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Supply Chain Management Strategies Approach for the UK Textile Industry

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Abstract

This study focuses on the specific types of supply chain strategies throughout the UK textile industry as extant literature has either emphasised on the fashion apparel industry or on sub-industry of fast fashion. A combination of normalised local priority weights of criteria and sub-criteria is used with respect to successive hierarchical levels which modelled in an Analytical Hierarchy Process (AHP) at different levels. This helped in obtaining global composite priority weights for all the sub-criteria at third level of AHP model. The changes in different factors are observed with respect to digitalisation in sensitivity analysis at different levels of variations in the weight for which marginal changes are noted in the following variables: development of key suppliers, supplier capability auditing, and long-term orientation with suppliers. Supply base optimisation and purchasing integration showed changes at all levels of variations. Purchasing and production strategy was crucial as primary criteria for accomplishing the goal of the supply chain management future. There was substantial evidence from the three companies participating in the research that purchasing and production strategies play equally significant roles in successful digitalisation, identification, and delivery.

Keywords: Sensitivity Analysis; Supply Chain Management Strategies; UK Textile Industry

1. Introduction

The textile industry is specifically divided on the basis of three certain markets; apparel, home, and technical textiles. The core emphasis of this study is subjected toward the apparel industry as it is highly significant and related with respect to volume. Recently, the apparel industry is classified as one of the largest and oldest export industries being dynamic, global, and complex in charisma [1]. The fashion world might be stylish, glamorous, and sensational,

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but its unexpected impact on the character is accumulated. From an environmental perspective, clothes and textiles can cause excessive disruption.

The apparel industry is considered as a dynamic sector based on facing constant change and great price competition. In the fashion apparel industry, important features of supply chains implement pursuing low-cost manufacturing possibilities by experiencing the rise of e-commerce, the emerging use of quick response, immense change, and rising sourcing offshore [2]. Furthermore, the increasing competition from the supermarkets entrance of selling clothes to fast fashion companies refines the buying behaviour process. According to Mudiyanselage and Herath [3], customers are highly encouraged toward the brand's reputation, sustainability stake, differentiation, and highly brand-sensitive status. To this end, a competitive advantage is required to be maintained by supply chain management practices and strategies as it integrates both the aspects of the uncertainties and the product associated with it.

There is a lack of SCM strategies and practices in UK textile industries as managers found it complicated to choose an adequate strategy and practice about the situation and their product type. Previously, it should be notable that SCM strategies and practices vary based on the firms with purchasing and production policies. Therefore, this study intends to consider the textile industry and identify SCM strategies and practices integrated with respect to different production and purchasing policies. Supply chain management is considered as an important aspect in establishing a sustainable competitive advantage and become strategically essential when competing in the recent period. Previously, a bulk of SCM research has been carried out within the fashion apparel industry in the field of fast fashion.

1.1 Scope and Contribution

This study focuses on the specific types of supply chain strategies throughout the UK textile industry as extant literature has either emphasised on the fashion apparel industry or on sub-industry of fast fashion. Therefore, this study is significant based on three objectives. Firstly, the study is significant for fashion apparel retailers who perform as an intermediary between the manufacturer and the final customer, given the responsiveness of a purchasing department and the purchasing of finished goods. Likewise, this study is quite beneficial for the fashion apparel industry to restructure their own purchasing departments for buying fabrics, materials, and garments, but a third party is included in this production phase. Lastly, this study is significant for the fashion apparel industry for the purchasing or production of all the raw materials which are important for the garment production as well as their own manufacturing facilities.

1.2 Article Structure

The following sections will cover review of literature on supply chain management strategies for the UK textile. Later on, methodology will be presented in the third section discussing the recruitment of potential participants from selected textile firms and steps to address data collection and analysis. The fourth section will present analysis based on the data collected in the form of AHP framework. The fifth and last section summarises the overall article.

2. Literature Review

2.1 SCM Operations in Textile Industry

The efficiency of a business process is ensured by the support of supply chain management. The adaptation of the supply chain is commenced by all industries, specifically by Textiles. It has been observed that a firm must realise the social and environmental practices of businesses along with all strategies and decisions of business on the basis of profit maximisation [4]. Therefore, both financial and non-financial outcomes are assessed under the objectives of the activities of supply chain members. Textile contributors such as China, Hong Kong, Pakistan, Turkey, India, Bangladesh, and the US have commenced adapting supply chain strategies for sustaining successfully globally. Across various industries, studies on the supply chain commenced in the early 90’s and focused on the significance of textile supply chain management comprehensively with supply chain coordination, leading to competitiveness [5]. It is a fact that most significant effects of a company are usually observed regarding its value chain and its operations. Moreover, it upstream the environmental and social effects of its suppliers as well as downstream the effects of its products and

services. One of the key aspects of sustainability management is to improve the sustainability performance along with the supply chain efficiency [6].

