The Impact of Demand Planning Processes on Supply Chain Performance: A Field Study in Fast-Moving Consumer Goods Industries in Jordan

أثر عمليات تخطيط الطلب على أداء سلسلة التوريد: دراسة ميدانية في صناعات السلع الاستهلاكية في الأردن

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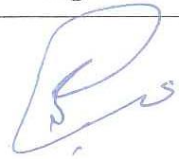
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Dedication

This thesis is devoted to my family, who consistently provided love and support throughout my academic adventure. I extend special appreciation to my mother, whose belief in me and sacrifices have played a crucial role in my achievements, and to my siblings, who have been a constant source of inspiration.

I am thankful to my friends and mentors for their unwavering support and guidance. The creation of this thesis represents the collaborative efforts and shared belief of all those who have been involved in my academic journey.

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The Impact of Demand Planning Processes on Supply Chain Performance

A Field Study in Fast-Moving Consumer Goods Industries / Jordan

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Abstract

This study explores the impact of demand planning processes, including demand forecasting, Sales and Operations Planning, and demand collaboration, on supply chain performance within Jordan's Fast-Moving Consumer Goods (FMCG) industries. Through a quantitative approach, 679 participants in the Jordanian FMCG sector were surveyed, and statistical analyses, including descriptive statistics and correlation tests, were conducted to examine variable relationships. The study revealed strong positive correlations between demand planning processes and supply chain performance, specifically impacting inventory control, supply chain agility, and customer satisfaction.

The findings indicate a moderate implementation level of demand planning processes and supply chain performance dimensions in Jordan's FMCG sector. This suggests a composed approach in the industry, and organizations can leverage study insights for strategic improvements, such as implementing collaboration platforms, investing in forecasting technologies, fostering cross-functional collaboration, strategic inventory management, enhancing agility, and proactively addressing customer satisfaction. These actions aim to fortify supply chain dynamics for improved resilience and sustained customer satisfaction.

Limitations include the study's focus on Jordanian FMCG industries within a limited timeframe, which may limit broad generalizations. Future research is encouraged to consider cross-industry and cross-regional analyses, longitudinal studies, and involve diverse stakeholders. Enhanced data accessibility and a combination of qualitative methods could provide deeper insights into the dynamics of supply chain performance.

The study's distinctive value lies in its focused examination of demand planning processes and their impact on supply chain performance in Jordanian FMCG industries. The empirical findings contribute practical implications, enriching the understanding of supply chain dynamics in this sector, and provide a valuable resource for practitioners, policymakers, and scholars alike.

Keywords: Demand Planning, Demand Collaboration, Demand Forecasting, Supply Chain Performance, Sales, and Operation Planning (S&OP), Inventory Control, Supply Chain Agility, Customer Satisfaction, FMCG Industries.

أثر تخطيط الطلب على تكامل سلسلة التوريد: دراسة ميدانية في صناعات السلع الاستهلاكية في الأردن

اعداد: نجلاء فريد غنايم

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الملخص

تستكشف هذه الدراسة تأثير تخطيط الطلب، بما في ذلك التنبؤ بالطلب، وتخطيط المبيعات والعمليات، والتعاون في الطلب، على تكامل سلسلة التوريد داخل صناعات السلع الاستهلاكية سريعة الحركة في الأردن. من خلال المنهج الكمي، تم مسح 679 مشاركًا في قطاع السلع الاستهلاكية سريعة الحركة الأردني، وتم إجراء التحليلات الإحصائية، بما في ذلك الإحصاءات الوصفية واختبارات الارتباط، لفحص العلاقات المتغيرة. وكشفت الدراسة عن وجود ارتباطات إيجابية قوية بين عمليات تخطيط الطلب وتكامل سلسلة التوريد، مما يؤثر بشكل خاص على مراقبة المخزون، ومرونة سلسلة التوريد، ورضا العملاء.

تشير النتائج إلى مستوى تنفيذ معتدل لعمليات تخطيط الطلب وأبعاد تكامل سلسلة التوريد في قطاع السلع الاستهلاكية سريعة الحركة في الأردن. يشير هذا إلى اتباع نهج متوازن في الصناعة، ويمكن للمؤسسات الاستفادة من رؤى الدراسة لإجراء تحسينات استراتيجية، مثل تنفيذ منصات التعاون، والاستثمار في تقنيات التنبؤ، وتعزيز التعاون بين الوظائف، وإدارة المخزون الاستراتيجي، وتعزيز المرونة، ومعالجة رضا العملاء بشكل استباقي. تهدف هذه الإجراءات إلى تعزيز ديناميكيات سلسلة التوريد لتحسين المرونة ورضا العملاء المستدام.

تم العثور على عمليات تخطيط الطلب الفعالة لتعزيز أداء سلسلة التوريد، مما يؤثر بشكل إيجابي على توافر منتجات السلع الاستهلاكية سريعة الحركة وإمكانية الوصول إليها في السوق. تضمن سلسلة التوريد المحسنة إدارة فعالة للمنتجات، مما قد يفيد المستهلكين من حيث توفر المنتج والتسعير والرضا العام، مما يؤثر بشكل إيجابي على أصحاب المصلحة عبر النظام البيئي لسلسلة التوريد.

تشمل القيود تركيز الدراسة على صناعات السلع الاستهلاكية سريعة الحركة في الأردن ضمن إطار زمني محدود، مما قد يحد من التعميمات الواسعة. يتم تشجيع الأبحاث المستقبلية على النظر في التحليلات الشاملة للصناعات والأقاليم، والدراسات الطولية، وإشراك أصحاب المصلحة المتنوعين. يمكن أن توفر إمكانية الوصول المحسنة إلى البيانات ومجموعة من الأساليب النوعية رؤى أعمق حول ديناميكيات تكامل سلسلة التوريد.

وتكمن القيمة المميزة للدراسة في دراستها المركزة لعمليات تخطيط الطلب وتأثيرها على تكامل سلسلة التوريد في صناعات السلع الاستهلاكية سريعة الحركة في الأردن. تساهم النتائج التجريبية بآثار عملية، مما يثري فهم ديناميكيات سلسلة التوريد في هذا القطاع، ويوفر مصدرًا قيمًا للممارسين وصانعي السياسات والعلماء على حدٍ سواء.

الكلمات المفتاحية: تخطيط الطلب، التنبؤ بالطلب، عمليات تخطيط المبيعات والعمليات، تشارك الطلب، تكامل سلسلة التوريد، التحكم بالخزون، مرونة سلسلة التوريد، رضا العملاء، صناعات السلع الاستهلاكية السريعة.

Chapter One
Introduction

1.1 Background

Efficient supply chain performance is essential for optimizing operations, minimizing costs, and enhancing overall organizational competitiveness (Mofokeng and Chinomona, 2019). Demand planning processes have emerged as a key driver for achieving seamless supply chain performance (Abolghasemi, Gerlachb, and Beh, 2019). By accurately forecasting future demand patterns and aligning them with production and distribution activities, organizations can effectively synchronize their operations, minimize inefficiencies, and enhance overall supply chain performance (Venkatadri, Wang and Srinivasan, 2021).

According to Jackson, Tolujevs, and Kegenbekov (2020), inventory control stands as a key factor in effective supply chain management. By implementing well-executed demand planning processes, organizations can achieve a delicate balance between maintaining optimal inventory levels and meeting customer demands (Tliche, Taghipour, and Depitre, 2020). Accurate demand forecasting, aligned production schedules, and optimized replenishment strategies contribute to enhanced inventory control, reducing holding costs and ensuring products are readily available where and when needed (Abolghasemi, Gerlachb, and Beh, 2019). Customer satisfaction serves as a vital determinant of success within the organization (Wibowo, 2022). Organizations that consistently meet and exceed customer expectations regarding product availability, order fulfillment, and customer service gain a significant competitive advantage (Ahmad, 2022). By employing effective demand planning processes, companies can align their

supply chains with customer demands, resulting in reduced lead times and enhanced order accuracy, leading to heightened levels of customer satisfaction (Nwiyii, et. al. 2022).

According to Venkatadri, Wang, and Srinivasan (2021), supply chain agility has become a critical characteristic of successful organizations. The ability to quickly adapt and respond to market dynamics, emerging trends, and unexpected disruptions is crucial (Bai and Kybernetes 2023). Demand planning processes play a pivotal role in fostering supply chain agility, providing accurate and timely insights into demand patterns according to Butturi, et. al. (2021), this facilitates initiative-taking decision-making, enabling organizations to swiftly adjust production, sourcing, and distribution strategies to maintain optimal supply chain performance in (Sutanto, Harianto, and Balkan, 2022).

The implementation of the S&OP planning method according to Goh and Eldridge (2019) is a crucial dimension of demand planning processes that significantly impacts supply chain performance. Effective S&OP implementation improves coordination and alignment among different functions within the supply chain, contributing to enhanced performance and performance according to Ambrose, et. al.(2016), enables businesses to synchronize their demand and supply planning activities, leading to better responsiveness and efficiency throughout the supply chain according to Goh (2019). Accurate demand forecasting acts as the backbone of effective demand planning Basson, et. al. (2019), enabling informed decision-making production, procurement, and inventory management. Furthermore, nurturing collaborative demand underscores the significance of tight coordination and information exchange among partners in the supply chain, facilitating a collaborative approach to demand planning and contributing to enhanced supply chain performance (Tutuhatunewa, Surachman, and Santoso, 2019). To minimize stockouts, overstocks, and disruptions, supply chain performance is needed according to

Jackson, Tolujevs, and Kegenbekov (2020), it fosters collaboration and information sharing among different stakeholders leading to enhanced visibility and responsiveness (Yea, et. al. 2022). Demand forecasting using S&OP strengthens supply chain performance by enabling companies to meet customer demands, optimize resources, and improve overall operational performance (Bi, et. al. 2022).

In conducting a field study within the FMCG industry in Jordan, this research seeks to provide valuable insights into the significance of demand planning processes in achieving robust supply chain performance. The outcomes of this study are anticipated to contribute to the enhancement of operational efficiency, supply chain agility, and customer satisfaction within the FMCG sector, empowering organizations to strengthen their competitiveness and drive sustainable growth in a dynamic marketplace.

1.2 Study Purposes and Objectives

The purpose of this study is to explore the impact of demand planning processes on supply chain performance within the Fast-Moving Consumer Goods (FMCG) industries in Jordan. Specifically, the investigation delves into the contributions of demand forecasting, Sales and Operations Planning (S&OP), and demand collaboration to the overall performance of the supply chain. The objective is to discern whether these demand planning processes play a significant role in shaping the interconnectedness of various supply chain elements, ultimately influencing inventory control, supply chain agility, and customer satisfaction. The main objectives:

1. To identify the implementation level of demand planning processes across FMCG industries in Jordan.

2. To identify supply chain performance levels in the FMCG industries in Jordan.

3. To identify the relationship between demand planning processes (S&OP, demand forecasting, and demand collaborating) on supply chain performance.

4. To investigate the impact of demand planning processes sub-dimensions (demand forecasting, S&OP, demand collaborating) on supply chain performance within FMCG industries in Jordan.

Furthermore, this study aims to introduce a novel approach for evaluating and enhancing demand planning processes in FMCG organizations in Jordan. The focus is on dimensions such as sales and operation planning (S&OP), demand forecasting and demand collaborating, which are crucial for achieving supply chain performance. By optimizing inventory control, supply chain agility, and customer satisfaction, this research intends to offer practical recommendations to improve the demand planning processes in the FMCG sector in Jordan.

Moreover, this research also aims to contribute to the existing theoretical framework and benefit in supporting future studies and research by deepening the comprehension of the connection between demand planning processes and the associated dimensions of inventory control, customer satisfaction, and supply chain agility within the context of the FMCG industry in Jordan.

1.3 Study Importance

The study could be regarded as one of the forefront investigations exploring the influence of demand planning processes on supply chain performance within the FMCG sector in Jordan, mainly because it holds significance for several reasons. Firstly, It fills a significant knowledge gap by exploring the influence of demand planning processes on achieving supply chain performance, which will contribute to the understanding of how demand planning processes influence the dependent dimensions of inventory control,

supply chain agility, and customer satisfaction, thereby providing insights into enhancing overall supply chain performance in the FMCG sector.

Secondly, the study aims to provide empirical evidence on specific processes, like Sales and Operations Planning (S&OP), demand collaborating, and demand forecasting. By examining the level of implementation of these demand planning processes and studying their relationship with supply chain performance dimensions, the research offers practical insights and guidance for FMCG organizations in Jordan to improve their demand planning processes.

Moreover, the study's novel approach for evaluating and enhancing demand planning processes in FMCG organizations in Jordan, by focusing on dimensions of S&OP, demand forecasting, and demand collaborating offers a unique contribution to the field so we can provide practical recommendations that can directly benefit organizations and enhance their supply chain performance efforts by optimizing inventory control, supply chain agility, and customer satisfaction.

