South Asian Journal of Operations and Logistics
2024 Vol. 3, No. 2, pp. 180-197
DOI: 10.57044/SAJOL.2024.3.2.2437

Enabling supply chain agility through process integration and flexibility for operational performance

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Article History

Received: March 10 2023
Revised: February 20 2024

JEL Classification
R41
Q56
G14

ABSTRACT

This research is based on the emphasis on undergoing processes which, if corrected, will help companies perform much better, achieve more, and be effective in most of their operations as suppliers. This study is conducted. This study focuses on improving firms' ability to excel in their supply chain processes; it is necessary to investigate the influential components of process integration, flexibility of supply line and dynamic view of products on supply chain agility and how these components impact the firm's effectiveness. Survey data from a sample of supply chain managers working only on emphasising supply line performance enhancement. These findings show that a flexible supply line with a mixture of dynamic products is a mediator that draws the effects of the firm's PI and supply chain agility. Moreover, this automatically influences the firm's business performance. Moreover, the firm's overall framework is competent, yet it needs to be consistently effective regarding the complex structure of its goods for sale. This nature of a firm's framework usually impedes the effect of a flexible supply line on supply chain agility. However, on the other hand, it adds details about the impact of PI on supply chain agility. Other conditionally implemented indirect effects show that the indirect effect of PI on supply chain agility, given the flexible supply line, proves to be vigorous when a complex product mix is identified. This study will be a guide to emerging economies, leading the idea towards supply chain managers to improve their performance in the shape of their competent framework to stabilize their market worth.

Keywords: *Process compliance, Supply chain agility, Supply side dependency, Demand side dependency, Operational performance, Quantitative research*

Citation of this article:

Rahim, J. (2024). Enabling supply chain agility through process integration and flexibility for operational performance. *South Asian Journal of Operations and Logistics*, *3*(2), 180-197. https://doi.org/10.57044/SAJOL.2024.3.2.2437

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1. Introduction

When distinguishing firms based on supply line performance and the long-term reliability of a company, the only constant factor is the variability of the environment (Lee, 2004; Rashid et al., 2024a). This environment never stabilizes and continuously changes, prompting firms to analyze ongoing processes and anticipate upcoming threats and challenges. These changes may include shifts in consumer demands and needs and transformations in supply line processes (Albhirat et al., 2024; Wagner & Silveira-Camargos, 2012). In this context, the agility of a supply line can be defined as the company's ability to adapt and respond smoothly to any changes in the environment by engaging with suppliers and communicating effectively with customers (Braunscheidel & Suresh, 2009). Moreover, beyond merely reacting to changes, firms should proactively identify critical points to maintain effectiveness and preserve the quality standards they have upheld.

Against these combined effects and processes, the significance of supply line agility with environmental transformation is further investigated to call upon any other means of handling changes to achieve the best outcome in the surrounding changes (Lee, 2004). Keeping in mind the findings related to the benefits of supply chain agility, the predecessors of supply chain agility remain hidden (Rashid et al., 2024b; Swafford et al., 2006). Only the concepts driven by the influences may support the methods. Since the importance of the supply chain keeps increasing with the transformations mentioned above related to the environment, it also increases the vitality of the study (Ismail et al., 2007). All the efforts made in the study contribute to enhancing the theory development and practical path of the research. It complies in two ways.

In the top order, we make sure what we think of the two undergoing terms that lead to the disasters in any supply line: the supply chain competence and the consumer demand. These are related to the external environments that may affect them. Secondly, we look for the company's skills and proficiencies in the management line, which are the activities related to the supply chain process and the firm's capability to react to the changes. Both aspects are crucially important because the firms keep increasing their processes to rely on their supply chain in context to their availability in the market and meet consumer demands (Choi & Krause, 2006). These effectual capabilities postulate the effectiveness of both the ideas, either internal or external, and influence the performance ability of a firm. The firm's supply agility is always influenced by these models of internal and external change handling traits and makes the firm comparatively strong regarding supply performance.

1.1 Problem Statement

Many researchers argued on the variance of a firm's operational performance depending on its demand and supply side dependency. However, anything that was set to be not changing and continuously affecting the performance were environmental factors (Lee, 2004). Ismail et al. (2007) contribute that with the transformation of environmental factors, the significance of variance in operational performance also increases. With these affecting and relying factors, we need to understand the critical factors that balance the variation within the relationship and also manage to overcome barriers to improving performance. Braunscheidel and Suresh (2009) explain the agile supply line as a firm's strength to maintain a balanced and more rigid tie with their suppliers and customers to tackle any of the market's emerging transformations. Now that the external variations have been studied, we analyze an internally affecting factor that can be an essential stroke on the firm's supply line: in-house management. This comprises employees and management staff to take control over the production and supply processes, and only the smooth and effective processes work beneficially for optimal level results (Collin & Lorenzin, 2006). These internal and external forces are joint in many FMCG organizations and follow their daily operations by sticking to every department. However, every organization stands a chance of improvement with their operational processes and dependency on

onward predictions.

