitioners who aim at increasing response to the market demand and lowering price. Complicated operations are required within the supply chain of a business (Macchion et al., 2015). Retailers in the fashion sector have trouble in selecting the right products delivering in the right amount for responding to the needs and expectations of customers in the nearby season. The decision to buy can be hold until the last minute in order to understand the needs of customers and fulfill market volatility, which is the possible solution to the problem (Jamil and Jamil, 2017).

The burden is shifted by the fashion retailers to the upstream members for gaining leeway. The upstream members involve suppliers of fabric and manufacturers of garments who must have a flexible approach in fulfilling the changing requirements of business. There is need to develop and implement effective and smart strategies for supply chain focusing on improved agility, better response time and increased speed of delivering items. Lack of working on these aspects will lead to the failure of a company and exist from the industry competition.

The most important aspect of success in the enhanced market competition is considered supply chain agility (Pantouvakis and Bouranta, 2017; Hassan and Alanazi 2018). The firms are able to respond to the market circumstances because of an agile supply chain. Moreover, firms become capable of meeting the supply of product with its demand and achieve less product time cycle (Hallgren and Olhager, 2009), have defined the agility of supply chain agility to be the capability of the supply chain of a firm to respond towards the market changing circumstance. Moreover, it is considered as the supply chain ability to realign its activities in order to fulfill the changing requirements of the customers. Several researchers have come to the point that the agility of a firm is affected through its flexible nature, which affects its overall performance (Basheer et al., 2018). It can be said that the flexibility of an organization and agility of the supply chain are linked with each other in a significant manner (Tao et al., 2017). For achieving a better supply chain agility and firm's performance, the flexibility of an organization is a crucial factor (Fayezi et al., 2017; Kozlowski et al., 2016). The first, struggle is done by the manufacturers to compete in the relentless market and secondly additional uncertainties are experienced by the firms in the emerging markets including fluctuation of exchange rate, increased operational cost and change in government policies. Such issues make firms interested to make improvement in their agility for sustaining competitive advantage. This research has focused on two flexibility factors of the organization i.e. the manufacturing flexibility and the strategic flexibility considering their relevance with the fashion manufacturing industry. Not all the antecedents are taken into account by this research (Mustafid et al., 2018). It has been investigated that how these two factors of flexibility affect the agility of the supply and performance of the firm. Moreover, the research analyzes the way in which supply chain agility mediates the association between the factors of flexibility and firm's performance (Hameed et al., 2018).

A research framework has been developed using resource-based view for creating a conceptualization relation between the four constructs of the research. These constructs are supply chain agility, flexibility in strategies, flexibility in manufacturing and performance of firm. Statistical testing has been done through use of SEM (Structural Equation Modeling) (Kumar et al., 2018; Haseeb et al., 2019). The data was collected through industrial survey. Recommendations have been given based on the conclusion for the managers to improve the strategic supply chain. Implications for future have been specific after conclusion and recommendations.

### **Theoretical Background**

The important antecedents and consequences of the supply chain agility have been explored in this part of the research. The relation among the constructs has been conceptualized through the research framework. This research framework acts as a basis for the empirical study. Several definitions and concepts of supply chain agility have been given in literature. The term agility was firstly used by Iacocca Institute in the business field. It was argued that a firm survives in the market environment, which is not stable and changes rapidly. According to Appelbaum, Calla, Desautels, and Hasan (2017), agility is an advantage involve in delivery customer value, developing partnerships, valuing skills and knowledge of workers. The strength of the relation between a firm and market is reflected through the level of its supply chain agility (Eckstein et al., 2015). The concepts of Eckstein et al. (2015) have been followed in this research study. Strategic flexibility was categorized by Eckstein et al., (2015) into coordination flexibility and resource flexibility. The researcher explained that the resource flexibility defines the resources of a firm while coordination flexibility is related to the way in which resources are deployed (Basheer et al., 2019; Basheer et al., 2018; Hossain et al., 2018).

### **Research Hypotheses**

Total seven research hypotheses have been constructed in consideration of the resource-based view. The research hypothesis will be tested to determine the interrelationships of supply chain agility with the main consequence (firm performance) and the two antecedents (flexibility factors).