Furthermore, the research holds importance in the academic context. By enhancing the comprehension of the correlation between demand planning processes and the associated dimensions of inventory control, customer satisfaction, and supply chain agility, The study adds to the current theoretical framework. The findings and insights generated by the research can serve as a basis for future studies and research in the field of supply chain management, particularly within the Jordanian FMCG industries.

In summary, the study's significance lies in its contribution to knowledge by addressing a crucial gap in understanding, its practical implications for FMCG organizations in Jordan, its potential to enhance the performance of supply chain efforts,

as well as its contribution to the academic community by expanding the theoretical framework and supporting future research endeavors.

1.4 Problem Statement

This study delves into the challenges faced by organizations in the fast-moving consumer goods (FMCG) sector in Jordan concerning supply chain performance. A comprehensive review of existing literature and empirical studies has identified common challenges, including complexities in strategically managing and optimizing inventory levels to meet demand effectively while minimizing holding costs and preventing stockouts. Additionally, concerns have emerged regarding the agility of the supply chain and its capability to respond promptly and efficiently to dynamic market conditions and unforeseen disruptions, adapting swiftly to changes in demand, supply, and external factors. Furthermore, significant obstacles have been recognized in meeting customer satisfaction targets, collectively contributing to the overarching concept of supply chain performance.

The FMCG sector holds paramount importance in the economic landscape of Jordan. As a vital contributor to the country's Gross Domestic Product (GDP) and employment, the FMCG industry plays a pivotal role in sustaining economic growth and providing job opportunities for a significant portion of the population. Its importance extends beyond economic contributions; the sector ensures the availability of essential daily commodities, meeting the diverse needs of consumers across the nation. Consequently, optimizing supply chain operations in the FMCG sector is not only economically significant but also directly influences the well-being and satisfaction of the Jordanian populace.

The success and efficiency of the FMCG industry are intricately tied to effective supply chain performance, making it imperative to explore and enhance the industry's

resilience and responsiveness while addressing the identified challenges to foster continued growth and prosperity within the Jordanian FMCG context.

According to Awanga (2018) have shown that effective demand planning processes significantly improve inventory control, leading to reduced stockouts and lower inventory holding costs. Moreover, Mofokeng and Chinomona (2019) highlight the positive influence of demand planning processes on customer satisfaction, emphasizing that accurate demand forecasts enable timely and efficient fulfillment of customer orders. Furthermore, supply chain agility is a critical aspect of FMCG industries, allowing corporations to respond quickly and effectively to the dynamics of markets Abolghasemi, Gerlachb, and Beh (2019), there is an argue that demand planning processes, like collaborative forecasting and information sharing, enhance supply chain agility by facilitating rapid adjustments to changing customer demands (Ahmad, 2022).

Hence, a thorough empirical study is necessary to investigate demand planning processes' impacts on achieving supply chain performance within FMCG industries in Jordan.

Study Questions

In line with the problem statement, the primary objective of this research is to investigate the impact of demand planning processes on supply chain performance in the Jordanian FMCG industry by addressing the following study questions:

1. What is the level of demand planning processes in the FMCG industries in Jordan?

2. What is the supply chain's performance level in Jordan's FMCG industries?

3. Is there a relationship between demand planning processes and the performance of supply chain dimensions of FMCG industries in Jordan?

4. Do demand planning processes impact supply chain performance dimensions within the FMCG industries in Jordan?

Questions 1 and 2 were addressed through descriptive analysis, question 3 using the correlation test, and question 4 by evaluating the study hypothesis through multiple regressions.

1.5 Study Hypotheses

By the problem statement and questions, the following hypotheses were formulated:

- **H_{01}**: Demand planning processes (demand forecasting, "sales and operation", and demand collaborating) do not impact supply chain performance in FMCG industries in Jordan, at $\alpha=0.05$.

Based on supply chain performance dimensions, the primary hypothesis is subdivided into:

- **$H_{01.1}$**: Demand forecasting does not impact supply chain performance in the Jordanian FMCG industries, at $\alpha=0.05$.

- **$H_{01.2}$**: Sales and operation planning (S&OP) does not impact supply chain performance in the Jordanian FMCG industries, at $\alpha=0.05$.

- **$H_{01.3}$**: Demand collaborating does not impact supply chain performance in the Jordanian FMCG industries, at $\alpha=0.05$.

1.6 Study Model

The conceptual model for this study aims to reveal the relationships between demand planning processes and supply chain performance in the FMCG sector in Jordan. Informed by the problem statement and study objectives, the model incorporates key variables and their interdependencies.

Components of the model include:

1. Demand Planning Processes: This pivotal component integrates demand forecasting, Sales and Operations Planning (S&OP), and collaborative demand planning, building on insights from previous studies, the processes are intricately interconnected, and influenced by factors identified. Demand forecasting, derived from Abolghasemi, Gerlachb, and Beh (2019), establishes a robust foundation, aligning with Goh's (2019) emphasis on effective S&OP methodologies for cohesive planning. Additionally, Tutuhatunewa, Surachman, and Santoso's (2019) insights on collaborative demand planning underscore the importance of shared information among stakeholders. This synthesis of findings underscores the holistic and coordinated nature of demand planning processes within the Fast-Moving Consumer Goods (FMCG) sector.

2. Supply Chain performance: The dependent variable, supply chain performance, is at the core of the model. This represents the harmonious coordination of various supply chain elements, including inventory control according to Yea. et. al. (2022), supply chain agility according to Sutanto, Harianto, and Balkan (2022), and customer satisfaction (Ahmad, 2022), as indicated by the study objectives.
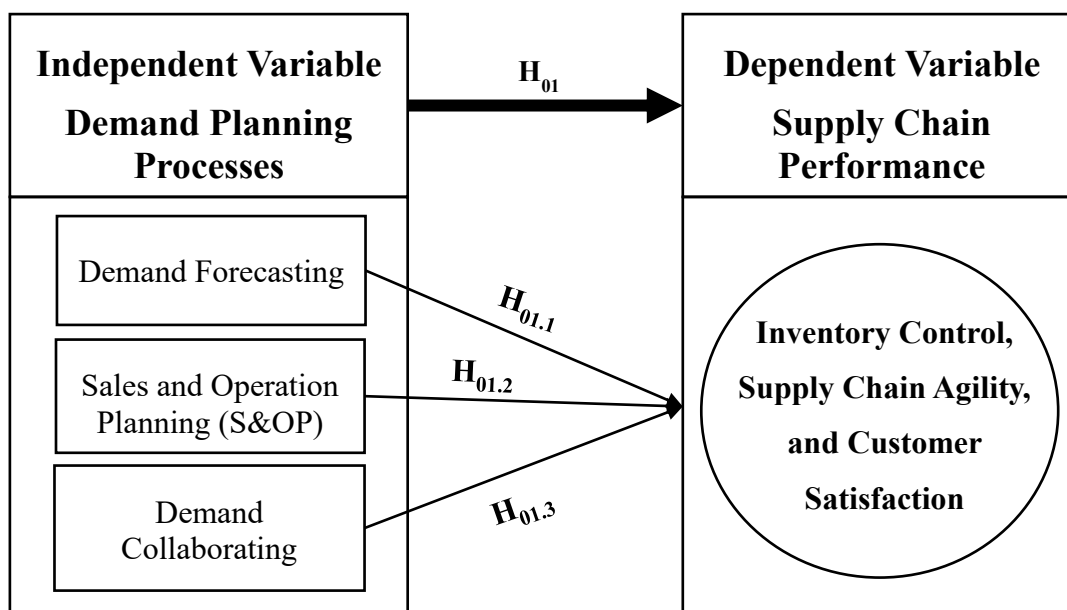
Model (1. 1) Conceptual Model: Sources: Abolghasemi, Gerlachb, and Beh (2019), Tutuhatunewa, Surachman and Santoso (2019), Akintokunbo and Obom (2021), Yea. et. al. (2022), Ahmad (2022), Sutanto, Harianto, and Balkan (2022)

1.7 Operational Definitions

Demand Planning Processes: involve systematic processes and strategies used by organizations to forecast and manage customer demand. These processes, assessed through demand forecasting, "sales and operations planning", and demand collaboration, entail analyzing market trends and historical data to align production, inventory, and supply chain activities with accurate demand forecasts, the questionnaire measured the demand planning processes with questions from 1 to 21, as shown in Appendix (1)

Demand Forecasting: Forecasting is crucial for predicting future product demand by analyzing past sales and market needs. This involves monitoring emerging markets, responding to demand changes, and developing a customer database for efficient supply and demand management. This process is vital for businesses as it aids in planning production, inventory, and resources effectively to meet

customer needs and optimize operations, the questionnaire measured the demand forecasting by questions from 1 to 7, as shown in Appendix (1)

Sales and Operation Planning (S&OP): is a business process that combines different departments, such as marketing, sales, and operations, to align their plans and ensure smooth coordination. It involves creating a unified plan that combines production capabilities, sales forecasts, and inventory management to meet customer demand efficiently, the questionnaire measured S&OP with questions from 8 to 14, as shown in Appendix (1).

Demand Collaborating: is a structured approach to collaborating with internal teams and external partners, fostering flexibility in strategy, encouraging idea exchange, and involving key stakeholders to enhance process performance and efficiency. It refers to the act of working together and sharing information between different parties involved in the supply chain, including retailers, manufacturers, and suppliers, aiming to improve the accuracy of demand forecasts and enhance coordination to meet customer demand effectively, the questionnaire measured the demand collaborating with questions from 15 to 21, as shown in Appendix (1).

Supply Chain Performance: Supply chain Performance refers to the measurable effectiveness and efficiency of the various processes within a supply chain. It involves the evaluation of specific criteria and metrics such as inventory control, supply chain agility, and customer satisfaction, the questionnaire measured supply chain performance with questions from 22 to 40, as shown in Appendix (1)

Inventory Control: Inventory control involves managing stock levels to fulfill customer demands, coordinating with suppliers, and reducing inventory-related costs. The goal is to monitor and maintain optimal stock levels to meet customer demand while minimizing costs and avoiding stockouts or excess inventory, the

questionnaire measured inventory control with questions from 22 to 27, as shown in Appendix (1)

Supply Chain Agility: Supply chain agility refers to the capability of the supply chain to respond rapidly and effectively to changes and disruptions in the business environment, it involves being flexible, adaptive, and responsive in adjusting supply chain operations, processes, and strategies to meet customer demands, market conditions, and unforeseen events, the questionnaire measured supply chain agility with questions from 28 to 34, as shown in Appendix (1).

Customer Satisfaction: Refers to meeting customer expectations and desires, achieved through product quality, prompt responses, timely deliveries, and value-appropriate pricing. Emphasizing problem-solving and attracting new customers are key components in ensuring customer satisfaction within the context of a business or organizational interaction, the questionnaire measured customer satisfaction with questions from 35 to 40, as shown in Appendix (1).

Study Limitations and Delimitations

Human Limitations: The study was conducted on employees who are responsible for supply chain planning within the Jordanian FMCG industries.

Place Limitations: The study was conducted on FMCG industries in Jordan.

Time Limitations: The study was conducted between two academic semesters, from Jun 2023 to Dec 2023.

Study Delimitations: This study includes various delimitations that assist in delineating the scope and limits of the research. Firstly, the study specifically focuses on the FMCG industries in Jordan, limiting its generalizability to other regions or industries. The unique characteristics of the Jordanian FMCG sector,

including market dynamics, cultural factors, and the regulatory environment, influence the findings and may not be directly applicable to different contexts.

Secondly, the study adopts an empirical research approach, which restricts the analysis to quantitative data and may not capture the full depth of qualitative insights. The study's timeframe is also delimited to a specific period, and changes or developments in demand planning processes or supply chain performance beyond this timeframe may not be considered. These delimitations provide clarity on the specific context, methodology, and timeframe of the study.

Chapter Two
Conceptual and Theoretical Framework and Previous Studies

2.1 Introduction

The chapter incorporates a definition of demand planning processes on supply chain performance, examining their components, relevant studies, and models. Finally, it summarizes the distinctions that characterize this study compared to previous ones.

2.2 Definitions and Components of Variables

Authors have defined demand planning processes and supply chain performance components in diverse ways, tailoring each definition to the specific field, industry, and objectives of their respective studies. It observed that components of demand planning processes, whether in full or part, contribute to the enhancement of supply chain performance.