The importance of sustainability initiatives for companies' strategies is observed specifically for those companies who operate in sensitive business realms, which include the fashion industry with its intensive use of high labour inputs and natural resources. The social and environmental effects of these business operations are considered by integrating corporate social responsibility throughout fashion supply chains [7]. On the one hand, environmental issues of pollution and high use of natural resources are associated with the textile pipeline and textile waste issues in the consumer disposal of used garments. Moreover, the associated use of water and toxic chemicals at the fabric and processing stage is considered due to the fast fashion with a limited lifespan and the ever-shorter trend cycles and the rise of low quality [8]. In contrast, the implications are focused specifically on social issues, considering the labour-intensive garment manufacturing functions. Three areas can be considered primitively for the social issues of Corporate Social Responsibility (CSR), which include working hours, working conditions, and wages. An important supply chain challenge includes ethical transgressions because fashion industry is a considerable point for worker exploitation, sweatshops, and child labour [9]. Precisely, there are substantial challenges to successfully integrate strategies that are both socially responsible and competitive as illustrated from the intense focus on speed and cost reduction in the fashion industry.

2.2 SCM Planning in Textile Industry

Recently, technology has enabled the sustainability of the modern supply chain, which comprises of four fundamental aspects. These aspects include an effective computer-based management information system, a knowledge base of effective practices, a set of optimisation tools, and conceptual paradigms. The effective computer-based management information system is the most important component in the modern supply chain process [10]. Two different kinds of suppliers are usually categorised by retailers. The first kind includes a short lead time, more flexibility, and higher cost. In contrast, the second kind includes a longer lead time, less flexible, and lower cost. This segmentation assists in planning a strategy with respect to the basic or fashion goods and type of consumers' demand, which are determined by prediction, variety, changes, production volume, and style variation [11]. The retailers prefer to work with one of the main suppliers' groups which include the fashion goods and the basic goods.

The impact of inaccurate prediction is minimised by redesigning planning procedures that allow retailers to select those alternatives, which result in a faster supply chain and are not culturally or geographically differentiated [12]. In this regard, cost is one of the important criteria in the planning phase. The aim of the cost criteria is to anticipate and compare the extent of the financial resources required by different strategies. The classification of cost is based on the levels and values of intensity. However, it has been deemed that lower financial resources leading to higher cost strategies are required within the planning phase. Another important criterion is the time, which is usually regarded in the implementation phase of the strategic planning [13]. In addition, it is considered along with the intensity values and levels. In this regard, the objective of the time aspect is to set the preference of the developed strategies based on the shortest times.

2.3 Outsourcing in Apparel Industry

Outsourcing is an important perspective for the majority of European fashion apparel companies to low-wage cost suppliers all over the world. The product is designed and purchased by the fabric, whereas the fabric is trimmed by the manufacturer within the clothing firm. The design, marketing, and planning functions of the supply chain are focused by these companies, which now own any manufacturing facilities [14]. Outsourcing is characterised as coordinated firms in which the complete value chain is coordinated from the final design to the distribution of final products. Therefore, this category allows fashion companies to make use of third-party manufacturing, including both companies with their own stores and no own stores either locally or in offshore production locations [15].

Providing relatively high flexibility is becoming a frequently used practice in the fashion apparel industry while considering the likelihood of switching from low capital investments and great control, to outsourcing parts of the production to third party suppliers. Companies might outsource parts of their production due to an increasing number

of products, which require a rapid instigation to the market and a greater number of skills and abilities [16]. However, this variety requires managing a large network of suppliers resulting from an increasing number of products and a growing volume per product. Companies majorly depend on sourcing agencies to handle their import and export activities and their difficulties, which require knowledge and access of existing supplier activities, product technical expertise, and offering a complete logistics and sourcing service with local professionals.