1.2 Research Objectives

With the help of these concepts and contextual beliefs, we relate the firm's performance to be vital in cost management, meeting the consumer needs with the right quality and in time, their way of reaction in different transformations to the environment and their accessibility to the market (Beamon, 1999; Rashid & Rasheed, 2023). When it comes to the disagreement that the supply line of the firm matches its resources to the changes in the market and helps out the efforts that make it competitive throughout the market, it remains positive. To study the focus of supply chain agility as an essential role, we stress the importance of the relationship that acts as a mediator between consumer demand and supply competence comparatively and performance. Moreover, we assess the eventuality of the compliance process as a moderating relationship between the two aspects: supply chain agility and supply/demand competence. We define the compliance process as the exact match to the supply chain processes: the management used to distribute the goods and the accurate production according to the demand. With our reasoning against this theory, we portray that the exact match of thinking must be standardized to be competitive and effective through the supply line. Moreover, this will be possible in the presence of verified and compliance-based processes to be checked upon any environmental change.

1.3 Research Questions

1. *How does variation in supply-side dependency take hold of operational performance?*
2. *How does variation in demand-side dependency affect operational performance?*
3. *What is the significance of supply chain agility in the relationship between supply-side dependency and operational performance?*
4. *How does supply chain agility drive the relationship between demand-side dependency and operational performance?*
5. *How does process compliance arbitrate the effect of supply-side dependency on operational performance?*
6. *How does process compliance arbitrate the effect of demand-side dependency on operational performance?*

1.4 Purpose of the Study

This study aims to identify the internal and external factors that affect the firm's supply line and automatically result in their outcome. In Pakistan, the FMCG industry is precious in terms of market share. However, it is also found to be a competent and challenging industry because it is dependent on consumer satisfaction and buying power. Consumer satisfaction and their willingness to trust the product are directly related to their loyalty towards the brand (Akbar & Parvez, 2009). Not only the effectiveness but also the values provided to the consumer are worth debating. Since the competition and quality of the product are making the sector compete internally, another distribution process has also taken place where, instead of production, companies move towards the imports of canned and premanufactured goods by alternatively guaranteeing the quality and eliminating the chances of inefficiency. Li and Xu (2008) explain that customer satisfaction also lies in the queue, with customer loyalty working alongside and driving the purchasing decision. This study finds the lacking areas in FMCG Industries and the ways of improvement to get the optimal production and supply of goods from the supplier to the customer and provide satisfying effects afterwards.

1.5 Significance of the Study

This study focuses on the system structure FMCG industries use most commonly according to their business modules and finding the gaps within their process flow. We will further investigate the effect of two factors: (1) Supply-side dependency and (2) Demand-side dependency on a firm's operational performance to connect to its customers. Furthermore, we will discuss the significance of their active supply chain ability to connect to the link between their supplier and the customer while being the manufacturer or distributor. Since these factors, hidden or in the image, are interrelated

according to the theoretical forms, they are also practically involved in the firm's practical operations. We move towards the study's findings, which will theoretically and practically prove important in improving the firm's supply line and effective performance outcomes.

1.6 Outline of the Study

This report consists of several key terms to be experienced and explored throughout the study, mainly (1) Supply-side dependency based on the firm's link with the supplier to get the product or the raw material for their production or distribution. (2) Demand side dependency: It is based on consumer needs and their demand for the product. (3) Supply chain agility is the company's ability to act upon upcoming challenges in the internal or external environment. (4) Process compliance that relates to the in-house teams and management system to make the processes effective and going in the flow, and finally (5) Operational performance in which the company evaluates the result of their tip-to-toe processes in reaching the final product and generating revenue. All these terms are interlinked with their relevance towards one another and will be studied individually and rationally to get the desired outcome.

1.7 Definition of Key Terms

Supply-side dependency relies on firms' supplier-based activities and management strategies to improve the bridge between supplier and production management (Choi & Krause, 2006).

Demand side dependency: Demand side dependency stands to be the potential of an organization to manage preceding components of consumer demand-related outlook and focus on the relationship between demand and production management (Choi & Krause, 2006).