Independent Variable (Demand Planning Processes)

Demand planning is a fundamental process in supply chain management, involving developing reliable forecasts (Uzsoy, Fowler, and Mönch, 2017). It ensures the alignment of inventory levels with demand fluctuations, meeting customer expectations and improving profitability (Awanga, 2018). According to Basson, et. al. (2019) emphasizes the impact of demand planning in understanding profit potential and indirectly influencing capacity, financing, and stakeholder confidence, the study highlights demand planning as the initial step in subsequent processes such as purchasing, production, and distribution. Abolghasemi, Gerlachb, and Beh (2019) describe demand planning as the allocation of customer demand among facilities or product lines through Sales and Operations Planning. Demand planning significantly impacts supply chain management and the overall business bottom line Venkatadri, Wang, and Srinivasan (2021), also

according to Contreras, Raffo, Ibañez, and Rivera (2020) highlight that Demand planning represents the initial phase in supply chain planning, and its outcomes significantly impact the quality of subsequent planning activities. However, the signal of demand is often unreliable, leading to amplified uncertainty, according to Yea, et. al. (2022) define demand planning as a supply chain activity that utilizes sales forecasts and inputs from various functions to draft a comprehensive demand plan. Meanwhile, Demand planning encompasses processes such as goal setting, data gathering, demand forecasting, communication, and supply-demand synchronization (Bi, et. al. 2022). Digital tools enable real-time data gathering, improved forecasting, and seamless communication, addressing challenges of uncertainty and signal reliability (Ganbold, Matsui, and Rotaru, 2021). This strategic approach not only meets customer expectations but also optimizes supply chain efficiency (Boone, Ganeshan, Jain, and Sanders,2019), making demand planning a vital component for organizations navigating complexities in the modern business landscape (Ganbold, Matsui, and Rotaru, 2021).

In summary, Demand planning refers to the process of developing reliable forecasts to align inventory levels with customer demand, meeting expectations, and improving the integrity of an organization's supply chain.

Demand Forecasting: Demand forecasting is a technique used to estimate future product demand based on past sales and market needs (Basson, et. al. 2019). It involves the process of predicting or projecting the future demand for a product or service, holding a vital position in supply chain management and business planning (Purnamasari. et. al. (2023). Accurate demand forecasts empower organizations to make well-informed decisions related to production, inventory management, resource allocation, and overall business strategy (Abou Maroun, Zowghi, and Agarwal, 2019). Demand forecasting

encompasses a range of quantitative and qualitative methods that have been developed to improve the accuracy and reliability of forecasts (Narayanan, Sahin, and Robinson, 2019). Time series analysis methods, including moving averages and exponential smoothing, utilize past sales data to identify patterns and trends (Tliche, Taghipour, and Depitre, 2020). Econometric models, including regression analysis, incorporate external factors such as economic indicators and market conditions into the forecasting process (Abolghasemi, Gerlachb, and Beh, 2019). Additionally, collaborative forecasting approaches highlight the significance of information sharing and collaboration among supply chain partners as crucial to improving forecast accuracy (Bi, et. al. 2022). By accurately predicting future demand, organizations can effectively manage inventory levels, streamline production schedules, and allocate resources efficiently (Wamoto, Kwasira, and Ndolo, 2023). This demand forecasting performance ensures smooth coordination, enhances operational efficiency, and ultimately improves customer satisfaction (Basson, et. al. 2019).

Sales and Operation Planning: Demand planning processes play a crucial role in achieving supply chain performance. Sales and operations planning (S&OP) is a cohesive and tactical planning process that balances demand and supply, ensuring it aligns with the strategic business plan (Nemati, Madhoshi, and Ghadikolaei, 2017). It entails establishing the overall level of manufacturing output and activities to fulfill planned sales levels while meeting the general business objectives (Danese, Molinaro, and Romano, 2018). S&OP facilitates cross-functional coordination, particularly across the operations-marketing interface (Rokonuzzaman, 2018). Sales and Operations Planning is a pivotal process that enhances performance and communication between business functions, aligning the plans of a company into one integrated set (Goh and Eldridge, 2019). It enables effective management of the organization's supply chain, providing a blueprint for success

(Ambrose, et. al. 2016). S&OP integrates all plans within the business, integrating marketing, sales, manufacturing, development, sourcing, and financial aspects ASCM (2022), effective demand planning processes are essential as they link strategic plans with execution and influence the financial performance, operational efficiency, and service level of the organization (Goh, 2019). Demand planning plays a crucial role in achieving the balance between customer demand and product supply, ultimately helping firms achieve demand and supply balance (Cedillo and García, 2019). In S&OP, developing products in response to market research is crucial. It aligns production priorities with market needs, leveraging insights into customer preferences, emerging trends, and competitive dynamics Rokonuzzaman (2018), this performance ensures informed decisions, anticipates future trends, and aligns the product portfolio with the dynamic market, fostering agility and responsiveness to customer requirements (Santa Cruz, Torres, and Ibañez, 2019).

Within the scope of this study, S&OP is a strategic process that aligns sales and operational activities across the organization and is crucial for effective supply chain performance, optimizing resource deployment, and ensuring profitability in FMCG industries.

Demand Collaborating: Involves collaborative behavior and shared decision-making between companies, representing a voluntary engagement in inter-organizational efforts (Aviv, 2001). It involves real-time data exchange facilitated by electronic communications, including electronic data interchange and vendor-managed inventory systems, which facilitate the exchange of demand information and the adoption of a unified forecasting approach (Mtshali, Mbhele, and Neboh, 2019). A relational view of collaboration emphasizes building partnerships, fostering trust, sharing information, and

engaging in joint planning to a greater extent than customary processes (Tutuhatunewa, Surachman, and Santoso, 2019). Collaboration is perceived as a process grounded in trust, mutual respect, sharing information, making decisions jointly, and collectively assuming responsibility for outcomes (Mtshali, Mbhele, and Neboh, 2019). Successful collaboration is contingent upon establishing high trust and mutually beneficial relationships between interdependent organizations (Isa and Dweiri, 2019). A framework suggests four categories of demand collaboration based on the degree of reliance on relational and technological dimensions: transaction-based, technology-based, affinity-based, and integral-based according to Akintokunbo and Obom (2021), involving fostering strategic flexibility, encouraging idea exchange, and engaging key stakeholders to enhance process performance and efficiency according to Sutanto, Harianto, and Balkan (2022), and entails working together and sharing information among supply chain parties, such as retailers, manufacturers, and suppliers, to improve demand forecast accuracy and enhance coordination for effective customer demand fulfillment (Ahmad, 2022).

Demand collaboration, in the context of this research, refers to the cooperative and joint decision-making efforts between companies in the FMCG industries of Jordan. It includes the sharing of real-time data and exchanging information facilitated by electronic communications systems to establish meaningful partnerships, foster trust, and engage in joint planning to achieve the performance of the supply chain.

Dependent Variable (Supply Chain Performance)

Supply chain performance stands as a critical determinant of organizational success and competitive advantage (Mofokeng and Chinomona, 2019). A well-functioning supply chain is integral to the seamless flow of goods and services, encompassing various

interconnected processes from procurement to production and distribution (Akintokunbo and Obom, 2021). Achieving optimal supply chain performance requires a strategic approach that incorporates advanced technologies, streamlined processes, and effective collaboration with suppliers and partners (Awanga, 2018). Effective supply chain performance leads to better coordination of activities, improved communication, and sharing of information, which in turn enables organizations to quickly respond to market changes and customer demands (Mofokeng and Chinomona, 2019). As well as supply chain performance leads to improved customer satisfaction, reduced lead times, increased operational efficiency, and cost reduction according to Isa and Dweiri (2019), by integrating their operations with suppliers, manufacturers, and distributors, organizations can streamline processes, reduce waste, and optimize resource allocation (Veeragoudar and Bharamanaikar, 2020). According to Dubey, et. al. (2021) highlights the relationship between supply chain performance and improved supply chain agility, they argue that performance enables companies to align their operations with customer demand, thereby reducing lead times and improving customer service, they also stress the importance of trust and collaboration for successful performance among supply chain partners (Wibowo, 2022).

In the context of this study, Supply chain performance pertains to the strategic collaboration and coordination among the partners of the supply chain to effectively and efficiently manage the flow of information, decisions, services, products, and money. It involves building strong relationships, facilitating collaborative decision-making, and sharing information to achieve seamless performance and maximize value for all stakeholders

Inventory Control: Inventory control is a complex and challenging activity that involves managing thousands of items and handling a wide range of demand volumes, from high-frequency items to low-demand products (Ndlala, Mbohwa, and Sobiyi, 2017). It encompasses the management-based activities of determining requirements, forecasting, setting goals, and issuing necessary instructions to ensure the correct quantity and quality of goods and services are delivered to the right place at the right time (Lu, et. al. 2018). Effective inventory control aims to optimize operational efficiency, minimize costs, meet customer demand, and mitigate the risk of excess inventory or stockouts (Duong, Wood, and Wang, 2018). It involves accurate demand forecasting, efficient order processing, robust inventory tracking systems, and proactive management strategies (Tliche, Taghipour, and Depitre, 2020). Additionally, inventory control is essential for achieving supply chain objectives, such as reducing lead times, improving customer satisfaction, and minimizing holding and carrying costs according to Jackson, Tolujevs, and Kegenbekov (2020), the proper timing and size of replenishment play a crucial role in inventory control theory according to Yea, et. al. (2022), and managing stock levels to fulfill customer demands, coordinating with suppliers, and strategically reducing inventory-related costs to maintain optimal stock levels, ensuring the fulfillment of customer demand while minimizing costs and preventing stockouts or excess inventory (Yea, et. al, 2022).

In summary, inventory control in this study refers to the management activities aimed at optimizing inventory levels, ensuring timely deliveries, and minimizing costs to enhance overall supply chain performance.

Supply Chain Agility: Supply chain agility is a distinct concept from other similar terms such as flexibility, leanness, adaptability, and resilience (Dubey, et. al. 2021). It

involves various dimensions, with quickness, responsiveness, competency, and flexibility being prominent among them.

Openly exchanging information with key suppliers significantly contributes to supply chain agility Dubey. et. al. (2021), this process facilitates a transparent flow of information, fostering collaboration and real-time responsiveness according to Sutanto, Harianto, and Balkan (2022), by openly sharing data related to demand forecasts, inventory levels, and production schedules, the company and its suppliers can align their strategies more effectively according to Patel and Sambasivan (2022) and enhance the ability to adapt swiftly to changes in demand, supply chain disruptions, and market dynamics (Sutanto, Harianto, and Balkan, 2022). Literature on supply chain agility can be categorized into areas These include modeling enablers, agility assessment, agility implementation, agility, and agility maximization Patel and Sambasivan (2022) propose a practical definition and framework for supply chain agility, while also identifying potential areas for future studies, encompassing obstacles to agility, effective approaches to agility assessment, cost-benefit trade-offs in implementing agility, and empirical validation of the framework in healthcare and disaster relief supply chains. The agility of a company's supply chain has a significant impact on its financial performance (Sutanto, Harianto, and Balkan, 2022). Achieving supply chain agility requires collaboration among all members of the supply chain, including suppliers, manufacturers, distributors, and customers. This integrated approach aligns with the strategy-structure-performance paradigm (Aityassine. et. al. 2022). Four aspects of agile supply chain processes are recommended, namely customer responsiveness, virtual performance, process integration, and network integration. However, similar limitations have been identified in previous frameworks that apply to this one as well (Sutanto, Harianto, and Balkan, 2022).

In the context of this research, the agility of the supply chain is defined as the capacity of a supply chain to respond and adapt to changes promptly, it is closely related to supply chain integrity, which focuses on the smooth coordination of activities within the supply chain network. Demand planning, on the other hand, involves forecasting and anticipating customer demand. By integrating supply chain agility, supply chain integrity, and demand planning, businesses can effectively adjust their operations to meet changing market conditions and customer needs. This enables them to be more flexible, and responsive and ultimately enhances customer satisfaction

Customer Satisfaction: Customer satisfaction is a vital aspect of the contemporary business landscape, as highlighted by Rokonuzzaman (2018), it is influenced by various factors, including the quality of the product and the quality of service. Research within marketing management literature has shown that product quality positively affects customer satisfaction, as does service quality. Additionally, product quality has been found to influence the complaint level of customers, along with service quality. Furthermore, customer satisfaction itself has been identified as a determinant of complaint level. Customer satisfaction is a subjective evaluation that individuals experience when evaluating the actual performance of a product against their expectations (Narayanan, Sahin, and Robinson, 2019). It can be assessed based on dimensions or indicators such as meeting, exceeding, or falling below customer expectations. This evaluation is impacted by the customer's experience and the perceived attributes or benefits of a service or product (Tutuhatunewa, Surachman, and Santoso, 2019). Creating customer satisfaction involves delivering high customer value through quality, service, and value (Dubey, et. al. 2021). Customer loyalty is closely tied to the capability of delivering high customer value. In the context of the modern business landscape, customer satisfaction has become even more crucial due to the availability of numerous

options and the ease of communication through the Internet according to Ahmad (2022), simply producing an excellent product is no longer sufficient; satisfying customers has become imperative for businesses, particularly in the manufacturing sector. According to Wibowo (2022) defines customer satisfaction as the alignment between a customer's opinion of a product and their initial expectations. A satisfied customer not only helps build loyalty but also serves as a positive advocate for the business through word-of-mouth recommendations (Nwiyii, et. al. 2022).