The core objective of the SCM is to mitigate the cost and the lead time of the product. The aspects of the supply chain management involve efficient planning and management of logistics, availability of appropriate warehouses for storing goods, availability of improved maritime physical infrastructure, transportation of raw materials, informational sharing of demand, efficient planning and management of logistics, availability of better infrastructure of roads and railways, and highly efficient planning of ports and shipments. All these aspects contribute to reducing the lead time of the value chain as well as the related cost.

3. Research methodology

The present study discusses three apparel-based companies; therefore, quantitative method was appropriate in a real-life context to get insights about problems and relevant solutions in the practice of sustainable design. The quantitative method is commonly used when the knowledge about studies phenomena is robust [17]. It employs an exploratory approach rather than a descriptive one. The study is likely to help in describing and developing a framework indicating the performance measure that are included in different supply chains of the apparel industry.

The process followed in research uses deductive approach. The deductive approach uses theory to make predictions or explaining a phenomenon whereas inductive approach focuses on drawing conclusions by going down from the specific to the general. The combination of both the inductive and deductive approaches is referred to as abduction. This type of approach is used in a situation where there is an alternate use of research approach [18]. With reference to the present study, the main aim is to select the most optimum of best supply chain strategies and practices. The performance measures at subsequent levels help in listing and quantifying the available choices, which are later converted to weights for prioritising portfolios of ideas. Analytical Hierarchy Process (AHP) plays a vital role in ranking and making decisions in a systematic and rational way. Weighting provides flexibility in the decision-making process as it can be changed based on different industries and companies [19]. The assigning of pairwise comparisons is done based on the nine-point scale, as suggested by Saaty [20]. Priority vectors or relative weights were estimated for each of indicators, criteria, and sub-criteria in the decision hierarchy. A comparison matrix was used to estimate the relative weights. Lastly, it was essential to cross-check the sum of all weights which should be equal to 1.00.

A questionnaire survey was designed and administrated online to achieve the study's aim to support organisations in managing purchasing and production strategies. This research collects data from three textile companies, including H&M, Marks & Spencer, and Zara. The data collected from 238 participants was reviewed for completeness and accuracy. It underwent several stages of pre-analysis, such as error checking and data screening. The data was coded and fed into the AHP software to measure the importance of competing objectives. A dedicated tool and proven mathematical techniques enable the researcher to obtain the best decision to reach the goal. Hence, comparison AHP was used to develop the proposed production and purchasing strategies framework which displayed in Fig 1.

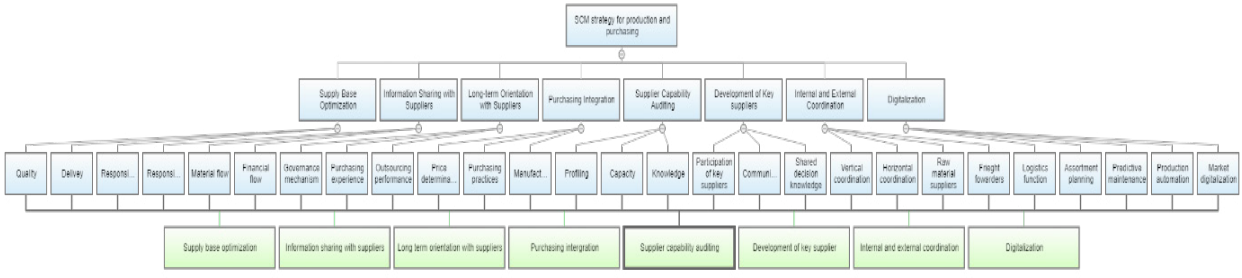

Fig 1. The proposed Production and purchasing Strategies AHP framework

4. Results and analysis

Figure 2 represents the relative importance of the criteria and sub-criteria, as can be seen, digitalisation stood first with 22.49% importance, followed by the "development of key suppliers", "supply base optimisation", "internal and external coordination", "purchasing integration" and "Information sharing with suppliers" with 14.44%, 12.48%, 12.36%, 11.05%, 9.72% and 9.23% respectively. The results revealed that the "long-term orientation with suppliers" was the least criterion, with 8.22%.