Supply chain agility: A constant reaction to change and continuous adaptation of new strategies to cope with the environment based on demands and supplies, as well as transformation in external environments in a company (Wagner & Silveira-Camargos, 2012).

Performance compliance: Process compliance is defined as the effective following of the supply line, that is, the management and the production process with perfection to moderate the relationship between supply side and demand side competency (Blome et al., 2013)

Operational performance: Operational performance is defined as the mix of several supply chain components that portray the influence of these significant factors on a firm's supply line. These can be the activity cost, effective customer service to be on time and with quality and most notably with the effect of supply chain agility (Beamon, 1999l; Rashid & Rasheed, 2024).

2. Literature Review

2.1 Supply Chain Agility

Since the significance of supply chain agility has been identified, there has also been an increase in studies related to production and supply chain management research to enhance the systems and performance of the organization. The most common focus of studies related to supply chain agility is the manufacturing process, which is the most turned-up tool for being competitive. Narasimhan et al. (2006) show agility as similar to the narrow neck of processes. Ismail et al. (2007) contribute to supply chain agility by stating it to be a strong bond for customer attraction strategy. Moreover, he finds supply chain agility to be acting as a resilient factor in small companies that are based on manufacturing. Studies have always emphasized supply chain agility, a widely known business skill that stabilises the company according to changing market conditions. It encompasses the structure of the organization, its processes, and its working attitude, which refers to flexibility and responsiveness. This concludes the supply chain's ability to go beyond a single company and includes its connection with its relying suppliers and customers. Swafford et al. (2006) and Braunscheidel and Suresh (2009) have added their recent research to this area. They further investigate the venture of a flexible supply chain and their process integration with the firm's inner circle. Both authors emphasize the significance of agility-based agility-based supply chains in research research and highlight the existing studies. Following these findings, we stress the upcoming conclusions on supply chain agility while reviewing the empirical research. Vinodh et al. (2011) decided to back the agility evaluation using association rules mining and designed the agility index measurement to dig in the data.

2.1.1 The Resource-Based View (RBV) of the firm and the dynamic capabilities perspective

We developed arguments based on defined theories rooted in the firm's RBV that supplement their perspectives on supply chain agility. An assumption that RBV is grounded in the firms is to be examined regarding their prominent resources (Hashmi et al., 2020a). If we characterize these resources as precious, uncommon, and constant, we can classify them as empowering the firm's capability and competitiveness. RBV has often been considered by various business management scholars and cited in recent articles (Armstrong & Shimizu, 2007; Narasimhan, 2006; Hashmi et al., 2021a; 2021b). Many renowned researchers and well-known articles continue to utilize RBV's popularity in their studies on production and supply chain capabilities. Hsu et al. (2011) utilized RBV's framework to integrate supply chain competence with strategies and performance. Yeung et al. (2007) examined organizational learning, innovation, and performance from the perspective of RBV. The initial study of RBV opposed resource diversification, with subsequent research focusing on their configuration (Eisenhardt & Martin, 2019). Consequently, more than simply having diverse resources may be necessary to impact competitive advantage; instead, these resources produced, designed, and utilized might make a difference, resulting in competitive differentiation (Allred et al., 2011). This realization led to the concept of dynamic capabilities (Teece, 2007), defined as "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (Teece, 1997, p. 516), which include “difficult-to-replicate” enterprise capabilities required to address rapidly changing environments" (Teece, 1997, p. 516). Harnessing these effective traits to configure the recovery of the supply chain and leveraging their potential in this transformative environment can offer significant advantages and enhance firms' competitiveness.

2.2 Hypothesis Development

The commencement towards developing our research model has been possible through thorough research using theories and literature based on supply chain agility. We set a hypothesis showing the link between supply and demand dependencies with supply chain agility and predicting its effect on the organization's operational performance. Keeping this link in contact, followed by our presumption, we observe that supply chain agility proves to be a mediating component in this connection. Based on these significant assumptions, we conclude that the moderating hypothesis suggests process compliance by enhancing the link between supply and demand dependency and supply

chain agility.

2.2.1 Linking supply and demand dependency to supply chain agility

Under consideration that our critical assets for the augmentation of supply chain agility are both supply side and demand side dependencies prove to be leading components in competitiveness. According to the path followed in strategic management literature, we can enormously distinguish between being capable with the processes and show that capabilities have stood higher than competencies based on supply and demand. The primary difference that stands out as a differentiating driver is that the competencies usually focus on internal factors, whereas capabilities focus on externally driven environments. Going deep into the definitions, it is idealized that the competency factor is limited to some access in the supply chain area; however, if we talk about the capabilities, they are described as connected broadly and visible externally in the entire supply chain. Keeping these separators in mind, we state supply and demand dependencies as part of internal matters or competency and on the other hand, supply chain agility is portrayed as a centre of focus that shows the impact on supply and demand dependency. In other words, the foundation of the capability of supply chain agility is based on the servings of supply and demand side dependency.