In the context of this research, Customer satisfaction pertains to the level of fulfillment and contentment among customers regarding the products and services provided by FMCG companies in Jordan. It encompasses considerations like product and service quality, along with the supply chain's efficiency in meeting customer demands. The comprehension and improvement of customer satisfaction play a vital role in building loyalty and encouraging repeat purchases.

2.3 Relationship between Demand Planning Processes and Supply Chain Performance

The exploration of the intricate relationship between demand planning practices and supply chain performance has garnered significant attention from researchers across various dimensions.

Demand planning processes serve as the foundation for accurate forecasting, ensuring that predictions align closely with actual market demands, according to Uzsoy, Fowler, and Mönch's (2017) study on semiconductor supply chain models highlights how effective demand planning contributes to the intricacies of inventory management and capacity planning and accurate forecasting, driven by effective demand planning, is vital for anticipating market trends, fluctuations, and demand patterns.

Alignment of Supply Chain Performance Dimensions: Accurate forecasting, as a result of effective demand planning, plays a crucial role in aligning the right dimensions of supply chain performance. According to Tutuhatunewa, Surachman, and Santoso's (2019) emphasis on information sharing and collaboration underscores how accurate forecasts ensure synchronization within the supply chain, enhancing overall performance.

The relationship between demand planning and supply chain performance extends beyond forecasting to encompass elements such as inventory control, supply chain agility, and customer satisfaction. As well as demand planning facilitates a better balance in demand-supply dynamics by providing insights into market demands, allowing organizations to optimize production and distribution accordingly, Abolghasemi, Gerlachb, and Beh's (2019) examination of demand volatility underscores the pivotal role of demand forecasting in maintaining this balance, especially during promotional activities, effective demand planning acts as a strategic tool for minimizing stockouts and overstocks, ensuring that inventory levels are optimized to meet demand while minimizing holding costs and avoiding product shortages (Ammar. Et al, 2022).

In summary, the existing literature presents a comprehensive landscape of studies examining various dimensions of demand planning Processes and supply chain performance. The unique contribution of this thesis lies in its synthesis of diverse perspectives, aiming to provide a more holistic understanding of the relationship between demand planning processes (demand forecasting, S&OP, and demand collaboration) on supply chain performance.

2.4 Previous Studies

Upon a comprehensive review of the existing literature, it is apparent that there exists a notable variability not only in the definitions and considerations of variables but also in the methodologies employed across previous studies.

Awanga (2018) study title: **Demand Planning on Supply Chain Performance: A Case Study of FMCGs in Kenya**: This study delved into examining the impact of demand planning on enhancing supply chain performance. The research employed descriptive and explanatory research designs, with a sample size of 80 individuals from FMCG organizations in Nairobi and Kiambu County. Structured questionnaires were employed to collect data, and both descriptive and inferential statistics were utilized for analysis. The findings showed that forecasting plays a crucial role in inventory optimization, supplier partnering enhances supply chain reliability, and demand planning reduces overall supply chain costs. Recommendations include incorporating forecasting and Sales Inventory and Operations Planning for inventory optimization, pursuing supplier collaboration activities, and embracing demand planning to improve cost visibility and reduce uncertainties in the supply chain. In conclusion, the study finds that forecasting reduces inventory holding, Sales Inventory and Operations Planning improves accuracy, and supply chain collaboration enhances reliability.

Narayanan, Sahin, and Robinson (2019) study title: **Demand and order-fulfillment planning: The impact of point-of-sale data, retailer orders, and distribution center orders on forecast accuracy**: The methodology utilized in the research involved collecting and analyzing daily demand data and operational information from a significant supply chain of consumer products. This study investigates the impact of different demand signals, including point-of-sale (POS) data, retailer orders, and

distribution center (DC) orders, on forecast accuracy for demand and order-fulfillment planning in a consumer-products supply chain. The findings challenge the claims made by consulting firms regarding the superiority of POS-based forecasting systems in improving forecast accuracy across all contexts. The study reveals that POS data improve forecast accuracy for demand planning but not for order fulfillment planning. Instead, replacing DC orders with retail orders at the supplier level yields a forecast accuracy comparable to a POS-based demand signal. The study emphasizes the importance of tailoring the demand signal choice to the specific planning objective. Sharing retailer order information is a viable alternative to sharing POS data, offering cost and operational advantages.

Santa Cruz, Torres, and Ibañez (2019) study title: **Sales and Operation Planning Model to Improve Inventory Management in Peruvian SMEs:** This study focuses on addressing the challenges faced by most Peruvian SMEs operating in the informal sector, particularly in industrial machinery rental services, where issues like inadequate inventory management hinder their development. A model based on Sales and Operation Planning (S&OP) is proposed to enhance inventory management in service companies. The model, implemented in a Lima-Peru case study, significantly improved inventory management, reducing Overstock by 47.67% and demand forecasting errors by 74%. The S&OP model also positively impacted the work climate and interdepartmental performance, alleviating organizational challenges. The use of a maturity model further allowed organizations to assess their level and plan actions to enhance inventory management processes, presenting a comprehensive approach for improvement.

Tutuhatunewa, Surachman, and Santoso (2019) study title: **Influence of Information Sharing, Partnership, and Collaboration on Supply Chain Performance**: This research focuses on the correlation between information sharing, collaboration, supply chain partnership, and supply chain performance in medium and small-sized organizations in the Apple agroindustry in East Java, Indonesia. The study used Partial Least Square analysis and discovered that information sharing exerted an indirect influence on both supply chain collaboration and supply chain performance. However, no direct effects were observed between information sharing and supply chain performance, or between partnerships and supply chain performance. This supports the research importance of collaboration and partnerships in improving supply chain performance. It is important to note that the limited resources of small-sized organizations may influence the process of information-sharing effectiveness.

Merkuryeva, Valberga, and Smirnov (2019) study title: **Demand Forecasting in pharmaceutical supply chains: A case study**. This paper addresses demand forecasting challenges in the pharmaceutical industry and presents an integrated approach for in-market product demand forecasting and purchase order generation in the pharmaceutical supply chain. The study includes a case analysis of pharmaceutical product supply from a wholesaler to a distribution company in an emerging market. Three forecasting scenarios using the SMA model, multiple linear regressions, and experimentally investigated are symbolic regression techniques using genetic programming. The results highlight the complexity of the pharmaceutical supply chain and emphasize the critical role of accurate demand forecasts. The experimental analysis indicates that the symbolic regression-based forecasting model outperforms others, providing the best fit to historical demand data, lower error estimates, and improved accuracy in predicting demand peak sales.

Balderas, Araiza, Peña, and Villarreal (2019) study title: **Improving Forecasting Accuracy to Reduce Variability of Customer Service Level**: This study focuses on a leading Mexican convenience store company's effort to address a high level of customer service variability, with 42% of stores experiencing stockouts on average. Through an analysis of the distribution network and existing forecasting and inventory management processes, the main issues were attributed to poor demand forecasting accuracy and incomplete inventory management structures. Improvement initiatives were implemented, leading to a 43% decrease in forecasting mean squared error (MSE) during a pilot study in the Puerto Vallarta Plaza. The company anticipates a 21% reduction in inventory levels and a 22% decrease in customer service variability. This case underscores the importance of accurate forecasting and inventory management in enhancing retail competitiveness, and the positive impact of these initiatives supports the wider application of the methodology in other store plazas in Mexico.

Boone, Ganeshan, Jain, and Sanders (2019) study title: **Forecasting Sales in the Supply Chain: Consumer Analytics in the Big Data Era.** This paper explores the impact of the surge in data, facilitated by technological advancements, on product forecasting within supply chain management. It reviews the influence of big data on sales forecasting, emphasizing the use of granular point-of-sale data, in-store technologies, and user-generated content from internet searches and social media to enhance aggregate forecasts. The conclusion highlights the promise of big data in improving forecasting accuracy but acknowledges challenges such as data size, unstructured content, and performance in conventional processes. Privacy, security, and governance are identified as critical management issues for firms embracing big data technologies. Despite challenges, the paper envisions the next decade as a golden age for forecasting,

anticipating improved efficiency and revenue enhancement through the utilization of large and diverse datasets in real-time.

Goh and Eldridge (2019): study title: **Sales and Operations Planning: The Effect of Coordination Mechanisms on Supply Chain Performance**: This study investigates the influence of Sales and Operations Planning (S&OP) on supply chain performance utilizing coordination and contingency theories. An analysis of 568 Sales and Operations Planning (S&OP) practitioners indicates that Strategic Alignment and Information Acquisition and Processing are crucial mechanisms for enhancing S&OP outcomes. However, a highly formalized S&OP Procedure impedes supply chain performance. Organizational bricolage is proposed as a coordinating mechanism for effective S&OP programs. The study suggests re-evaluating prescriptive S&OP procedures and offers implications for managers expanding S&OP across regions and industries. Further research opportunities and limitations are acknowledged.

Mtshali, Mbhele, and Neboh (2019) study title: **Demand Planning Information Sharing: NZAR**: focuses on the information sharing importance in demand planning for optimal performance and alignment with volatile operating environments. A quantitative explorative case study approach was used, collecting data through a structured questionnaire from employees across different divisions. The findings reveal that information sharing positively contributes to demand chain coordination, emphasizing the need for top management support and a shared vision among planning partners. Trust and frequent interactions are also identified as supporting factors. The study recommends full support from top management to facilitate the demand planning process. Overall, effective information sharing improves demand planning accuracy and enhances demand

chain performance, enabling organizations to meet customer demands and align their forecasts accordingly.

Basson, et. al. (2019) study title: **Forecast accuracy in demand planning: A fast-moving consumer goods case study:** This study focuses on a South African fast-moving consumer goods (FMCG) manufacturer, Company A, aiming to enhance its supply chain performance by improving demand planning accuracy. The organization implemented interventions to address the underperforming supply chain and sought to assess their impact. The study also identifies a literature gap in academic case studies related to such interventions. The conclusion reveals that the demand planning interventions had a positive impact on the overall supply chain performance of Company A. A notable positive relationship was identified between a well-informed, team-based, and technology-assisted approach to demand planning and improved forecasting accuracy within the FMCG sector.

Goh (2019) study title: **The Impact of Sales and Operations Planning on Supply Chain Performance: An Investigation of Contingency and Organizational Culture in S&OP Implementations**. This study delves into Sales and Operations Planning (S&OP), examining its impact on supply chain performance through case studies and a large-scale survey. The case studies reveal quantifiable improvements in supply chain performance post-S&OP implementation. The survey, involving 568 respondents, identifies Strategic Alignment and Information Acquisition/Processing as key mechanisms contributing to superior S&OP outcomes. Notably, a highly formalized S&OP Procedure was found to inhibit supply chain performance, with size and experience as amplifying factors. Additionally, organizational culture influences S&OP coordination,

showcasing its role in both positive coordination outcomes and potential suppression of supply chain performance.

Sufiyan. et. al. (2019) study title: **Evaluating food supply chain performance using hybrid fuzzy MCDM technique**: This study examines the performance of a Food Supply Chain by identifying six key performance criteria and associated indicators through a literature review and expert opinions. Using a fuzzy Decision-Making Trial and Evaluation Laboratory and a hybrid Multi-Criteria Decision-Making technique, the study prioritizes these criteria and indicators, highlighting service to the customer, quality, and supply chain efficiency as most crucial, with key indicators including customer satisfaction, customer complaint, and on-time delivery. The findings emphasize the importance of coordination and collaboration among supply chain partners, with information sharing playing a vital role. While subjective expert inputs present a limitation, the study contributes by enhancing the food supply chain performance measurement framework.

Contreras, Raffo, Ibañez, and Rivera's (2020) study titled: **Demand Management Model Based, on Quantitative Forecasting Methods, and Continuous Improvement to Increase, Production Planning Efficiencies of SMEs, Bakeries**: tackled the challenges encountered by Small and micro companies in the food industry due to poor management and inaccurate demand forecasting. A demand management model was developed and implemented in a micro bakery, leading to enhanced efficiency in production planning from 91.9% to 96.2% and increased accuracy from 89.6% to 97%. The model reduced losses by aligning actual demand with expected demand. Statistical analyses showed slight differences between simulation scenarios and validation results. The study concluded that the demand management model is effective, when the error

percentage surpasses 5% in daily demand forecasting and during periods of substantial economic changes.