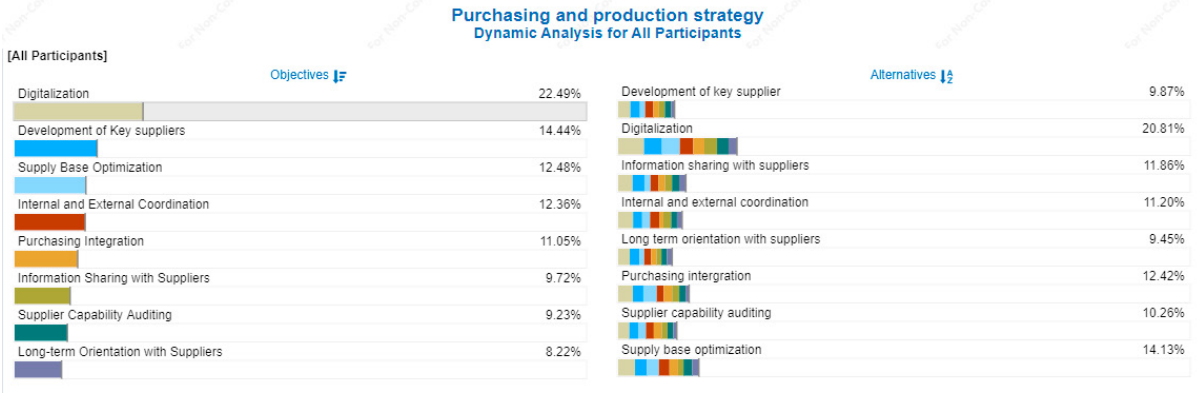

Fig 2. The priority weights of the included criteria in the framework

5. Sensitivity Analysis (SA)

The definition of SA varies according to its application to practice. Consensus concludes that SA is a science that studies and quantifies the impact of each input parameter on the outputs via the circulation of uncertainties [21]. There are three most popular ways to analyse criteria sensitivity [22] explicitly:

i) Firstly, changing criteria values.
ii) Secondly, changing the relative importance of criteria.
iii) Thirdly, changing criteria weights.

Therefore, the input data is slightly modified to observe the effect on the outcomes to implement sensitivity analysis. If the ranking does not change, then the results are considered stable, and the uncertainty in the participants' opinions within the percentage of changes in the input data does not affect the final output. Otherwise, the impact should be considered when concluding the study.

5.1 Sensitivity analysis for digitalisation criteria

The following figure shows the sensitivity performance of the first four variables considering the sensitivity on their benchmarks. The sensitivity performance is calculated based on 5%, 10%, and 15% weights in the AHP framework.

i) 5% increase

The first change was made in the digitalisation variable. With the increase in digitalisation up to 5%, supply base optimisation shows a change of 14.13%, purchasing integration shows a change of 11.86%, internal and external coordination shows a change of 11.20%, supplier capacity auditing shows a change of 10.26%, development of key supplier shows a change of 9.87%, and long-term orientation with supplier shows a change of 9.46% (Fig 3).

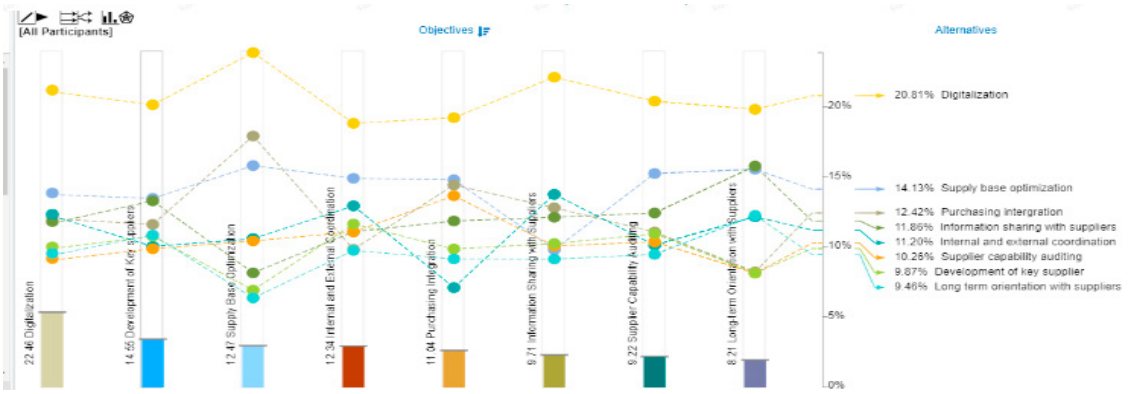

Fig 3. Sensitivity analysis at 5% changes in the digitalisation criteria

ii) 10% increase

With the increase in digitalisation up to 10%, supply base optimisation shows a change of 14.06%, purchasing integration shows a change of 12.35%, internal and external coordination shows a change of 11.48%, supplier capacity auditing shows a change of 9.99%, development of key supplier shows a change of 9.90%, and long-term orientation with supplier shows a change of 9.47% (Fig 4).