In the current economic and environmental landscape, the significance of both supply and demand sides cannot be overstated, as they wield immense influence over supply chain processes. Competency and adaptation within the framework are heightened as firms increasingly rely on their supply chain partners and respond to customer-driven forces. Analyzing these shifts resulting from changing trends and market requirements, a strengthening bond exists between the outsourcing structure and the supply chain's optimization (Handfield et al., 2009; Choi & Krause, 2006). Supply chains spanning different countries or continents have compounded logistics complexities, making them more susceptible to disruptions (Lee, 2004). In March 2011, a massive earthquake followed by a tsunami struck Japan, leading to significant supply chain disruptions and plant shutdowns reliant on Japanese goods (BBC, 2011).

Having thoroughly examined the complexity on the supply side, we turn our attention to demand dependency, where customers are becoming increasingly discerning (Nguyen et al., 2011). Product lifecycles have shortened due to the rapid pace of innovation, and firms are striving to reach target markets more swiftly through various online platforms, addressing significant issues as they arise (Kietzmann et al., 2011). A comprehensive study detailing the factors that underscore the significance of supply chain agility is provided by Vinodh et al. (2011), laying the groundwork for further research. In conclusion, the demands of both supply and demand sides play a crucial role in shaping today's market landscape, necessitating a continuous development of capabilities and effectiveness in responding to such transformations. However, previous research in this area suggests that while supply chain agility is integral, it is crucial to focus on other aspects of supply and demand dependencies (Shaw et al., 2005).

Therefore, we come across the statement that both the supply and demand side competencies are required to ironically respond to the undetermined environmental changes and be the creators of these widely spread capabilities under RBV. In given circumstances and dependencies, firms should react to market developments. Dependencies must be portrayed in diverse motions to react to these transformations effectively. A statement by Day (1994) shows that these capabilities comprise an interconnected set of proficiencies and theoretically correct literature that is run throughout an organisation's operational processes, enabling the firms to utilize their supply-based functions and making significant to their assets as a successful factor. Moreover, he defines capabilities as the attracting factors that bring all these assets and operations related to them close to performing their operations effectively and effectively. These statements explain that chain agility is a diverse capability that subsumes the antecedents of supply, said supply-side said demand-side to portray our first hypothesis.

H1a: Supply dependency has a positive impact on supply chain agility.

H1b: Demand-side dependency has a positive impact on supply chain agility.

2.2.2 Linking supply chain agility to operational performance

We situated supply chain agility as a unique capacity that enhances the successful match of assets to advertise changes. This ability should help a company's endeavours to take advantage of lucky breaks or kill dangers from fierce conditions (Van Hoek et al., 2001), at last prompting the accomplishment or upkeep of a severe position (Teece et al., 1997; Eisenhardt & Martin, 2019). All the more explicitly, hierarchical abilities can incite practical upper hand to the extent that (1) they are not tradable in essential element markets, (2) they consume a large chunk of the day to create, are generally based and way reliant, and (3) they involve socially complex associations with other authoritative assets (Barney, 1991). We accept inventory network readiness as having these attributes and addressing a particular asset base (Allred et al., 2011). In particular, an association's production network nimbleness is the best bet attractive; in view of the association's particular organic market side abilities, the nimbleness has, along these lines, advanced over a broadened timeframe and constantly includes connections to both vertical and descending production network substances (with which nimbleness can be accomplished). This would comprise dexterity as an essential asset under the RBV, and hence, the upper hand ought to be proven in our setting by more noteworthy degrees of functional execution. Besides, considering such violent occasions as we have as of late saw, dexterity should empower firms to respond all the more successfully to store network disturbances radiating from this climate. While disturbances restricted on schedule, expansiveness, and extension might be cushioned by security stock, interruptions more extensive in degree might bring about creation stops that could be avoided by a spry production network, eventually adding to enhanced production network costs. The significance of such capacity is stressed since production network interruptions have been displayed to address a significant cost factor for firms (Hendricks & Singhal, 2005).

Moreover, while store network dexterity might have the option to contribute to execution by a more robust reaction to outer stockpile disturbances, it may likewise have the option to give enormous advantages to the inner activities of the firm. For instance, change requests or plan alterations, as a reaction to inward orders, can be all the more viably cultivated. As of late, Vinodh et al. (2011) gave a thorough inventory of the advantages of assembling nimbleness, having the option to yield an assortment of execution results, including more prominent expense, quality and conveyance execution (Rasheed & Rashid, 2023). Having fostered our contentions along comparable lines, we theorize the positive effect of production network nimbleness on functional execution with this hypothesis.