Akintokunbo and Obom (2021) study title: **Material Requirement Planning and Supply Chain Performance of Oil and Gas Firms in Rivers State**, Nigeria: This study focuses on how material requirement planning (MRP) impacts supply chain performance and customer satisfaction in Oil and Gas firms in Rivers State, Nigeria. The results indicate a significant positive relationship between MRP and supply chain performance, highlighting the critical role of MRP in enhancing operational efficiency and responsiveness. Moreover, the study underscores the direct influence of supply chain performance on customer satisfaction. As a result, the researcher recommends that managers of oil and gas firms in Port Harcourt, Rivers State, prioritize strategic planning and efficient implementation of MRP strategies to not only improve supply chain performance but also elevate customer satisfaction levels, ultimately contributing to long-term success and competitiveness in the industry.

Subramanian (2021) study title: **Effective Demand Forecasting in Health Supply Chains: Emerging Trend, Enablers, and Blockers**. This study investigates the crucial role of demand forecasting in global health supply chains, examining insights from an analysis of, seventy-one articles. It identifies key factors influencing accurate forecasting, highlighting emerging trends, and proposing actionable recommendations for risk mitigation. The study concludes by emphasizing the necessity of prioritizing demand forecasting, aligning incentives, and fostering collaboration to enhance healthcare access globally. The recommended measures have the potential to save lives, reduce costs, and strengthen health systems on a global scale.

Sutanto, Harianto, and Balkan (2022) study title: **The Effect of Supply Chain Organizational and Supply Agility on Supply Chain Performance: The Mediation Role of Supply Chain Strategy in the Retail Shop**: This study concentrated on evaluating the influence of supply chain organizational characteristics and supply agility on the operational performance of supply chains within the retail industry. A total of 180 companies participated in the research. The results indicated that supply chain strategy played a significant mediating role, exerting a positive impact on the operational performance of supply chains in retail establishments. However, the supply chain strategy itself did not have a direct and significant effect on the operational performance of the supply chain. The findings underscored the crucial role of supply chain management in retail outlets, emphasizing the necessity for effective collaboration among various stakeholders in the supply chain. The research contributes valuable insights to the existing literature on the implementation of supply chain management in the retail sector, offering guidance for organizations aiming to enhance their competitiveness and profitability.

Nwiyii, et. al. (2022) study title: **The Impact of Material Planning on Customer Satisfaction and Productivity Optimization in Port-Harcourt Manufacturing Industries**: This study explored the impact of material planning on customer satisfaction and production optimization in the manufacturing industries of Port Harcourt. Utilizing an explanatory cross-sectional survey design, data were collected from 88 managers in 22 manufacturing companies. The findings demonstrated a strong positive relationship between material planning and both customer satisfaction and production optimization. The study concluded that material planning is a critical tool for maximizing productivity and improving customer service in manufacturing firms. Neglecting material planning may result in customer dissatisfaction and reduced output.

Aityassine. et al. (2022) study title: **The Effect of Supply Chain Resilience on supply chain performance of Chemical Industrial Companies**: This study aims to assess the impact of supply chain resilience, measured through flexibility, collaboration, and agility, on supply chain performance within chemical industrial companies in Jordan. Data collected from employees through electronic questionnaires were analyzed using SmartPLS 3.0. The results revealed that supply chain collaboration and agility significantly influenced supply chain performance, while supply chain flexibility showed no significant effect. The study recommends that managers focus on enhancing effective collaboration with partners and improving responsiveness to unpredictable changes. Scholars are encouraged to explore additional factors, such as the impact of supply chain redundancy on supply chain performance, for future research. In conclusion, the findings emphasize the importance of collaboration and agility in designing resilient supply chains for better performance.

Wamoto, Kwasira, and Ndolo (2023) study title: **Relationship between Demand Forecasting and Operational Performance of Stores Function in Commercial State Corporations in Kenya**: This research explores the impact of demand forecasting processes on the operational performance of the store's function in commercial state corporations in Kenya. Grounded in the Pareto (ABC) Model, the study involves a sample of ninety-nine employees. The results indicate a substantial influence of maintained inventory level and information flow, regarded as demand forecasting processes, on operational performance. Recommendations include the adoption of effective demand forecasting strategies and inventory management processes in alignment with the Public Procurement and Disposal Act 2015. The study concludes that demand forecasting processes significantly affect the operational performance of the store function in commercial state corporations in Kenya. Further recommendations involve the

formulation of policies that support demand forecasting-sensitive inventory management processes and enhancements in demand forecasting for achieving optimal inventory levels and overall operational performance in commercial state corporations in Kenya.

Bai and Kybernetes (2023) study title: **Acquiring Supply Chain Agility through Information Technology Capability: The Role of Demand Forecasting in the Retail Industry** This paper investigates the impact of demand forecasting on supply chain agility in the retail industry from a total information technology (IT) capability perspective. The research combines literature reviews and employs a quantitative method, utilizing algorithm analysis processed on Mat lab with firm data. Findings highlight the IT dimensions of demand forecasting and establish the relationship between supply chain agility and demand forecasting from an IT capability viewpoint. The practical implications suggest that managers can enhance their understanding of operating activities by balancing supply chain agility, IT capability, and demand forecasting. Integrating demand forecasting into firm operations is crucial for determining supply chain agility levels in the marketplace. This paper contributes new theoretical insights and provides empirical evidence for prioritizing IT about supply chain considerations.

In summary, the study stands out from previous research in different key aspects. Firstly, it specifically focuses on the FMCG industry in Jordan, providing insights into a specific geographical and industrial context that may differ from other regions. Secondly, it examines the impact of demand planning processes, including S&OP, Demand Forecasting, and Demand Collaboration, on dimensions such as Inventory Control, Supply Chain Agility, and Customer Satisfaction, aims to offer a thorough comprehension of the association between demand planning and supply chain integration in the Fast-Moving Consumer Goods (FMCG) sector. Moreover, it employs a rigorous methodology,

utilizing empirical research methods for data collection and analysis of the relationships between variables.

This empirical approach enhances the reliability and validity of the findings, thereby contributing significantly to the existing body of knowledge on demand planning processes and supply chain performance in the FMCG industry in Jordan.

2.5 Expected Contributions of the Current Study as Compared with Previous Studies

Concept: Prior research has explored the correlation between demand planning processes and supply chain performance across diverse industries and contexts, establishing a knowledge base on this subject. However, this study uniquely concentrates on evaluating the influence of demand planning processes on supply chain performance within the Fast-Moving Consumer Goods (FMCG) industries in Jordan. By doing so, it contributes a novel perspective and context to the existing literature on this topic.

Purpose: This study aims to delve into the repercussions of demand planning processes on specific dimensions; inventory control, supply chain agility, and customer satisfaction within the Fast-Moving Consumer Goods (FMCG) industries in Jordan. Unlike previous studies that explored diverse dimensions, this investigation aligns with a research design to comprehensively scrutinize how demand planning influences these critical dimensions. By employing this focused approach, the study endeavors to provide industry-specific insights and implications, concentrating on the impact of demand planning on key dimensions relevant to the FMCG sector in Jordan.

Environment: Previous studies have examined supply chain performance and demand planning processes in diverse environmental contexts, spanning different

regions and industries, while the Environment of this study examines the performance of supply chain and demand planning processes within the context of the FMCG industries in Jordan, offering a localized understanding of the challenges and dynamics in this specific environment.

Industry: Previous studies have explored the impact of demand planning processes across diverse industries, including retail, manufacturing, and logistics. The industry of this study targets the FMCG industries, contributing industry-specific findings that address the unique characteristics and requirements of this sector.

Methodology: previous research has utilized different research methodologies, such as quantitative analysis, case studies, and surveys, to investigate the correlation between demand planning processes and supply chain performance. In contrast, this study employs a specific research methodology, namely quantitative analysis, to scrutinize the relationship between demand planning processes and supply chain performance within the Fast-Moving Consumer Goods (FMCG) industries in Jordan.

Population: Previous studies have targeted different populations, ranging from specific companies or supply chains to broader industry samples, to gather insights into demand planning processes effects, while the Population: The current study focuses on the FMCG industries in Jordan as the population of interest, providing insights that are directly applicable to FMCG companies operating in this region.

Comparison: The outcomes of the present study juxtaposed with those of previous research to underscore both similarities and differences, providing insights into potential reasons behind such variations.

Chapter Three
Study Methodology (Methods and Procedures)

3.1 Introduction

This chapter delineates the research methodology, encompassing the study's design, methods, and processes for data analysis, reliability, and validity tests, the chapter also outlines the study's population, the procedures for sample selection and sampling units, and the guidelines for collecting primary and secondary data. Furthermore, it elucidates the steps involved in the development and testing of the research instrument, along with an explanation of the statistical methods employed for data analysis and result extraction.

3.2 Study Design

This study employs quantitative and descriptive-analytical research designed to investigate the impact of demand planning on supply chain performance within the Fast-Moving Consumer Goods (FMCG) industries in Jordan. The research initiation involves a comprehensive literature review, establishing the foundation for constructing a robust model that measures the impact of demand planning processes on supply chain performance. To enhance the measurement tool, a panel of experts is actively engaged, focusing on refining the questionnaire. Before the main data collection, a pilot survey was incorporated into the research design to validate the questionnaire's effectiveness. Subsequently, the collected data undergoes meticulous checks for validity and reliability. Following these pre-data collection analyses, the main survey was conducted, gathering data from relevant positions across FMCG industries in Jordan with supply chain responsibilities. Post-data collection and statistical coding using SPSS 25 were implemented the collected data were tested in terms of normality, validity, and reliability, and then descriptive analyses and correlations among variables were then explored,

enriching the understanding of the dataset. In the final phase, the study employs multiple regression analysis to quantitatively assess the impact of demand planning on supply chain performance. This sequential and comprehensive research design ensures a rigorous examination of the dynamics within FMCG supply chains in the Jordanian context.

3.3 Study Population, Sample, and Unit of Analysis

Population and Samples

This study targeted companies operating within the Fast-Moving Consumer Goods (FMCG) sector, registered with the Companies Control Department in Jordan. The FMCG sector is delineated into categories, including Food and Beverages, Health and Personal Care Products, and Household and Cleaning Products, as detailed in Table (3.1) obtained from the Companies Control Department, which records a total of 13,013 companies in Jordan. The classification of these entities relies on criteria provided by the Jordanian Chamber of Industry and Commerce, which divides companies into two distinct groups. The first category includes organizations with a capital of 30 thousand Jordanian dinars or more and a workforce of 10 employees or more. The second category encompasses organizations with a capital of less than 30 thousand Jordanian dinars and a workforce of fewer than 10 employees.

For this study, the sampling strategy exclusively targeted the first category, this category is anticipated to house companies with larger operational capacities, intricate supply chain structures, and potentially more sophisticated demand planning processes. By narrowing the study to this specific subset, the objective is to extract insights reflective of the broader dynamics and challenges faced by organizations with significant capital investment in the FMCG sector. Notably, a capital increase is associated with a more extensive planning process and supply chain operations (Wang, Chin, and Ting, 2023).

A stratified sampling approach was employed for this study. Companies were stratified based on their capital, with a particular emphasis on the first category (capital above 30,000 JOD and a workforce of 10 employees or more). The survey was then distributed to all eligible companies through an online platform, facilitating efficient data collection and analysis.

Table (3. 1) Population of FMCG companies in Joran

Sector	Population (Number of Companies)		
	First Category	**Second Category**	**Total**
Food and Beverages	193	5,503	5,696
Health and Personal Care Products	163	3,605	3,768
Household and Cleaning Products	79	3,470	3,549
	435	12,578	13,013

Source: Companies Control Department

Unit of Analysis

The unit of analysis for this survey consists of employees in supply chain positions or related roles within Fast-Moving Consumer Goods (FMCG) companies in Jordan. The chosen positions encompass a range from general managers to officers, ensuring a diverse representation. The decision to include individuals across these roles is strategic, aiming to capture varied perspectives and insights. General and deputy general managers contribute high-level strategic viewpoints, while department managers coordinate specific functions. Section heads oversee critical segments, and supervisors and officers play pivotal roles in day-to-day operations. This comprehensive approach enables a nuanced understanding of challenges and strategies at different levels of the supply chain hierarchy. The outreach efforts resulted in a final sample size of 679 respondents, emphasizing the inclusivity of the survey. This diverse representation enhances the study's validity by incorporating insights from individuals with varying responsibilities within the FMCG supply chain. The selected positions collectively contribute to a holistic

examination of supply chain dynamics, offering valuable insights for strategic planning and operational optimization within the FMCG sector in Jordan.