#### Flexibility and firm performance

Competitive advantage can be sustained by a firm in the changing business environment through flexibility of policies and approaches. Flexibility of approaches is a basic factor for mitigating with the risks and uncertainties in the market environment. Several uncertainties and high business competition is involved in the rapidly changing product markets According to Eckstein, Goellner, Blome, and Henke (2015) the capability of a firm to respond to the market fluctuations in terms of better response improves its performance. According to the

researchers, flexibility of resources and coordination flexibility are more than the antecedent at operation level. The internal and external resources can be reconfigured through coordination flexibility, which reduces the time, cost and efforts of the firm in employing resources. The term agility refers to the responsiveness of a firm to alter its business activities as per the need of the competition in the industry. A high degree of agility can be achieved by a firm through making improvements in the coordination and resource flexibility. Moreover, it enables a firm to perform effectively and efficiently. Considering this perspective, the following research hypothesis has been developed:

*Hypothesis 1 (H1): Strategic flexibility has significant relationship with supply chain agility*

Another important organizational flexibility is the manufacturing flexibility at operational level. It is the ability of a firm to reallocate its resources for manufacturing products as per the need of the customers and market requirements. Moreover, this can help the firm in achieving high business performance. Such flexibility is related to come up with the changing expectations of customers without compromising on the quality factor. Moreover, this must not be done at the sake of high cost, disruption and loss of performance (Hameed et al., 2018). The manufacturing flexibility of a firm can be exploited for utilizing the available range of manufacturing due to low time and cost. A firm becomes able to reduce its time between planning and implementation through higher manufacturing flexibility, which increasing its capability to improvise (Fayezi et al., 2017; Madhusudhanan, 2018). The supply chain agility can be improved by a firm by increasing the speed of changing business configuration from present stage to a newly required stage. It is believed that manufacturing flexibility is a key element in producing supply chain agility. Considering the fact, the following research hypothesis has been developed:

*Hypothesis 2 (H2): Manufacturing flexibility has significant impact on the Supply Chain Agility.*

The communication effectiveness can be improved through strategic flexibility along with improvements in the strategies, plans, market mix. This in tend improves the performance of a firm. Strategic flexibility has two main elements i.e. resource flexibility and coordination flexibility, which are related to the firm's resources. These determine the capability of a firm to use the resources and their functioning. The way in which competitive advantage is achieved by a firm is influenced by the strategic flexibility. These involve the major strategic changes for responding to the external environment. It is reflected by the strategic flexibility the way in which firm relocates its resources to newly developed actions. It also involves the strategy of a firm to respond promptly to the changing market conditions when the time is short. For the success of a manufacturing firm, strategic flexibility is an important factor. Based on the above notion, the following research hypothesis has been constructed.

*Hypothesis 3 (H3): Strategic flexibility is in significant impact on the firm performance*

The ability of a firm to implement new actions in the manufacturing process is referred as the manufacturing flexibility. These actions are taken to fulfill the needs and requirements of the market circumstances and respond effectively to the changing business environment. Competitive advantage can be achieved by a manufacturing if it is able to align business strategy, competitive environment, technology and organizational attributes, which are the exogenous variables. The competitive position can be enhanced through manufacturing flexibility by getting more customer orders. Manufacturing flexibility can have direct and significant impact on different outcomes of performance including the cost of manufacturing, financial growth and growth of sales growth as well as financial profitability. The firm performance is largely based on the manufacturing flexibility. Based on the above notion, the following research hypothesis has been constructed:

*Hypothesis 4 (H4): Manufacturing Flexibility is in significant relationship with firm performance.*

#### Firm Performance and Supply Chain Agility

The supply chain agility can be regarded as the ability of a firm to adapt to the market changes through internal and external strategic changes in relation with its customers and suppliers. This adds to the extended supply chain agility (Jamil and Jamil, 2017). The global competition has been intensified over the past some decades. Markets have become unpredictable and volatile. The customer demand changes drastically in the fashion industry. Open options should be kept by the firms to respond to the market challenges. In this way, firms will be able to offer superior quality, manage disruption risks and improve their overall business performance (Basheer et al., 2018). The acquiring of competitive advantage is the basic pillar of success for the firm in the form of high uncertainty and competition. The following research hypothesis has been constructed:

*Hypothesis 5 (H5): Supply chain agility is in significant relationship with the firm performance*

#### Supply Chain Agility as a mediator

According to the researcher, there are two main components of supply chain agility i.e. sensing and responding. The capability of Sensing is related to the ability of a firm to identify the change in environment. The responding capability refers to the ability of the firm to respond the market changes with suitable strategies and policies. The responding factor was related to the response ability by Appelbaum, Calla, Desautels, and Hasan (2017) This was defined as the physical ability. The skills of a firm to respond quickly to the opportunities and threats of the changing market determine its inherent competencies (Mustafid et al., 2018). A firm can be able to upgrade its strategic flexibility through sensing and responding through supply chain agility and taking actions through altering operations and strategies. It is believed that actions can be taken for improving strategic flexibility to influence

the performance of the firm. The following research hypothesis has been developed in this consent:

*Hypothesis 6 (H6): The supply chain agility mediates the relationship between strategic flexibility and firm performance.*

The ability of a firm to adapt various configurations in its manufacturing systems and easily change one type to another is referred as manufacturing flexibility. The total influence of manufacturing flexibility on the performance of a firm can be explained by the incorporation of supply chain agility. The effect cannot be explained better without the ability of a firm to sense changes in the industrial environment and developing of strategic actions to deal with such changes using the supply chain agility (Mustafid et al., 2018). A significant role is played by supply chain agility in mediating the impact of manufacturing flexibility on the performance of a firm. Therefore, the following research hypothesis has been proposed:

*Hypothesis 7 (H7): The supply chain agility mediates the relationship between manufacturing flexibility and firm performance.*

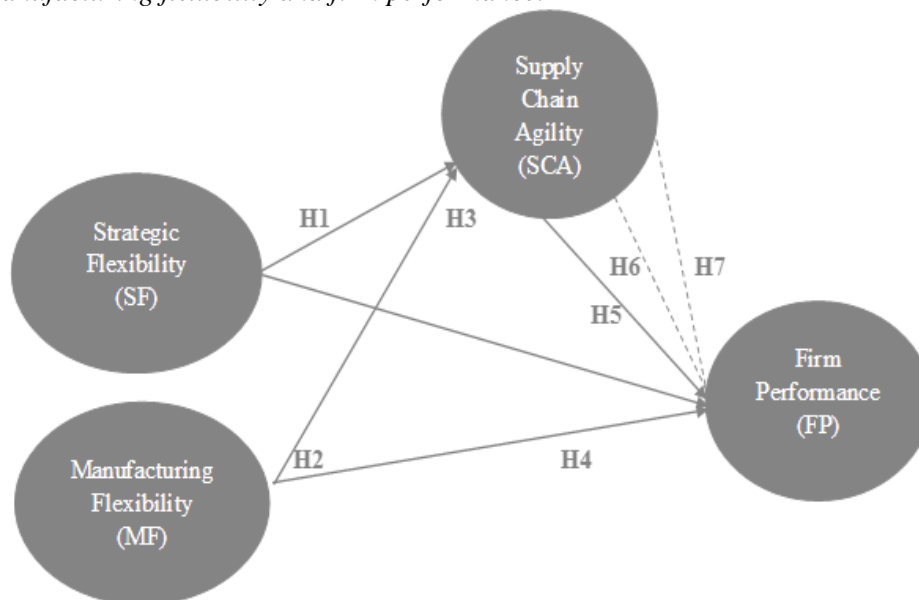


Figure 1. Assumption of the hypothesis 7

### Data and Methodology

The current study has employed the quantitative approach. The quantitative approach used the surveys-based methodology the reason why the quantitative research design has been framed for this study, is that it helps a researcher in thoroughly examining the large sample of respondents and then generalizing their responses. The initial study model comprised reflective measurement items that are manifest variables or indicators, four latent variables including two

independent, one dependent variable and one mediating variable constituting 5 relationships between them on the basis of the proposed study. Quite a number of analysis techniques exist in research field. Some of them include, descriptive, factor analysis, correlation analysis, and regression analysis (simple, multiple and hierarchical regressions). Each of these analyses is applied depending on the nature and objective of the study. For this study, various analyses such as descriptive analysis, factor analysis, correlation analysis, multiple and hierarchical regressions were all applied in order to achieve the study objectives. The random sampling is used to collect the data from firms in the fashion industry of Malaysia. Following Hameed, Basheer, Iqbal, Anwar and Ahmad, (2018) the sample size of 300 is selected. The 111-questionnaire returned and out of them 94 questionnaires were actually used in analysis. The response rate is 31.33 percent, which is according to Sekaran and Bougie (2003) is sufficient for reliable results. Below Table 1 shows the response rate.

**Table 1. Response rate**

Response	Frequency/Rate
Total questionnaires distributed	300
Total questionnaires returned	111
Total Useable questionnaires	94
Total questionnaires excluded	17
Total response rate	37%
Total response rate after data entry	31.33%

Several current research studies have regarded SEM approach as a statistical procedure having different stages (Eckstein et al., 2015; Hallgren and Olhager, 2009).