H2: Supply chain agility has a positive impact on operational performance.

2.2.3 The mediating effect of supply chain agility

Incorporating the RBV with the unique capacities viewpoint, we propose that organic market side skills are the resources or assets expected to assemble the ability of store network spryness. This returns to the thought that having heterogeneous assets is not adequate anymore, yet how they are arranged and used also matters (Barney, 1991). This is additionally validated by the truth that store network dexterity can be considered a higher-request ability 'obtained from coordinating lower-request abilities and assets (Vickery et al., 2010). These higher-request capacities make assets much harder to impersonate than lower-request abilities (Grant, 1996). For instance, Vickery et al. (2010) tried the intervening job of deftness in connecting predecessors (production network data innovation and store network authoritative drives) and firm execution.

Additionally, deftness was set as an arbiter in Swafford et al. (2008), connecting the impact of data innovation incorporation to serious business execution. Likewise, since almost every industry, including the assembling and retail areas, faces dynamic conditions and unexpected changes, more than store network skills are needed to yield the best functional execution. Therefore, developing this capability, with market-side expertise, serves as its building blocks. Only when these abilities are transformed into skills can they contribute most effectively to the firm's operational success (Rashid &

Amirah, 2017; Swafford et al., 2008).

Given that both supply-side and demand-side dependencies are crucial for success in supply chain management, the intervening impact of supply chain readiness may vary in size across the two intervention models. Supply chain agility might be more beneficial for one capability than the other in translating its benefits into operational performance. Specifically, while companies are becoming increasingly aware of upstream supply chain disruptions, the customer or demand side plays a significant role in a company's profitability, as the final customer makes purchases and is the firm's primary focus. Building on these previously proposed theories, we emphasize that supply chain agility is a crucial driver for the firm's operational efficiency and ability to mitigate adverse impacts. We issue official statements:

H3a: Supply chain agility acts as a mediator to the effect of supply-side dependency on operational performance

H3b: Supply chain agility acts as a mediator to the effect of demand-side dependency on operational performance.

H3c: Supply chain agility acts as a mediator to the effect of demand-side dependency on operational performance more than the effect of supply-side dependency.

2.2.4 The moderating effect of process compliance

In the last set of hypotheses, we consider the importance of process infrastructure and the appropriate adherence to it by the firm's employees. Collin and Lorenzin (2006) note that 'supply chain agility does not just happen'. The underlying notion is here that it is more than the mere existence of beneficial competencies; they also need to have the proper infrastructure and foundation in order to be able to be most effective. Process compliance assesses how well supply chain management processes are internally executed by the firm's employees. The processes implemented are presumed to be effective and valid and to represent optimized approaches for dealing with supply, production, demand and distribution aspects of the firm's supply chain operations; complying with established processes should thus enhance the transformation of supply- and demand-side competence into supply chain agility.

According to a hypothetical viewpoint, we view process consistency as the vehicle, establishment, or framework with which market interest side skill is most viably formed and sent into inventory network spryness. Expanding the Resource-Based View (RBV) focusing on powerful capacities and process consistency provides structure and guidance in transforming static assets (organizational skills on the market side) into supply chain agility. Related process-oriented literature provides support for this idea. Therefore, distinct and controlled processes are deemed essential for enhancing supply chain capabilities and a firm's performance, as demonstrated both on the demand side (Croxton et al., 2002) and the supply side (Gonzalez-Benito, 2007; Rashid et al., 2022a). For the model, Bendoly and Schoenherr (2005) showed in their review not just the positive item advantages of having executed an ERP framework, but they likewise delineated the massive effect of cycle benefits, gotten from the ERP execution on firm execution. Process compliance can be advantageous on an assortment of occasions. For instance, if there should be an occurrence of unexpected changes (for example, a production network disturbance), process consistency might empower quicker responses. In that capacity, rather than being diverted by the executives of the current cycles (which may be running admirably) in such a compelled circumstance, the firm can zero in straightforwardly on the most proficient method to react to the disturbance and foundation the fundamental changes. Inside this unique circumstance, process consistency can let loose assets that can be better utilized for the foundation of store network readiness and its usage to react to store network interruptions.