3.4 Data Collection Methods (Tools)

For data collection, we designed a constructed questionnaire tailored to our research objectives where questions underwent a thorough review by field experts and a small pilot test was conducted to ensure the clarity, validity, and reliability of the questionnaire relying on the data that have been collected from two sources:

Secondary Data: Information derived from books, theses, articles, journals, dissertations, and online sources extensively utilized to formulate the theoretical framework of the study.

Primary Data: Acquired through the online dissemination of an organized questionnaire among individuals occupying supply chain roles and other relevant professionals within selected Fast-Moving Consumer Goods (FMCG) companies.

Study Instrument (Tool): The questionnaire

The initial step involved the researcher reviewing relevant theoretical literature and previous research to construct the questionnaire. This survey is designed to understand the impact of demand planning processes on supply chain performance. A panel of judges and referees selected from distinguished academics across different universities and industry experts with substantial backgrounds in paint manufacturing, as outlined in Appendix (2) of the Referee Committee where the finalized questionnaire consisted of four parts detailed in Appendix (1) which are:

Demographic data: The demographic data encompassed participants' age, experience, education, and position within the study.

Company background: explored the industry field, the presence of Enterprise Resource Planning (ERP), Customer Relationship Management system (CRM), and Supplier Relationship Management. Additionally, it examined the range of stock varieties represented by the number of stock-keeping units (SKUs) the company operates with.

Independent variable (demand planning processes): There are twenty-one metrics spread across three dimensions that are used to measure the level of implementation of demand planning processes, as shown in Table (3.2)

Table (3. 2) Sub-variables of Demand Planning Processes Dimensions

Dimension	No. of Items	No. of Sequence
Demand Forecasting	7	1-7
Sales and Operation Planning (S&OP)	7	8-14
Demand Collaborating	7	15-21

Dependent variable (Supply chain performance): There are nineteen metrics spread across three dimensions that are used to measure the level of implementation of supply chain performance, as shown in Table (3.3)

Table (3. 3) Sub-variables of Supply Chain Performance

Dimension	No. of Items	No. of Sequence
Inventory Control	6	22-27
Supply Chain Agility	7	28-34
Customer Satisfaction	6	35-40

A five-point Likert scale was utilized to assess respondents' actual perceptions, ranging from 1 indicating strong non-implementation to 5 for strong implementation.

Data Collection and Analysis

A total of 679 comprehensive survey responses were collected from November to December 2023 within the Fast-Moving Consumer Goods (FMCG) sector in Jordan, spanning 1505 companies. Every questionnaire was coded using SPSS 25, and normality

validity and reliability tests were subsequently employed to ensure the robustness and integrity of the dataset for the intended analytical procedures.

Validity Test

The validation of the questionnaire employed a comprehensive three-fold approach, encompassing content validity, face validity, and construct validity to ensure the robustness and reliability of the instrument:

1. **The content validity is** supported by gathering data from literature review sources, encompassing books, journals, papers, research studies, theses, articles, and the global web.

2. **Face validity** was validated through assessment by a panel of judges (refer to Appendix 2), we had ten experts in supply chain operations and a General Manager review it which helps the questions be easy to understand and relevant to the experiences of professionals at various levels. Their feedback is crucial in making the survey practical and valuable.

3. **Construct validity** developed using Exploratory Factor Analysis, where:

   o Principal Component Factor Analysis is employed for explanatory data confirmation. using the Varimax factor rotation method and the loading factor for each element is not less than 0.30 which is associated with the sample size. Hair. et al. (2014) consider a factor loading exceeding 0.50 as acceptable.

   o The Kaiser Meyer Olkin (KMO) measure was utilized to evaluate the adequacy of sampling, coherence, and inter-correlations. Values exceeding 0.6 are considered satisfactory, while those falling within the range of 0.8 to 1 indicate a substantial level of sampling adequacy (Cerny and Kaiser, 1977).

o Bartlett's Sphericity Test (BST) is employed to signify the appropriateness of factor analysis, with a significance level below 0.05 at a 95% confidence level indicating the application of factor analysis (Cerny and Kaiser, 1977).

o The minimum eigenvalue used in determining the number of factors to extract from the correlation matrix is anticipated to exceed the value of 1.

Demand Forecasting

Table (3.4) summarizes the outcomes of a Principal Component Analysis (PCA) on demand forecasting processes and their impact on supply chain performance. The positive factor loadings (F1) ranging from 0.629 to 0.862 indicate a strong association between all items and the underlying factor, suggesting a cohesive relationship between these demand forecasting processes. The high KMO Measure of Sampling Adequacy (KMO) value of 0.913 and the significant Chi2 value of 3189 affirm the suitability of the data for PCA. The eigenvalue of 4.722 for the first factor (F1) is substantial, explaining 67.463% of the total variance. This underscores the importance of F1 in influencing the demand forecasting process within the context of supply chain performance. Items 1-7, which include employing digital systems, relying on historical data, monitoring competitors, tracking emerging markets, developing customer databases, monitoring economic indicators, and regularly updating forecasting results, all positively contribute to the effectiveness of demand forecasting, these findings suggest that companies embracing these processes are more likely to enhance their supply chain performance.

Table (3. 4) Principal Component Analysis of Demand Forecasting

No.	Item	F1	KMO	Chi2	BTS	Eigen Values	Var %	Sig
1	The company employs a digital system for demand prediction	0.629						
2	The company relies on historical data for demand predictions	0.839						
3	The company monitors competitor activities	0.827						
4	The company tracks emerging markets	0.848	0.913	3189	21	4.722	67.463	0.000
5	The company develops a customer database	0.862						
6	The company monitors economic indicators for forecasting	0.860						
7	The company regularly updates the demand forecasting results	0.859						

The results underscore the significance of employing digital tools, leveraging historical data, and staying informed about market dynamics. Companies that prioritize maintaining customer databases, monitoring economic indicators, and regularly updating forecasting results are poised to improve their overall supply chain performance. These insights provide guidance g to optimize their demand planning strategies for a more integrated and responsive supply chain.

Sales and Operations Planning (S&OP)

Table (3.5) encapsulates the outcomes of a Principal Component Analysis (PCA) investigating the Sales and Operations Planning (S&OP) process, the positive factor loadings (F1) ranging from 0.775 to 0.877 signify a robust positive correlation between each item and the overarching factor, underscoring the coherence of these S&OP processes, the high Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) value of 0.925 and the significant Chi2 value of 3524 affirm the appropriateness of the data for

PCA. The eigenvalue of 4.985 for the primary factor (F1) is substantial, elucidating that

it explains a noteworthy 71.215% of the total variance.

Table (3. 5) Principal Component Analysis of S&OP

No.	Item	F1	KMO	Chi2	BTS	Eigen Values	Var %	Sig
1	The company generates regular reports about customer feedback	0.775	0.925	3524	21	4.985	71.215	0.000
2	The company develops products in response to market research	0.847						
3	The company aligns production priorities based on market needs	0.877						
4	The company engages procurement in the production planning process	0.848						
5	The company reconciles deviations in the operational plan and financial forecasts	0.863						
6	The company holds monthly meetings to balance demand and rough-cut capacity	0.854						
7	The company incorporates operational plans into profit and loss	0.840						

This underscores the pivotal role of F1 in influencing the S&OP process. Items 1-7,

which encompass generating regular customer feedback reports, developing products

aligned with market research, adjusting production priorities to meet market needs,

involving procurement in the production planning process, reconciling operational plan

deviations, conducting monthly meetings to balance demand and capacity, and integrating

operational plans into profit and loss considerations, collectively contribute to the efficacy

of S&OP.

In practical terms, these findings suggest that companies adopting these S&OP

processes are likely to enhance operational efficiency and strategic alignment with market

dynamics. The emphasis on customer feedback, market-driven product development, and the seamless performance of production, procurement, and financial considerations signifies a holistic and integrated approach to S&OP.

Demand Collaborating

Table (3.6) provides insights from a Principal Component Analysis (PCA) investigating demand collaboration processes. The positive factor loadings (ranging from 0.793 to 0.876) underscore a robust positive correlation between individual items and the overarching factor (F1).

Table (3. 6) Principal Component Analysis of Demand Collaborating

No.	Item	F1	KMO	Chi2	BTS	Eigen Values	Sig
1	The company mandates the sales team to inform management about demand changes	0.828					
2	The company necessitates informing the planning team when preparing promotional offers	0.826					
3	The company openly exchanges information with its key suppliers	0.793					
4	The company encourages idea-sharing among team members	0.876	0.928	3374	21	4.922	0.000
5	The company engages key stakeholders in its operational planning	0.842					
6	The company implements a structured process for seamless R&D	0.835					
7	The company incorporates strategic flexibility in formulating its strategies	0.867					

The high Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) value of 0.928 and the significant Chi2 value of 3374.348 affirm the appropriateness of the dataset for PCA. The eigenvalue of 4.922 for the primary factor (F1) explains a substantial 70.310% of the total variance, indicating its critical role in influencing demand collaboration processes. Items 1-7 collectively contribute to effective demand

collaboration, emphasizing processes like mandating the sales team to promptly inform management about demand changes, requiring communication with the planning team during promotional offer preparations, fostering open information exchange with key suppliers, promoting idea-sharing among team members, involving key stakeholders in operational planning, implementing a structured process for seamless Research and Development (R&D), and incorporating strategic flexibility into strategy formulation. These findings suggest that companies adopting these demand collaboration processes are likely to cultivate a more integrated and responsive approach to demand management.

The emphasis on transparent communication with internal and external stakeholders, coupled with the encouragement of idea-sharing and strategic flexibility, reflects a holistic strategy aimed at enhancing collaboration throughout the demand chain. These insights offer valuable guidance for businesses seeking to optimize their demand collaboration strategies, thereby contributing to improved overall performance and adaptability within their operational framework.

Principal Component of Independent Variable Dimensions (Demand Planning Processes)

Table (3.7) encompasses three vital dimensions: Demand Forecasting, Sales and Operations Planning (S&OP), and Demand Collaboration. The positive factor loadings (ranging from 0.908 to 0.935) underscore robust correlations between each independent variable and the common underlying factor (F1), while individual KMO values for Demand Forecasting, S&OP, and Demand Collaboration offer varying insights into sampling adequacy, the collective significant Chi2 value of 1452 supports the appropriateness of the data for Principal Component Analysis (PCA) across the spectrum of independent variables.

Table (3. 7) Principal Component Analysis of Demand Planning Processes

No.	Item	F1	KMO	Chi2	BTS	Eigen values	Sig
1	Demand Forecasting	0.908					
2	Sales and Operation Planning (S&OP)	0.935	0.753	1452	3	2.565	0.000
3	Demand Collaboration	0.931					

The eigenvalues for Demand Forecasting (2.565), S&OP (not specified), and Demand Collaboration (not specified) collectively contribute to explaining a substantial 85.512% of the total variance. This cohesive representation implies an inherent synergy among the dimensions, suggesting that an overarching factor (F1) influences Demand Forecasting, S&OP, and Demand Collaboration.

Practically, these findings underscore the interdependence of effective demand forecasting, streamlined operations planning, and collaborative demand management within the supply chain. Organizations can leverage these insights to formulate comprehensive strategies that harmonize these dimensions, thereby promoting improved supply chain performance and overall performance. The amalgamated analysis provides a holistic viewpoint, empowering businesses to strategically navigate the complexities inherent in modern supply chain dynamics.

Inventory Control

As per Table (3.8), the positive factor loadings, ranging from 0.750 to 0.863, signify a strong positive correlation between each inventory control item and the dominant factor. The notable Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) value of 0.897 and the substantial Chi2 value of 2582 affirm the dataset's appropriateness for Principal Component Analysis (PCA).

Table (3. 8) Principal Component Analysis of Inventory Control

No.	Item	F1	KMO	Chi2	BTS	Eigen values	Sig
1	The company maintains a high inventory turnover rate	0.750					
2	The company maintains inventory that meets customer demands	0.862					
3	The company minimizes the duration between order placement and product arrival to customers	0.852					
4	The company assures uninterrupted production due to raw material shortages	0.862	0.897	2582	15	4.146	0.000
5	The company strategically manages expenses associated with holding inventory	0.863					
6	The company implements joint inventory management between suppliers and manufacturers	0.792					

The eigenvalue of 4.146 for the primary factor (F1) elucidates its pivotal role in explaining a significant 69.097% of the total variance. This suggests a coherent performance among the diverse inventory control processes evaluated. Practically, these findings imply that maintaining a high inventory turnover rate, aligning inventory with customer demands, minimizing order-to-arrival duration, ensuring uninterrupted production despite raw material shortages, strategically managing holding costs, and implementing collaborative inventory management processes with suppliers and manufacturers collectively contribute to the efficacy of inventory control. Businesses can strategically employ these insights to refine their inventory management strategies, promoting adaptability to market demands, cost-effectiveness, and operational resilience.