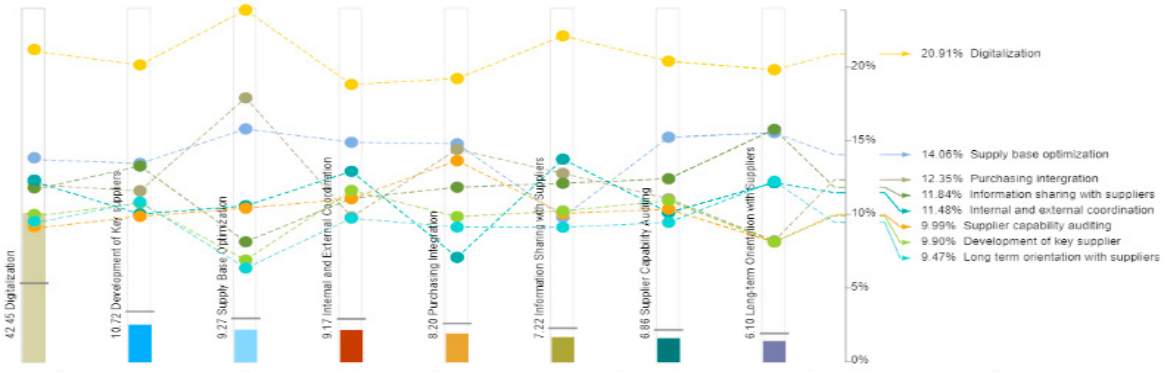

Fig 4. Sensitivity analysis at 10% changes in the digitalisation criteria

iii) 15% increase

With the increase in digitalisation up to 15%, supply base optimisation shows a change of 13.98%, purchasing integration shows a change of 12.27%, internal and external coordination shows a change of 11.79%, supplier capacity auditing shows a change of 9.94%, development of key supplier shows a change of 9.69%, and long-term orientation with supplier shows a change of 9.49%. In this regard, supply base optimisation showed better ranking as compared to other factors at 15% increase (Fig 5).

The changes in different factors were observed with respect to digitalisation in the sensitivity analysis. From the findings, it has been observed that changes were observed in each variation (5%, 10%, and 15%) in other criteria, whereas the marginal changes were noted in the following variables: development of key supplier, supplier capability auditing, and long-term orientation with suppliers. Supply base optimisation and purchasing integration showed changes in all three variations.

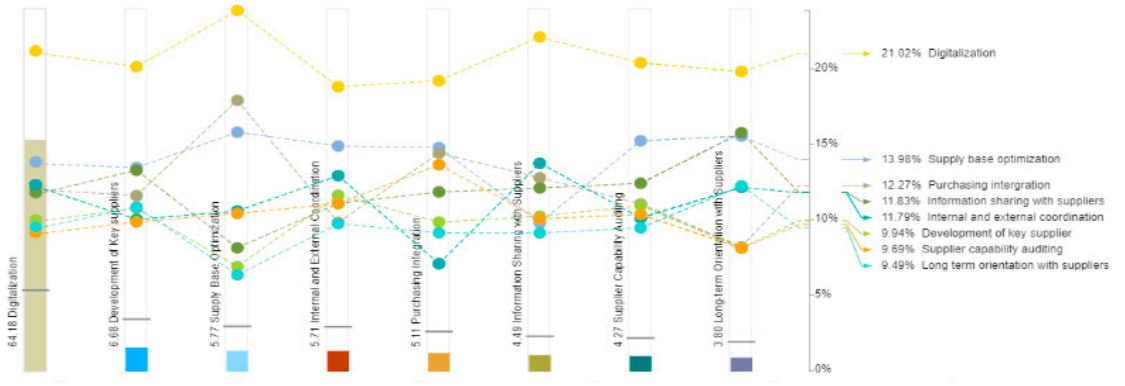

Fig 5. Sensitivity analysis at 15% changes in the digitalisation criteria

5.2 Sensitivity analysis for the Development of Key Suppliers

i) 5% Increase

The second change was made in the "development of key suppliers" variable. With the increase in development of key suppliers up to 5%, supply base optimisation shows a change of 14.05%, purchasing integration shows a change of 12.02%, internal and external coordination shows a change of 11.97%, supplier capacity auditing shows a change of 10.21%, digitalisation shows a change of 20.73%, and long-term orientation with supplier shows a change of 9.52% (Fig 6).