The valuable guiding effect of process consistency can also be observed from a theoretical perspective of information processing (Baloch & Rashid, 2022; Tushman & Nadler, 1978). Within our

context, information processing theory can explain organizational behaviour "in terms of information that needs to be gathered, interpreted, integrated, and coordinated in the context of direction" (Burns & Wholey, 1993; Hashmi, 2022). Since such behaviour is generally constrained by limited objectivity, managers typically apply legal rules, procedures, organizational structures, and other information processing methods (Galbraith, 1973; Rashid, 2016). This is precisely where our process consistency constructs tap into this domain. Therefore, process consistency provides the linkages through which organizational capability can be most effectively internalized, and the benefits can be most directly realized. In this vein, parallels can be drawn to absorptive capacity. Within this framework, process consistency can be considered a means to effectively assimilate (perceive, assess, assimilate, and apply) aspects of organizational capability for an enhanced impact on supply chain agility (Cohen & Levinthal, 2020). Along similar lines, following processes can also yield a greater sense of 'shared meaning' (Hult et al., 2004; Hashmi, 2023) and better internal coordination (Hillebrand & Biemans, 2003; Rashid et al., 2022b).

Similarly, with greater process consistency, relevant information can be directed most effectively and efficiently to the most appropriate internal constituents, where opportunities are more likely to be recognized, and deeper meaning can be generated (Narasimhan et al., 2006). Information technologies, such as enterprise resource planning systems, which promote greater process consistency, exemplify these patterns (Bendoly & Schoenherr, 2005). Even though it moreover has been shown that excessively inflexible or obsolete cycles may make firms more compelled (Gilbert, 2005; Rashid et al., 2019), we view process consistency as a significant empowering influence for the advancement of store network spryness from both stockpile and request side ability, given our above hypothetical contentions more officially:

H4a: Process compliance moderates supply-side dependency and supply-chain agility that works better under more excellent services of process compliance.

H4b: Process compliance moderates demand side dependency and supply chain agility, which works better under more excellent services of process compliance.

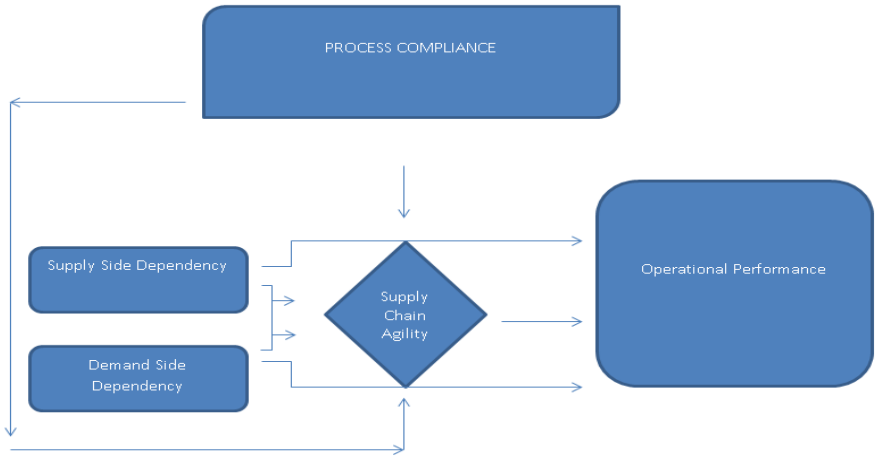

Figure 1: Framework of research

Source: Literature

3. Research Methodology

Amid the philosophical basis, research methodology is a patch to retain methods of data collection to analyze the collected data out of the two ways of data collection are Qualitative and Quantitative (Alrazehi et al., 2021; Agha et al., 2021; Hashmi & Mohd, 2020). Following Khan et al. (2021; 2022), the quantitative research approach is used to collect data, and further to analyze the

collected data, an inductive approach is used. Moreover, qualitative research can have trustworthiness issues. Therefore, the quantitative research was deemed appropriate (Haq et al., 2023). Since we use a quantitative research approach, we use a correlational research design to get the strengths using complex variables and their effect on one another (Haque et al., 2021). To access the target population, we have to reach for relevant employees of the FMCG Industry who are easily accessible and their effective responses to be recorded. For this study, we will go for employees of FMCG companies who interact with such factors dealing with their operational performance to keep the authenticity of our findings valid and up to the mark. For an unknown population, following Das et al. (2021) and later Rashid et al. (2023), the sample size that will be considered best is 384 for optimal results. The non-probability convenience sampling technique will be used for accessible employees in relevant industries (Rashid et al., 2021; Rashid & Rasheed, 2022). The data will be collected through a questionnaire survey to get authentic data from exclusively relevant respondents of the FMCG industry to save time and discrepancies. A 5-point Likert scale with responses "Strongly Disagree" and "Strongly Agree" will be used to analyze the primarily collected data through a questionnaire survey.