The comprehensive analysis provides valuable guidance for organizations seeking to optimize their inventory control processes within the broader context of supply chain dynamics.

Supply Chain Agility

Table (3.9) sheds light on the essential elements influencing the agility of the supply chain. The positive factor loadings, ranging from 0.781 to 0.894, indicate a robust positive correlation between each supply chain agility item and the dominant factor (F1). With a high (KMO) value of 0.922 and a significant Chi2 value of 3353, the dataset demonstrates exceptional suitability for Principal Component Analysis (PCA), the eigenvalue of 4.869 for the primary factor (F1) reveals its pivotal role, explaining a substantial 69.560% of the total variance.

Table (3. 9) Principal Component Analysis of Supply Chain Agility

No.	Item	F1	KMO	Chi2	BTS	Eigen values	Sig
1	The company's suppliers consistently meet our requirements	0.817					
2	The company switches suppliers to meet unexpected demand spikes	0.781					
3	The company responds to market changes promptly	0.894					
4	The company accurately forecasts market demand	0.837	0.922	3354	21	4.869	0.000
5	The company adjusts production scheduling based on demand fluctuations	0.874					
6	The company optimizes product development time	0.790					
7	The company controls the cost of goods sold	0.840					

This suggests a cohesive performance among the diverse processes evaluated in the context of supply chain agility. In practical terms, these findings imply that ensuring supplier reliability, promptly responding to market changes, accurately forecasting market demand, adjusting production scheduling based on demand fluctuations, optimizing product development time, and controlling the cost of goods sold collectively contribute to enhancing the agility of the supply chain.

Businesses can strategically leverage these insights to fortify their supply chain agility, fostering adaptability and responsiveness to the dynamic landscape of market conditions. The comprehensive analysis encapsulated in Table (3.9) provides actionable guidance for organizations seeking to optimize their supply chain agility within the broader framework of operational excellence.

Customer Satisfaction

Table (3.10) illuminates the critical factors that influence customer satisfaction within a business framework.

Table (3. 10) Principal Component Analysis of Customer Satisfaction

No.	Item	F1	KMO	Chi2	BTS	Eigen Values	Sig
1	The company provides products that meet customer expectations	0.909					
2	The company responds to customer inquiries promptly	0.906					
3	The company guarantees on-time delivery orders	0.909					
4	The company prices the products according to the provided value	0.900	0.921	3928	15	4.780	0.000
5	The company proactively treats potential issues before they escalate	0.829					
6	The company fosters customer loyalty	0.900					

The positive factor loadings, ranging from 0.829 to 0.909, signify a robust positive correlation between each customer satisfaction item and the dominant factor (F1), the high Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) value of 0.921 and the substantial Chi2 value of 3927.954 affirm the dataset's exceptional suitability for Principal Component Analysis (PCA). The eigenvalue of 4.780 for the primary factor

(F1) underscores its pivotal role, explaining a noteworthy 79.674% of the total variance which suggests a cohesive performance among the customer satisfaction. Practically, these findings imply that ensuring products meet customer expectations, responding promptly to inquiries, guaranteeing on-time delivery, pricing products according to perceived value, proactively addressing potential issues, and fostering customer loyalty collectively contribute to elevating customer satisfaction. Businesses can strategically utilize these insights to refine their customer satisfaction strategies, enhancing overall customer experience and fostering sustained customer loyalty. The comprehensive analysis encapsulated in Table (3.10) provides valuable guidance for organizations seeking to optimize their customer satisfaction processes within the broader context of customer-centric business strategies.

Principal Component of Dependent Variable Dimensions (Supply Chain Performance)

Table (3.11) consolidates a comprehensive analysis of three pivotal dimensions: Inventory Control, Supply Chain Agility, and Customer Satisfaction. The positive factor loadings, ranging from 0.931 to 0.952, underscore a robust positive correlation between each dependent variable and the overarching factor (F1). Where KMO measures sampling adequacy values for Inventory Control (0.758), Supply Chain Agility (not specified), and Customer Satisfaction (not specified) indicate varying degrees of sampling adequacy, the collective significant Chi2 value of 1699.639 attests to the suitability of the data for Principal Component Analysis (PCA). The eigenvalue of 2.643 for the primary factor (F1) elucidates its significant role, explaining a noteworthy 88.087% of the total variance. This suggests a cohesive integration among the diverse dimensions evaluated in the context of Inventory Control, Supply Chain Agility, and Customer Satisfaction.

Table (3. 11) Principal Component Analysis of Dependent Variables

No.	Item	F1	KMO	Chi2	BTS	Eigen Values	Sig
1	Inventory Control	0.931					
2	Supply Chain Agility	0.952	0.758	1700	3	2.643	0.000
3	Customer Satisfaction	0.932					

These findings imply that effective management of Inventory Control, fostering robust Supply Chain Agility, and ensuring high levels of Customer Satisfaction collectively contribute to the overarching factor (F1). Businesses can strategically leverage these insights to develop holistic operational strategies, fostering improved supply chain performance, adaptability, and customer-centric processes. The amalgamated analysis in Table (3.11) provides actionable guidance for organizations aiming to optimize their overall operational performance and customer relations within the broader framework of supply chain dynamics.

Reliability Test (Cronbach's Alpha):

The reliability of the research instrument, particularly the sub-variables for demand planning and supply chain performance, underwent thorough evaluation using Cronbach's Alpha coefficient. According to Sekaran and Bougie (2016), a Cronbach's Alpha value surpassing 0.70 is statistically acceptable, signifying high internal consistency. Furthermore, Hair. et al. (2014) assert that instruments with Cronbach's Alpha values above 0.70 are reliable, and values exceeding 0.60 are considered acceptable. In Table (3.12), the reliability coefficients for the demand planning sub-variables demonstrate robust internal consistency, ranging from 0.918 to 0.966. Similarly, the reliability coefficients for supply chain performance fall within the high-reliability range, spanning from 0.91 to 0.969. These results affirm the reliability of the questionnaire items associated with demand planning and supply chain performance, providing confidence in

the consistency and stability of the data collected for these crucial components of the study.

Table (3. 12) Reliability Test for all variables

Variable	Cronbach's Alpha	No. of Items
Demand Planning Processes	**0.966**	**21**
Demand Forecasting	0.918	7
Sales and Operation Planning (S&OP)	0.932	7
Demand Collaboration	0.929	7
Supply Chain Performance	**0.969**	**19**
Inventory Control	0.910	6
Supply Chain Agility	0.927	7
Customer Satisfaction	0.949	6

Demographic Analysis and Companies Background

The demographic analysis in the following sections is derived from the attributes of the valid respondents, encompassing details such as age, experience, education, position, industry field, technological landscape, and product variety landscape.

Age:

Table (3.13) presents a comprehensive overview of the age distribution among respondents, shedding light on the demographic composition of participants in the study. The data reveals a balanced representation across different age categories. Notably, individuals aged less than 30 constitute 24.4% of the sample, indicating a significant presence of younger professionals. Similarly, the 30 to less than 35 age group represents 27.5% of respondents, suggesting a consistent distribution in the early to mid-thirties range. Equally noteworthy is the 24.0% each attributed to the 35 to less than 40 and 40 and above age groups, emphasizing an even distribution among older demographics. This diverse age representation carries implications for the study.

Table (3. 13) Respondents' Age in Years

Scheme	Frequency	%
Less than 30	166	24.4%
30- Less than 35	187	27.5%
35-Less than 40	163	24.0%
40 and above	163	24.0%
679		

The well-balanced distribution ensures that insights garnered from the research are reflective of a broad spectrum of age demographics within the FMCG sector. The varied perspectives and experiences across age groups contribute to the robustness and applicability of the study's findings. Additionally, the proportions are equal in each age category underscoring the study's ability to capture a comprehensive view of how professionals across various stages of their careers perceive and engage with demand planning processes and supply chain performance. Future analyses may delve deeper into potential age-related nuances, offering richer insights into the interplay between age and perspectives on supply chain dynamics.

Experience:

Table (3.14) provides an insightful breakdown of the professional experience levels of the respondents, offering a comprehensive understanding of the tenure distribution within the sample. The data underscores a balanced representation of participants across various experience categories. Notably, individuals with less than 5 years of experience constitute 23.1% of the respondents, suggesting a substantial presence of early-career professionals. Similarly, the five to less than ten years category accounts for 24.0%, indicating a consistent distribution among mid-career professionals. The subsequent categories, ten to less than fifteen years and fifteen and above, each represent 24.9% and 28.0%, respectively, signifying a higher concentration of respondents with extensive professional experience. This balanced distribution across experience levels enhances the robustness of the study's findings.

Table (3. 14) Respondents' Experience in Years

Scheme	Frequency	%
Less than 5	157	23.1%
5 - Less than 10	163	24.0%
10 - Less than 15	169	24.9%
15 and above	190	28.0%
679		

The diverse range of experience among participants ensures a multifaceted exploration of how professionals at various stages of their careers perceive and engage with demand planning processes and supply chain performance. The study's outcomes are to capture a holistic view of the challenges and opportunities associated with the supply chain, incorporating insights from both emerging and seasoned professionals.

Education

Table (3.15) sheds light on the educational qualifications of the respondents, offering a nuanced perspective on the academic backgrounds within the surveyed sample. The distribution underscores a diverse representation of educational levels among the participants. A considerable proportion of respondents, amounting to 72.5%, have attained a bachelor's degree, indicating a robust educational background among the surveyed professionals. Additionally, 16.1% of respondents have pursued a master's degree, underscoring the notable presence of individuals with advanced academic qualifications. Moreover, 9.7% of participants possess a Diploma, suggesting the existence of professionals with specialized training beyond the high school level. A noteworthy observation is the smaller yet considerable proportion of respondents with Ph.D. qualifications, amounting to 1.8%. This indicates the inclusion of highly educated individuals with extensive academic expertise in the surveyed cohort. This diverse educational profile enhances the study's credibility by incorporating insights from individuals with varied levels of academic attainment.

Table (3. 15) Respondents Education

Level	Frequency	%
Diploma	66	9.7%
Bachelor	492	72.5%
Master	109	16.1%
Ph.D.	12	1.8%
679		

This reflects a comprehensive understanding of how professionals with different educational backgrounds perceive and contribute to demand planning processes and supply chain performance. Future research endeavors could explore potential correlations between educational qualifications and specific perspectives on supply chain management within the FMCG sector.

Position:

Table (3.16) outlines the professional positions held by the respondents, providing valuable insights into the organizational hierarchy and the distribution of roles among the surveyed individuals. The data highlights a diverse array of positions, offering a holistic understanding of the perspectives contributing to the study.

The largest segment in terms of position is the "Department Manager/Head of Section" category, representing 39.5% of the respondents. This substantial proportion indicates that many surveyed individuals hold key managerial roles responsible for overseeing specific departments or sections within their organizations. Their perspectives are likely to hold considerable significance in comprehending the ramifications of demand planning processes on supply chain performance. The next notable category is "Supervisor," constituting 21.8% of the respondents. This group represents mid-level management, often tasked with direct oversight of operational processes.

Table (3. 16) Respondents' Position

Position	Frequency	%
General Manager/Deputy General Manager	58	8.5%
Department Manager/Head of Section	268	39.5%
Supervisor	148	21.8%
Officer	205	30.2%
679		

Their perspectives are crucial in gauging the on-the-ground impact of demand planning processes within the Fast-Moving Consumer Goods (FMCG) sector, where Officers and General Manager/Deputy General Manager categories are also present, accounting for 30.2% and 8.5%, respectively. These positions, spanning from entry-level roles to upper management, contribute to a comprehensive view of how different organizational levels perceive and engage with demand planning and its effects on supply chain performance.

The distribution across various positions enriches the study by incorporating perspectives from multiple tiers of organizational hierarchies. This inclusivity enhances the validity of the findings, ensuring a well-rounded exploration of the research questions from different professional vantage points.

Industry Field:

Table (3.17) illustrates the distribution of respondents across different industry fields within the FMCG sector. This breakdown allows for a nuanced exploration of how professionals from distinct industry segments perceive and engage with demand planning processes, contributing to the overall study's comprehensiveness.

The predominant industry represented in the study is "Food and Beverages" with 48.9% of the respondents belonging to this sector. This substantial percentage suggests

that the findings are particularly reflective of the dynamics within the food and beverages industry, emphasizing its significance in the research outcomes.