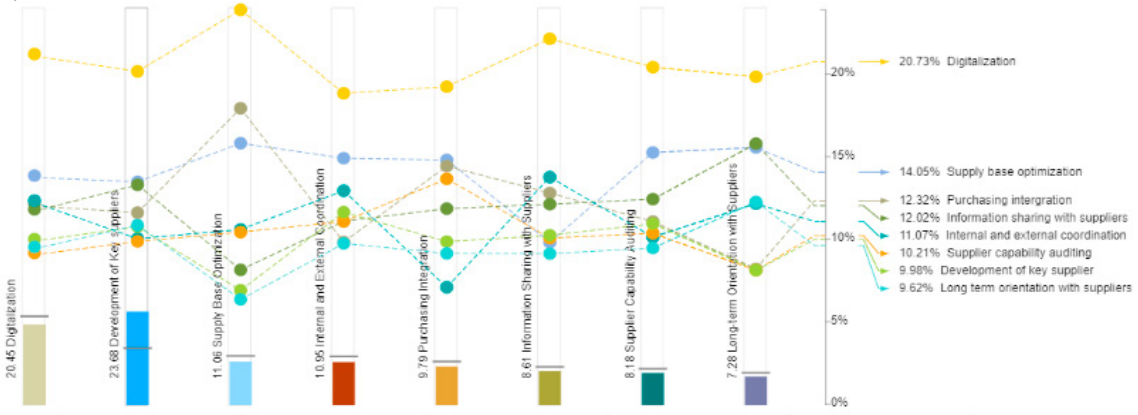

Fig 6. Sensitivity analysis at 5% changes in the development of key suppliers criteria

ii) 10% increase

With the increase in the development of key suppliers up to 10%, supply base optimisation shows a change of 13.92%, purchasing integration shows a change of 12.31%, internal and external coordination shows a change of 10.83%, supplier capacity auditing shows a change of 10.13%, digitalisation shows a change of 20.61%, and long-term orientation with supplier shows a change of 9.89% (Fig 7).

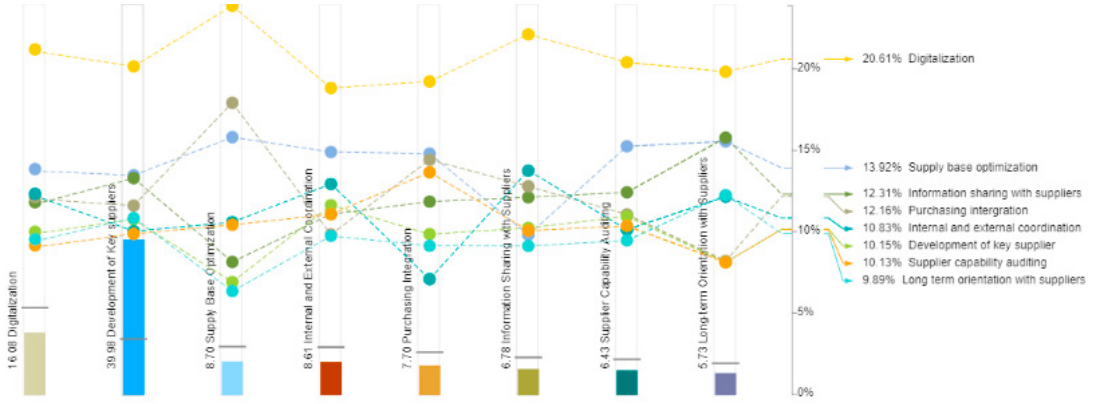

Fig 7. Sensitivity analysis at 10% changes in the development of key suppliers criteria

iii) 15% increase

With the increase in the development of key suppliers up to 15%, supply base optimisation shows a change of 13.73%, purchasing integration shows a change of 11.93%, internal and external coordination shows a change of 10.50%, supplier capacity auditing shows a change of 10.02%, digitalisation shows a change of 20.42%, and long-term orientation with supplier shows a change of 10.28% (Fig 8).