## Results

The outer model i.e. the measurement model is assessed with PLS-SEM. This is done before the testing of research hypothesis. The method proposed by (Jamil and Jamil, 2017; Mazaro, 2018), was followed by this research study. The study has examined the values of Composite Reliability and Cronbach Alpha in the Table. The range of Cronbach Alpha lies among 0.890-0.964. The range of composite reliability lies between 0.759- 0.971, which is higher than the suggested level of 0.7. The convergent validity of the outer model is confirmed through these results. For confirming the convergent validity of the outer model, the value of Average Variance Extracted was found. It has been indicated by AVE that the average of variance extracted among a group of items related to the shared variance with measurement errors. The variance that is reflected by the indicators in relation to the measurement errors is measured by AVE. The range of average values lie among 0.510-0.99, which reflects the level of construct validity to be good. In the

current study, the reliability of all the variables is above the threshold level, which indicates that the study is free from the reliability issue.

**Table 2. Reliability**

	<b>CR</b>	<b>AVE</b>	<b>Cronbach Alpha</b>
<b>SF</b>	0.975	0.872	0.885
<b>MF</b>	0.702	0.737	0.924
<b>SCA</b>	0.960	0.871	0.893
<b>FP</b>	0.802	0.832	0.916

To check the construct validity of the outer model, the discriminant validity is established. The hypothesis testing is one through path analysis and for this, it is compulsory to test the discriminant validity. The variance should be greater than the variance shared by the constructs. The method of Fornell and Larcker (1981) was used for determining the discriminant validity of measures. In our analysis the top diagonal value of each columns is greater than the values in lower columns, which indicates that our instrument is valid. Thus, the elements in the diagonal of the table higher than other elements in the column confirm the discriminant validity of the outer model.

**Table 3. Discriminant Validity**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>SF</b>	<b>0.709</b>			
<b>MF</b>	0.680	<b>0.727</b>		
<b>SCA</b>	0.657	0.676	<b>0.712</b>	
<b>FP</b>	0.632	0.654	0.682	<b>0.832</b>

It is believed that the testing of the construct validity of the outer model has resulted in valid and reliable results. The hypothesized relation among the variables has been examined after the confirmation of outer model's goodness. Using Smart PLS, the PLS Algorithm was undertaken and the hypothesis model was evaluated.

**Table 4. Direct Effect**

	<b>(β)</b>	<b>SD</b>	<b>T-value</b>	<b>P-Values</b>
<b>H1</b>	0.211	0.135	3.211	0.000
<b>H2</b>	0.357	0.152	3.678	0.000
<b>H3</b>	0.321	0.178	3.321	0.000
<b>H4</b>	0.342	0.165	3.234	0.000
<b>H5</b>	0.453	0.187	3.768	0.000

The results of the direct relationship between supply chain agility and firm performance, strategic flexibility and firm performance and between manufacturing flexibility indicates that all the hypothesis are accepted significantly. The positive sign indicates that the strategic flexibility, manufacturing flexibility and supply



chain agility enhance the firm performance. The indirect effect of the current study is shown in the table 4.

**Table 5. Indirect Effect**

	( $\beta$ )	SD	T-value	P-Values
<b>H6</b>	0.211	0.135	3.211	0.000
<b>H7</b>	0.357	0.152	3.678	0.000

Table 5 highlighted the results of mediating role of supply chain agility in the relationship between strategic flexibility and firm performance and in the relationship between manufacturing flexibility and firm performance. The results of the study has shown consistency with the hypothesized results as the supply chain agility mediates the relationship between strategic flexibility and firm performance and between manufacturing flexibility and firm performance

The predictor variables explain the R2 value of the endogenous variables in the study of multivariate data analysis. The magnitude of R2 value for the endogenous variables has been considered as an indicator of the predictive power of the mode. Moreover, the technique developed by Katiyar, Meena, Barua, Tibrewala, and Kumar (2018) . The variance explained by the independent variables in FP is 53.3 percent.

**Table 6. Expected Variance**

	R <sup>2</sup>
<b>FP</b>	53.3%

The study is carried out on the fashion industry of Indonesia. The main purpose of the current study is to investigate the relationship between strategic flexibility, manufacturing flexibility, supply chain flexibility and firm performance. The strategic flexibility and manufacturing flexibility appeared in significant relationship. these findings are in line with the proposition of resource-based view theory (Basheer et al., 2019) and are consistent with the studies of Fayezi et al., (2017) and Hallgren and Olhager (2009) and Katiyar et al., (2018). The supply chain agility appears in significant and positive direct and mediating relation with supply chain flexibilities and firm performance which is supporting the resource based view as well as in consistency with the prior findings of (Eckstein et al., 2015) and Gligor, Esmark, and Holcomb (2015)

