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The Relationship between Product Nature and Supply Chain Strategy: An Empirical Evidence

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***Abstract*— The purpose of the paper is to explore the relationship between the nature of product and respective supply chain strategy of the firm's operation in manufacturing sector. The relationship is investigated by using the fisher's model as conceptual framework. Data was collected through questionnaire-based self-administered survey. The results of the survey were analysed by testing the fisher's model related to Supply Chain Strategy and product characteristics. The results of the study indicated that there is a significant relationship between nature of the product and supply chain strategy in manufacturing sector of Pakistan. The practical implication can be derived by the policy makers and practitioners of the supply chain strategy domain that characteristics of the product can have an impact of the decision to device supply chain strategy. Furthermore, this study is conducted in special context of underdeveloped country like Pakistan. Therefore, results of this study enhanced the existing literature on underdeveloped economies.**

***Keywords*—** *Supply Chain Strategy, Product Nature, Manufacturing Sector, Fisher Model, Pakistan*

1. Introduction

There has been a growing emphasis on the alignment of business processes to enhance effectiveness of the business performance through adopting the more thought-out patterns as compare to traditional ways in the research literature. The alignment of supply chain patterns is one of these patterns [1]. Furthermore, if all supply chain are perfectly aligned and have shared objective, this alignment can lead to attainment of competitive advantage by leveraging the synergy created through common objectives [2]. The integration and alignment of internal organizational departments along with external members is imperative for any organization to effectively meet the diverse needs of consumers. This need has become more important due the challenges of completion and globalization. Customer has more choices now and it is very difficult for organizations to retain the loyalty of customers through repetitive purchase behaviour [3], highlighted that supply chain strategy is an integral part business level strategy of any organization that clearly demarcate the core point of competition and positioning of any organization as compare to competing organizations, whether it would compete on quality, service, innovation or low cost. The competition among firms is no longer between individual organizations it has re-shaped and now transformed to all channel member level [4], the impact of competition can be traced to whole network [5]. The relationship between the nature of product and supply chain strategy was examined by [6] and proposed a model to investigate the proposed relationship and pose this decision as a strategic decision for any organization. This model is widely cited and used in the literature [7][8][9]. The present study will also try to test the model and validate the possible relationship that the model is claiming to explore.

The rest of the paper is organized as; the next section of the paper is based on the literature review on supply chain strategies, nature of product and on the previous studies conducted on this area. This section will also try to create a foundation for current research. The next section is designated to the discussion of the Fisher's model which serves as a conceptual model for present study, its dimensions and explanations of the dimensions proposed

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by Fisher's Model. The proceeding section will explain the methodology adopted for the study along with the instrument and measurement tools used for data collection. Next section will provide the data analysis and discussion on the findings of the present study, followed by the section on significance of the study. The last section will conclude the paper.

1.1 Fisher's Model of supply chain strategy and product nature

As proposed by [6] a model that creates a link between supply chain strategy and nature of product. In his typology Fisher product characteristics are grouped into two types, innovative and functional products. He described functional products with longer life cycle, stable demand, low product variety, longer lead times and lower margins for organizations. While the innovative products were described as short product life cycle, higher margins, greater product variety and shorter lead time to order. Moreover, demand patterns are more predictable for functional products and less predictable for innovative products, please see the figure for detailed elaboration of products classification of Fisher.

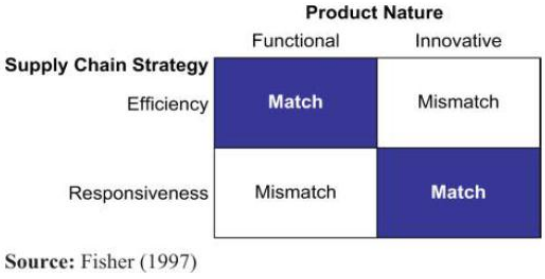

Figure 1: Integration of Supply chain strategy with product nature

[10] also proposed similar model of matching the nature of product for drafting supply chain strategy, similar approached were presented by [3] and [11].