4. Data Analysis

A total of 150 questionnaires were spread out, of which 148 participants responded, and as you can see in Table 1, males, 106 (71.6%), and 42 (28.4%) were females, portraying that most of the respondents were male. Of these 148 participants, 39% were under the age bracket of (31-40). However, age groups (21-40) and (41-50) had almost the same number of respondents, 24% and 29.3%, respectively. Only 6% of the participants were aged above 50. On educational grounds, the majority of the participants that is 61.3%, were holding Master's; however, the other 36.7% were graduates, and the other 0.7% were intermediate. On the basis of their positions, a majority of 52.7% were executives, followed by 23.6% as senior executives and 13.5% as Assistant Managers, whereas only 3.3% were counted as heads of the departments.

Table 1: Demographic characteristics of the participants

Sample Characteristics		n	% age	cumulative % age
	Gender			
	Male	106	70.7	71.6
	Female	42	28.0	100.0
	Total	148	98.7	100.0
	Missing	2	1.3	
	Age			
	21 - 30	36	24.0	24.3
	31 - 40	59	39.3	64.2
	41 - 50	44	29.3	93.9
	Above 50	9	6.0	100.0
	Total	148	98.7	
	Missing	2	1.3	
	Education			
	Graduate	55	36.7	37.2
	Masters	92	61.3	99.3
	Intermediate	1	.7	100.0
	Total	148	98.7	
	Missing	2	1.3	
	Position			
	Executive	78	52.7	13.5
	Sr. Executive	35	23.6	35.1
	Assistant Manager	20	13.5	58.1
	Manager	10	6.7	81.1
	Head of Department	5	3.3	100.0
	Total	148	98.7	
	Missing	2	1.3	
Total		150	100.0	
	Note: N=148			

Source: SPSS output

The KMO value in Table 2 above is 0.822, which is greater than 0.7 with the sig. The value is also less than 0.5, allowing us to perform factor analysis for data (Hashmi et al., 2020b).

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.822
Bartlett's Test of Sphericity	
Approx. Chi-Square	719.995
df	210
Sig.	.000

Source: SPSS output

Table 3 shows that the questions taken against the respective variables in the questionnaire are part of those respective variables, and their results are significant towards the study.

Table 3: Rotated component matrix for factor analysis

	Component				
	1	2	3	4	5
SSD-1	.753				
SSD -2	.746				
SSD -3	.737				
SSD -4	.686				
DSD -1		.817			
DSD -2		.724			
DSD -3		.698			
DSD -4		.702			
PC -1			.678		
PC -2			.683		
PC -3	.		.759		
PC -4			.797		
SCA-1				.841	
SCA-2				.733	
SCA-3				.673	
SCA-4				.863	
SCA-5				.699	
OP -1					.721
OP -2					.634
OP -3					.612
OP -4					.819

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 23 iterations.

Source: SPSS output

The Cronbach's Alpha value, as per Table 4 above, is 0.753, which is greater than 0.7, showing that the reliability of the questionnaire is reasonable to proceed with the validation of the data (Khan et al., 2023a; 2023b; Rashid et al., 2020).

Table 4: Cumulative reliability statistics

	Cronbach's Alpha	N
All Variables	.753	21

Note: N= 21

Source: SPSS output

As per Table 5, Cronbach's alpha values of all the variables are 0.751, 0.709, 0.757, 0.801, and 0.802. They are respectively greater than 0.7, indicating that the reliability of the questions and data is suitable for data collection (Rashid et al., 2023).

Table 5: Individual reliability statistics

	Cronbach's Alpha	N
Supply Side Dependency	.751	4

Demand Side Dependency		
	.709	4
Process Compliance		
	.757	4
Supply Chain Agility		
	.801	5
Operational Performance		
	.802	4

Source: SPSS output

Correlation analysis in Table 6 shows that the Operational performance (Correlation coefficient value 0.584, 0.592, 0.621, and 0.684) positively and significantly impacts (sig value less than 0.05) supply-side dependence, demand-side dependence, process compliance, and supply chain agility.