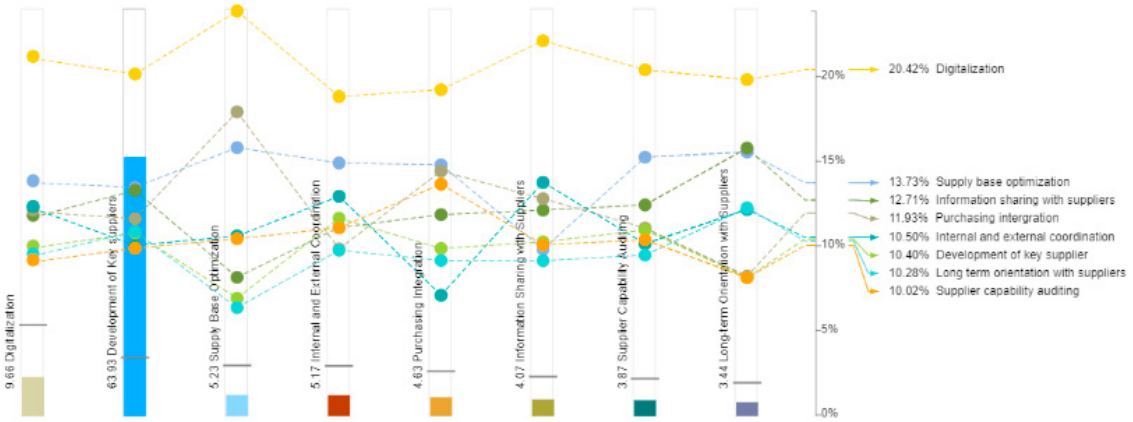

Fig 8. Sensitivity analysis at 15% changes in the development of key suppliers criteria

5.3 Sensitivity analysis for the Supply Chain Optimisation

i) 5% increase

The third change was made in the "supply chain optimisation" variable. With the increase in supply chain optimisation up to 5%, development of key suppliers shows a change of 9.54%, purchasing integration shows a change of 13.02%, internal and external coordination shows a change of 11.05%, supplier capacity auditing shows a change of 10.40%, digitalisation shows a change of 21.09%, and long-term orientation with supplier shows a change of 9.10% (Fig 9).

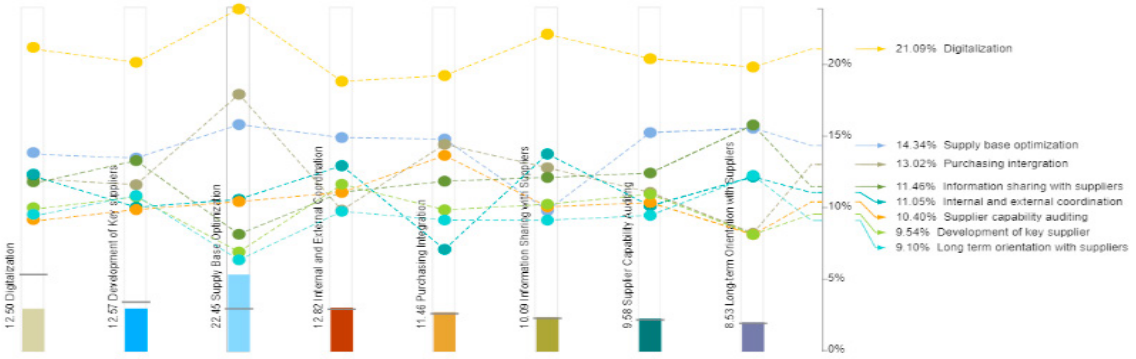

Fig 9. Sensitivity analysis at 5% changes in the supply chain optimisation criteria

ii) 10% increase

With the increase in supply chain optimisation up to 10%, development of key supplier shows a change of 8.81%, purchasing integration shows a change of 14.38%, internal and external coordination shows a change of 10.92%, supplier capacity auditing shows a change of 10.41%, digitalisation shows a change of 21.87%, and long-term orientation with supplier shows a change of 8.33% (Fig 10).