2. Literature Review

This section of the paper is designated to the review of the existing literature on Supply Chain strategies, nature and product and their possible relationship. Supporting paradigms will be explored to create foundation for the present study along with the development of hypothesis. The background literature will help in establishing the conceptual model of the present study. [25] [26] were the pioneered to explore the relationship between nature of product and choice of delivery process, they propose the product process matrix, which explain the possible best fit among the nature of product and design of delivery process. Fisher (6] proposed that the choice of the supply chain strategy will be decided keeping in view the nature of product. According to Fisher (6] the nature of product and supply chain strategy is mutually exclusive in nature. There are various studies which are in support of Fisher's claim of mutual exclusiveness in theoretical perspective (13](14](15](24]. This leads to a fundamental question that whether nature of product can have an impact of supply chain strategy.

H1. There is a significant relationship between the nature of product and supply chain strategy.

Fisher model classified products into two categories, functional products and innovative products. This statement leads to analogy that will there be any difference in supply chain strategy for the firms offering functional product from those organizations offering innovative products. Through a mathematical model [9] explored that association can be found between innovating product and responsive manufacturing. However, the opposite results were found by [8] while conducting an empirical study, furthermore the relationship between functional type of products and efficiency strategy was proved. In the light of aforementioned discussion and including the proposition made by Fisher following hypotheses can be formulated.

H2. The organizations offering functional products accentuate efficiency-related supply chain strategies as compare to the organizations offering innovative products.

H3. The organizations offering innovative products tend to follow responsive supply chain strategies are oppose to the firms offering functional products.

Fisher's model distinguishes between the match and mismatch for products and supply chain strategies, therefore this can be deduced that match between product nature and supply chain strategy will result in superior financial performance.

H4. Organizations with match among the nature of product and supply chain strategy will lead to superior profitability as compare to organizations with mismatch.

2.1 Supply Chain Strategy

The concept of supply chain strategy is in its emergence phase and is recently conceptualized [2]. Supply chain strategy is repeatedly discussed in the research literature as an advanced form of operations. The intense competition has forced the firms to devise supply chain strategy which is more efficient as compare to competing firm [1]. Management of supply chain strategy has become a great challenge for supply chain professionals [15]. The development of competitive supply chain strategy has become one of the key strategic decisions in order to create value for customers [16]. There is an agreement between

the scholars of supply chain that the supply chain strategy should be composed on the basis of matching the nature of different products or markets with the supply chain strategy to enhance the efficiency of the organization [17][6] [15] [18].

3. Methodology of Research

Keeping in view the purpose of current study the quantitative data was gathered to explore the relationship between supply chain strategy and nature of the product in manufacturing organizations working in Pakistan. Data was gathered through a self-administered survey. Total of 1,000 questionnaires were send for data collection to 112 organizations operating in manufacturing industries. Out of total 1000 questionnaires 857 questionnaires were considered completed in all respect and included for analysis. The response rate is approximately 85.7% which acceptable as said by [19]. The questionnaire consists of two sections, 1st section has questions about supply chain strategy used by organization and next part is about product characteristics. The demographic profile of the respondents and background information about the organization is also collected. The supply chain strategy and product characteristics dimensions were adopted from [6]. Questionnaire was drafted as per the recommendations and guidelines proposed by [20][21]and [22]. The unit of analysis for current study is staff working on the manufacturing of the main line of products, as described by [20][21] it is impossible for organizations and plants to respond to any questions, so the human resource working in organizations and plants are the respondents for any study.

3.1 Data Analysis and Discussion on Results

The survey results indicated that most of the organizations pursuing responsive and efficiency supply chain strategy. Similarly most of the manufacturing companies are producing functional product.

Table 1. Respondent's Profile

Position	**Percentage**
Manager	8.6
Supply Chain Executive	33.9
Production Supervisor	21.3
Systems Support	9.8
Operations Manager	12.0
Purchasing Manager	7.2
Other	7.2

The first attempt is to verify the relationship among product type and supply chain strategy. The respondent's data is presented in table 2 where it is noted that most of the companies producing functional products are using efficiency supply chain strategy. Consequently, innovative product producers follow the responsive supply chain strategy. Hence it is said that nature of product and supply chain strategy is significantly associated as hypothesized by [6] hence, H1 is not reject. Further, Chi-square test was employed to measure the statistical significance of each product type corresponding to each supply chain strategy.