Table 6: Pearson correlation

	SSD	DSD	PC	SCA	OP
SSD					
Pearson Correlation	1	.578**	.552**	.612**	.549**
Sig. (2-tailed)		.000	.000	.000	.000
N	148	148	148	148	148
DSD					
Pearson Correlation	.578**	1	.510**	.518**	.563**
Sig. (2-tailed)	.000		.000	.000	.000
N	148	148	148	148	148
PC					
Pearson Correlation	.552**	.510**	1	.645**	.621**
Sig. (2-tailed)	.000	.000		.000	.000
N	148	148	148	148	148
SCA					
Pearson Correlation	.612**	.518**	.645**	1	.635**
Sig. (2-tailed)	.000	.000	.000		
N	148	148	148	148	148
OP					
Pearson Correlation	.549**	.563**	.621**	.635**	1
Sig. (2-tailed)	.000	.000	.000	.000	
N	148	148	148	148	148

**. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS output

Model summary in Table 7 defines that Operational performance explained 52% (adjusted R^2 = 0.520) of variance in supply-side dependence, demand-side dependence, process compliance and supply-chain agility.

Table 7: Model Summary

Model	R	R^2	Adj R^2	Std. Error of the Estimate
1	.721[a]	.520	.510	.39658

a. Predictors: (Constant), SUPPLY_SIDE_ DEPENDENCE, DEMAND_SIDE_DEPENDENCE, PROCESS_COMPLIANCE, SUPPLY_CHAIN_AGILITY

Source: SPSS output

As you can see in Tables 8 and 9, the sig values of all three variables are less than 0., indicating that all four variables aimpactperational performance.

Table 8: Analysis of Variance

	Sum of Squares	df	Mean Square	F	Sig.
Model					
Regression	24.554	3	8.185	52.039	.000[a]
Residual	22.648	144	.157		
Total	47.202	147			

a. Predictors: (Constant), SUPPLY_SIDE_DEPENDENCE, DEMAND_SIDE_DEPENDENCE, PROCESS_COMPLIANCE, SUPPLY_CHAIN_AGILITY

Source: SPSS output

Table 9: Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
Model					
Supply_side_dependence	.328	.080	.313	4.115	.000
Demand_side_dependence	.134	.076	.130	1.762	.000
Process_compliance	.448	.080	.406	5.625	.000
Process_compliance	.432	.073	.398	4.821	.000
a. Dependent Variable: SCM_Performance					

Source: SPSS output

5. Conclusion, Discussions, Implications and Limitations

The study's objective was to inquire about the effects of supply-side dependency and demand-side dependency amid the presence of Process Compliance and Supply chain agility on Operational Performance, specifically towards FMCG organizations. 280 questionnaires were spread out, and we obtained 148 responses. The collected data was analyzed through KMO and Bartlett's test, descriptive correlation and regression analysis. It was found that Process Compliance and Supply chain agility affected the industry's Operational performance as it relied on the companies' supply and demand side dependency. The research concluded that the company's dependence on suppliers and consumer demands was significant to reaching the desired Operational performance in the presence of mediators and moderators.

With the help of this research and its results, we verify that process compliance is one of the most significant carriers of supply chain agility relative to supply chain flexibility that comprises the supply and demand side dependency. It also validates that process compliance is crucial for acquiring supply chain agility. When organizations put more effort into calculating and eliminating errors in their processes, they achieve a flexible supply line that automatically leads towards good operational performance. FMCG products, specifically in the line of imported goods, are found to be critically dependent on the excellence of the supply chain. This supply chain has numerous systematic and standardized traits connected to one another in every process while the consignment flows. Each link must be complied with perfectly and with more significant effort to keep the chain flowing, which is also when the product line is complex. In addition, supply chain flexibility, comprised of supply and demand side dependency, is connected to the supply chain agility to reach the desired results and stability of the chain. Each factor must be critically handled from the root to the crown. Either one of these falls apart; it takes down the tree. With the help of our findings, we support our discussion that process compliance and supply chain agility positively moderate the effect of supply chain flexibility on operational performance. In the FMCG industry, the product carriage from the origin to the consumer makes the supply line complex. With the help of Process compliance and an agile supply chain, organizations move toward step-by-step problem-solving in order to achieve desired operational performance.

The research findings highlighted the evidence that a robust process compliance structure and flexible supply line contribute towards ease in complex supply lines carrying a load of demand and supply of the product mix according to the market. Due to problematic global situations, process compliance, supply chain agility, and supply flexibility are dynamic capabilities that help the organization achieve its maximum outcome. Organizations in this highly technology-based world are leaner towards outsourcing their supply chain, where suddenly appearing problems are dealt with by professionally equipped departments and solved within the time limit for the organization. This helps the organizations save time and workforce instead of specifically deploying individuals to look after these problems. They are putting more effort into considering several windows to be opened for the products to be sustained in the market rather than carrying loads of supply chain issues and new discoveries. Lastly, the study was limited to the employees working for the supply chain departments

of FMCG companies and their supply chain processes. Furthermore, limited responses were recorded due to the unavailability of being physically present.

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