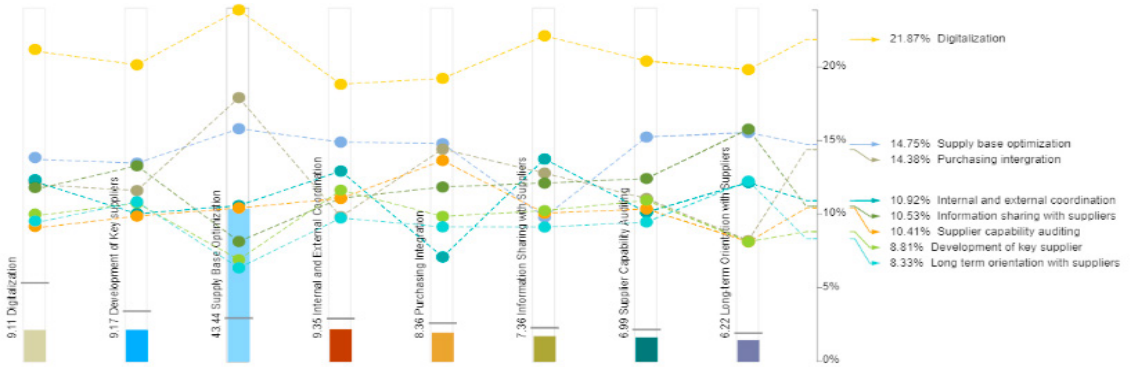

Fig 10. Sensitivity analysis at 10% changes in the development of key suppliers criteria

iii) 15% increase

With the increase in supply chain optimisation up to 15%, development of key suppliers shows a change of 8.08%, purchasing integration shows a change of 15.74%, internal and external coordination shows a change of 10.79%, supplier capacity auditing shows a change of 10.41%, digitalisation shows a change of 22.64%, and long-term orientation with supplier shows a change of 7.57% (Fig 11).

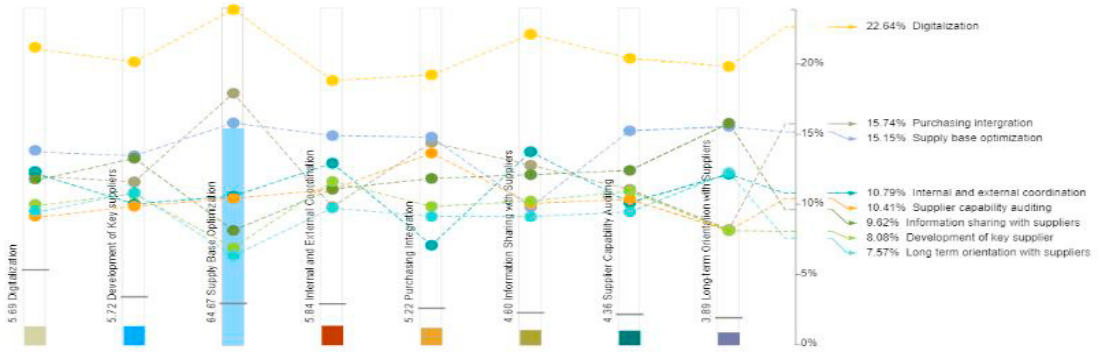

Fig 11. Sensitivity analysis at 15% changes in the development of key suppliers criteria

5. Conclusion

In conclusion, the "validation of the proposed framework through feedback from the questionnaires drawn from the three companies was crucial for the research methodology. By creating a questionnaire consisting of pairwise comparisons and feeding the reaction to the AHP software, strong judgements could be made about how the various criteria fared in the contributor's needs. The diverse purchasing and production components were carefully chosen after conducting a thorough literature review and studying developing trends in the textile sector. Thus, if the priorities of these criteria were closely placed around each other, it would imply that the proposed form is fit for its purpose. However, if, on the other hand, some components had relatively low priority compared to the rest, then it would imply that participants did not share the view of the former being included in the framework. In this case, these could even be removed from the framework".

- The criteria show that digitalisation such as Industry 4.0 is the topmost required.
- Long-term orientation with suppliers and Information sharing with suppliers were the most influential in assisting market digitalisation".
- There is ample evidence that supply chain strategy is related to a company's success.
- Companies today understand that success depends on aligning their supply chain strategy with their business model. The characteristics of a product and the stage of its life cycle have a significant impact on the market environment and customer needs, both of which must be considered when developing a business model.
- To maximise profits requires a flexible supply chain that can rapidly increase or decrease production in response to demand.
- This requires a flexible supply chain emphasising low-volume, high-variety production, and fast turnaround times.
- It goes without saying that no one supplier is always the best choice in any situation.
- Instead, the selection of the best suppliers must be guided by the company's supply chain plan, which is higher management.

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