Table 2. Respondent's Responses According to Product Type

Number of Respondents	**Functional Product**	**Innovative Product**
Hybrid	90	73
No Preferred Strategy	97	20
Efficiency	460	50
Responsiveness	29	181
Total	676	324

The results of chi-square is presented in table 3 and found that product characteristics lead to specific supply chain strategy. Hence it is concluded that the product characteristics are significantly influenced the choice of supply chain strategy.

Table 3. Chi-Square Test

Chi-square	2.628
Df	**3**
Sig.	**0.003**

In next step this study emphasized to check the statistical association among product nature and two supply chain strategies named as responsiveness and efficiency. As, mentioned by [6] innovative products leads to responsiveness strategy while functional products lead to efficiency supply chain strategy. This study applied t-test to measure the significant difference in the mean value of each product type associated with corresponding supply chain strategy. The result of t- test is illustrated in table 4.

Table 4. T-Test For Equality of Means

Supply Chain Strategy	Product Type	Mean	Standard Deviation	t-Value	P-Value
Efficiency	Functional	4.8526	0.6287	2.834	0.000
	Innovative	3.2347	0.4092		
Responsiveness	Functional	3.494	0.3923	2.748	0.000
	Innovative	4.824	0.272		

The results of t-test revealed that firm producing functional product emphasize on efficiency-based supply chain strategy and the use of efficiency-based supply chain strategy is more significant in functional types of products. Consequently, firm producing innovative products are pursuing responsiveness-based strategy. The significance of responsiveness-based supply chain strategy for innovative product is elevated than functional product. Hence, we can declare that 2nd [H2] and 3rd [H3] hypothesis is therefore accepted. The above discussion concludes that the product nature significantly affects the choice of supply chain strategy. Hence, we can declare that the results of this investigation are in line with the [6] propositions.

In order to further examine [H4] the benefits of these supply chain strategies according to product nature is estimated by utilizing chi-square technique. We employed chi-square method to investigate the significant profitability difference among companies following supply chain strategy according to [6] model. The profitability of companies is measure by ROA. The companies providing innovative product utilizing responsiveness strategy and the companies emphasizing on efficiency strategy while producing functional products are grouped as matching group. All the other companies that are not following the [6] model grouped as mismatching group. The mean value of profitability of both groups are compared and presented in table 5.

Table 5. Chi-Square Test for Profitability Comparison

Chi-square	1.854
Df	**2**
Sig.	**0.00**

The Chi square results revealed that Organizations with match among the nature of product and supply chain strategy will lead to superior profitability as compare to organizations with mismatch.

The findings of the current study can be useful for the supply chain operations of the manufacturing firms. The results of the study can also be used in the countries with similar economic and social conditions. The research also tried to provide deeper and rich insight for the policy makers for devising effective supply chain strategies taking into account the nature of product. Moreover, the findings of the research will be contributing to the existing body of knowledge in the area of supply chain strategies operating in manufacturing sector.

Future research studies can be undertaken using longitudinal study mode to explore the relationship over longer period of time and assess if there is any variation or similar relationship also exist if time interval is applied.

4. Conclusion

The study was aimed at exploring the possible correlations between the nature of the product and respective supply chain strategy. The present study tried to explore this relationship in the manufacturing firms operating in Pakistan, the review of literature suggests that this is the under-research phenomena. In the context of present study, this will be one of the evident of the significance of the present study. The results of present study confirmed that there exists a positive relationship between nature of product and respective supply chain strategy among manufacturing firms operating in Pakistan. The data for current study was collected from Pakistan, which is war torn country and is classified as developing country; therefore, the findings of the study can be further investigated and verified through replication of the same model in countries with similar socio-economic conditions. It is also expected that different findings can be drawn if the same model is applied to different context in terms of socio economic conditions, which would obviously be adding contextual knowledge on the area of the nature of the product and respective supply chain strategy.

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