### Conclusion

This research has focused on two flexibility factors of the organization i.e. the manufacturing flexibility and the strategic flexibility considering their relevance with the fashion manufacturing industry. Not all the antecedents are taken into account by this research. It has been investigated that how these two factors of flexibility affect the agility of the supply and performance of the firm. Moreover, the research analyzes the way in which supply chain agility mediates the association between the factors of flexibility and firm's performance. A research framework has been developed using resource-based view for creating a

conceptualization relation between the four constructs of the research. These constructs are supply chain agility, flexibility in strategies, flexibility in manufacturing and performance of firm. Statistical testing has been done through use of SEM (Structural Equation Modeling). The fashion industry is one of the dynamic industries, which undergoes rapid transformation in both the demand and flexibility. So, current study has used SEM-PLS as statistical tool to answer the research questions raised in this study and research objectives envisaged in the current study. The findings of the study have provided support to the theoretical foundation and proposed hypothesis of the current study. Current study will be helpful for policymakers and practitioners in understanding the issues related to supply chain risk, supply chain integration and supply chain performance. In author knowledge this is among very few pioneering studies on this issue.

#### Limitations and recommendations

The current study not free from the limitations as this research study focuses on the identified research gap by analyzing the aspects of fashion products' manufacturers in the developing Asian market and the manufacturers working in Indonesia is taken for the study. Thus, current study is carried out on the single sector such as fashion industry, the similar study on the other sector is recommended.

Furthermore, the study has conceptualized the supply chain flexibility into two flexibilities namely manufacturing flexibility and strategic flexibility. Whereas there are certain issues in supply chain flexibility such as technological flexibility, Its flexibility logistic flexibility etc. are ignored. Therefore, another study with comprehensive conceptualization of supply chain flexibility is recommended.

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**STRATEGICZNA ELASTYCZNOŚĆ, ELASTYCZNOŚĆ PRODUKCYJNA I WYDAJNOŚĆ FIRMY W KONTEKŚCIE ZWINNYCH ŁAŃCUCHÓW DOSTAW: PRZYPADEK ZARZĄDZANIA STRATEGICZNEGO W BRANŻY MODY**

**Streszczenie:** Branża modowa jest jedną z dynamicznych gałęzi przemysłu, która podlega szybkiej transformacji zarówno pod względem popytu, jak i elastyczności. Głównym celem obecnego badania jest zbadanie związku między strategiczną elastycznością, elastycznością produkcji, elastycznością łańcucha dostaw i wydajnością firmy. Oprócz tego obserwuje się mediacyjną rolę elastyczności łańcucha dostaw w relacji między strategiczną elastycznością, elastycznością produkcji i wydajnością firmy. Firmy działające w branży mody w Indonezji są wybierane jako próba badania. Wykorzystując metodologię opartą na ankietach, technika SEM-PLS jest wykorzystywana do testowania hipotetycznych relacji. W związku z tym w bieżącym badaniu wykorzystano SEM-PLS jako narzędzie statystyczne do odpowiedzi na pytania badawcze poruszone w niniejszym badaniu i cele badawcze przewidziane w bieżącym badaniu. Wyniki badania dostarczyły wsparcia teoretycznej podstawie i zaproponowały hipotezę obecnego badania. Obecne badania będą pomocne dla decydentów i praktyków w zrozumieniu problemów związanych z ryzykiem łańcucha dostaw, integracją łańcucha dostaw i wydajnością łańcucha dostaw. W wiedzy autora jest to jedna z niewielu pionierskich badań w tej kwestii.

**Słowa kluczowe:** elastyczność, zwinność, łańcuch dostaw, Indonezja.

**在敏捷供应链的存在下，战略灵活性，制造灵活性和公司业绩：时装业的战略管理案例**

**摘要：**时尚产业是一个充满活力的产业，需求和灵活性都在快速转变。本研究的主要目标是调查战略灵活性，制造灵活性，供应链灵活性和公司绩效之间的关系。除此之外，还观察到供应链敏捷性在战略灵活性，制造灵活性和公司绩效之间的关系中的中介作用。选择在印度尼西亚时装业经营的公司作为研究样本。采用基于调查的方法，SEM-PLS技术用于测试假设的关系。因此，目前的研究使用SEM-PLS作为统计工具来回答本研究中提出的研究问题和当前研究中设想的研究目标。该研究的结果为当前研究的理论基础和提出的假设提供了支持。目前的研究将有助于政策制定者和从业者理解与供应链风险，供应链整合和供应链绩效相关的问题。在作者的知识中，这是很少有关于这个问题的开创性研究。

**关键词：**灵活性，敏捷性，供应链，印度尼西亚。