Table (3. 17) Respondents' Industry Field

Industry	Frequency	%
Food and Beverages	332	48.9%
Health and Personal Care Products	218	32.1%
Household and Cleaning Products	129	19.0%
679		

A thorough examination of the nuances and challenges specific to this sector provides targeted insights for organizations operating in this field. The "Health and Personal Care Products" industry follows, comprising 32.1% of the respondents. This segment adds diversity to the study, ensuring a more holistic understanding by incorporating perspectives from professionals in the health and personal care products industry. The distinct characteristics of this sector may introduce unique considerations in the realm of demand planning and supply chain performance. The "Household and Cleaning Products" industry, while representing a smaller portion at 19.0%, remains a significant component of the study. The insights from this sector contribute to the broader picture, enabling comparisons and contrasts with the other industries. This diversity enhances the generalizability of the study's findings, recognizing the variations in demand planning processes across different FMCG industry segments. In summary, the distribution across industry fields in Table (3.17) enriches the study by acknowledging the heterogeneity within the FMCG sector. It allows for tailored insights based on industry-specific challenges and processes, reinforcing the relevance and applicability of the research outcomes to a broader spectrum of FMCG organizations.

Technological Landscape:

Table (3.18) delves into the technological landscape within the FMCG sector, specifically exploring the availability of Supplier Relationship Management SRM, Enterprise Resource Planning ERP, and Customer Relationship Management CRM systems among the surveyed respondents. The findings reveal that most respondents have access to ERP systems, with 541 out of 679 respondents reporting their availability. This represents a substantial 79.7% of the respondents, indicating a widespread adoption of ERP systems within the FMCG organizations under study.

Table (3. 18) Technological Landscape

System	Frequency			%		
	System Available	System Not Available	Total	System Available	System Not Available	Total
ERP	541	138	679	79.7%	20.3%	100.0%
CRM	273	406	679	40.2%	59.8%	100.0%
SRM	337	342	679	49.6%	50.4%	100.0%

This prevalence suggests a significant reliance on ERP solutions for overseeing diverse business processes, encompassing demand planning and supply chain activities. Concerning CRM systems, the data show that 273 out of 679 respondents have access to them, constituting 40.2% of the surveyed sample. While not as universally adopted as ERP systems, CRM systems remain a significant component of the technological landscape in the FMCG sector. This availability signifies a recognition of the importance of customer relationship management in the circumstance of demand.

Supplier Relationship Management (SRM) was reported to be available to 337 out of 679 respondents, representing 49.6% of the surveyed sample. This indicates a considerable utilization of SRM systems within FMCG organizations, emphasizing the recognition of the strategic role played by supplier relationships in the supply chain dynamics.

Product Variety Landscape:

Table (3.19) sheds light on the product variety landscape within the Fast-Moving Consumer Goods (FMCG) sector, offering valuable insights into the distribution of respondents across distinct categories of stock-keeping units (SKUs). The data reveal that a substantial portion of respondents, specifically 241 out of 679, are associated with organizations managing less than 100 SKUs. This category represents 35.5% of the surveyed sample, indicating a significant presence of FMCG companies with a comparatively restricted number of stock-keeping units. Organizations in this group may benefit from demand planning strategies tailored to a more focused product assortment.

Table (3. 19) Product Variety Landscape

Number of stock-keeping units (SKUs)	Frequency	%
Less than 100	241	35.5%
100- Less than 250	160	23.6%
250 and above	278	40.9%
679		

Another noteworthy segment consists of organizations managing 100 to less than 250 SKUs, accounting for 160 out of 679 respondents or 23.6%. This category represents companies with a moderate number of SKUs, requiring demand planning processes that cater to a more diverse product assortment compared to the first group. The largest segment, comprising 278 out of 679 respondents or 40.9%, corresponds to organizations managing 250 and above SKUs. This indicates a considerable number of FMCG companies with an extensive product portfolio, necessitating sophisticated demand planning strategies to manage the complexities associated with a diverse range of stock-keeping units.

In summary, Table (3.19) provides a nuanced understanding of the product variety landscape within the FMCG sector, emphasizing the diversity among surveyed organizations in terms of the number of stock-keeping units. This diversity underscores the importance of tailoring demand planning processes to align with the specific challenges posed by varying SKU counts.

Chapter Four

Analysis and Results

4.1 Introduction

In this chapter, we delve into a comprehensive analysis aimed at addressing the key questions laid out in Chapter 1. The first two questions focused on the current state of demand planning processes and the degree of supply chain performance within the FMCG industries in Jordan were thoroughly examined using descriptive analysis. This method provides a detailed overview of the existing landscape in these crucial areas.

Additionally, we employ the correlation test to explore the intricate relationships between demand planning processes and various dimensions of supply chain performance, as posed in question 3. Lastly, question 4, which probes into the impact of demand planning processes on supply chain performance dimensions, is tackled through multiple regression analyses. This robust analytical approach aims to unravel the dynamics and intricacies within the FMCG industry in Jordan, offering valuable insights for both academic discourse and practical implications. The subsequent sections meticulously present the findings, paving the way for a nuanced understanding of the industry's demand planning processes and supply chain performance.

4.2 Descriptive Statistical Analysis

To rigorously examine the study hypotheses, the analysis utilized SPSS 25 software, employing robust statistical methods for a thorough descriptive analysis. Metrics such as mean, standard deviation, t-value, ranking, and implementation level are intricately applied to elucidate the respondents' perceptions and the precise degree of implementation for each variable, dimension, and item. The implementation level is

meticulously categorized into three distinct segments, delineated by a predetermined formula:

$$\frac{5-1}{3} = 1.33$$

Hence, the categorization deems implementation as high if it falls within the range of 3.67-5.00, medium if it spans from 2.34 to 3.66, and low if it lies between 1.00 and 2.33.

Independent Variable (Demand Planning Processes)

The analysis of Demand Planning components, as presented in Table (4.1), provides valuable insights into the implementation levels within the FMCG industries in Jordan.

Firstly, for Demand Forecasting, the mean of 2.78 with a negative t-value of -5.73 suggests a substantial difference between the observed and assumed averages. This indicates a lower-than-expected implementation level, emphasizing the need for potential improvements in demand forecasting processes. In the case of Sales and Operation Planning (S&OP), the mean of 2.81 and a negative t-value of -4.96 reveal a significant difference, suggesting that the current implementation level is below the assumed average. This highlights an area that may benefit from strategic enhancements and attention. Demand Collaboration exhibits a mean of 2.76 with a negative t-value of -6.41 <T-tabulated = 1.96, indicating a substantial difference and signaling a potential gap in collaborative processes that could be addressed for improvement.

Considering Demand Planning Processes overall, the mean of 2.78 and a negative t-value of -6.15 further emphasize a significant difference between observed and hypothetical means. This underscores the importance of a comprehensive approach to enhancing demand planning processes.

Table (4. 1) Mean, Standard deviation, T-value, Ranking, and implementation level toward Demand Planning

No	Item	Mean	S.D.	T	Sig	Rank	Imp.
1	Demand Forecasting	2.78	0.98	-5.73	0.00	2	Medium
2	Sales and Operation Planning (S&OP)	2.81	1.02	-4.96	0.00	1	Medium
3	Demand Collaboration	2.76	0.97	-6.41	0.00	3	Medium
	Demand Planning Processes	2.78	0.91	-6.15	0.00	-	Medium

T-tabulated = 1.96

In summary, the negative t-values across all components collectively suggest that the observed implementation levels in demand planning processes are notably lower than the average of 3. This signifies key areas for improvement within the FMCG industries in Jordan, highlighting the potential for strategic enhancements and targeted interventions to elevate demand planning processes.

Demand Forecasting:

Analyzing the demand forecasting strategies demonstrated in Table (4.2), mean values range from 2.71 to 2.85, indicating a relatively consistent average impact. Standard deviations vary from 0.984 to 1.27, suggesting differences in the precision of strategy implementations. All strategies are classified as Medium in terms of implementation level, reflecting a balanced organizational approach. Notably, t-values are consistently negative, ranging from -6.22 to -3.29. The minimum t-value, associated with monitoring competitor activities, underscores a significant negative impact, necessitating careful attention. Meanwhile, regularly updating demand forecasting results, with the maximum t-value, signifies a relatively less negative impact but is still crucial for evaluation. The consistently negative t-values across Demand Planning strategies underscore significant impacts and emphasize the need for a comprehensive approach to enhance planning

outcomes. The narrow range of mean values indicates a comparable average impact, necessitating a closer examination of t-values for nuanced strategy refinement.

Table (4. 2) Mean, T-value, Ranking Standard deviation, and implementation level toward demand forecasting.

No	Item	Mean	S.D	T	Sig	Rank	Imp.
1	The company employs a digital system for demand prediction	2.83	1.15	-3.85	0.00	2	Medium
2	The company relies on historical data for demand predictions	2.82	1.24	-3.73	0.00	3	Medium
3	The company monitors competitor activities	2.71	1.20	-6.22	0.00	7	Medium
4	The company tracks emerging markets	2.76	1.19	-5.30	0.00	5	Medium
5	The company develops a customer database	2.73	1.27	-5.63	0.00	6	Medium
6	The company monitors economic indicators for forecasting	2.79	1.16	-4.80	0.00	4	Medium
7	The company regularly updates the demand forecasting results	2.85	1.20	-3.29	0.00	1	Medium
	Demand Forecasting	2.78	0.98	-5.73	0.00	-	Medium

T-tabulated = 1.96

This analysis directs attention towards a holistic recalibration, focusing on strategies with stronger negative impacts. Continual monitoring and adjustment are crucial for adaptive and responsive Demand Planning processes in dynamic market conditions. The negative t-values not only signify areas for improvement but also guide a strategic overhaul to enhance overall planning efficiency.

Sales and Operation Planning (S&OP):

Upon analyzing the data for Sales and Operation Planning (S&OP) processes in the FMCG industry in Jordan, Table (4.3). Consistently negative t-values across Sales and Operation (S&OP) strategies emphasize their significant impact and underscore the need for a comprehensive approach to enhance operational planning. The narrow range of

mean values (2.72 to 2.84) indicates a comparable average impact, necessitating a closer

examination of t-values for nuanced strategy refinement.

Table (4. 3) Mean, Standard deviation, Ranking, implementation level, and T-values toward Sales and Operation

No.	Item	Mean	S.D.	t	Sig	Rank	Imp.
1	The company generates regular reports about customer feedback	2.84	1.18	-3.61	0.00	2	Medium
2	The company develops products in response to market research	2.78	1.19	-4.77	0.00	6	Medium
3	The company aligns production priorities based on market needs	2.80	1.26	-4.16	0.00	5	Medium
4	The company engages procurement in the production planning process	2.83	1.22	-3.57	0.00	3	Medium
5	The company reconciles deviations in the operational plan and financial forecasts	2.84	1.11	-3.73	0.00	1	Medium
6	The company holds monthly meetings to balance demand and rough-cut capacity	2.83	1.25	-3.53	0.00	4	Medium
7	The company incorporates operational plans into profit and loss	2.72	1.21	-5.95	0.00	7	Medium
	Total of Sales and Operation Planning (S&OP)	2.81	1.02	-4.96	0.00	-	Medium

T-tabulated = 1.96

The company's process of incorporating operational plans into profit and loss exhibits

the lowest t-value (-5.95), highlighting a substantial negative effect on the performance

process. Conversely, aligning production priorities based on market needs demonstrates

a relatively lower negative t-value (-4.16), suggesting a comparatively lesser negative

impact on production prioritization. Ranking positions and implementation levels provide

additional context, with reconciling deviations in the operational plan and financial

forecasts securing the top ranking and S&OP holding the overall 'Medium'

implementation level. In conclusion, the consistently negative t-values signify significant

areas for improvement in S&OP strategies. The variation in mean values suggests a comparable average impact, prompting the need for holistic recalibration and strategic refinement to enhance overall operational planning efficiency within the organization.

Demand Collaboration:

Analyzing Table (4.4), which provides insights into Demand Collaboration strategies, the consistently negative t-values, ranging from -4.03 to -6.87, underscore the substantial impact of these strategies, emphasizing the necessity of a comprehensive approach to enhancing demand collaboration. The narrow range of mean values (2.71 to 2.82) indicates a relatively consistent average impact, prompting a closer examination of t-values for informed strategy refinement.

Table (4. 4) Mean, Standard deviation, Ranking T-Values, and implementation level toward Demand Collaboration

No.	Item	Mean	S.D.	T	Sig.	Rank	Imp.
1	The company mandates the sales team to inform management about demand changes	2.75	1.24	-5.28	0.00	5	Medium
2	The company necessitates informing the planning team when preparing promotional offers	2.71	1.20	-6.31	0.00	7	Medium
3	The company openly exchanges information with its key suppliers	2.81	1.10	-4.57	0.00	2	Medium
4	The company encourages idea-sharing among team members	2.76	1.19	-5.22	0.00	4	Medium
5	The company engages key stakeholders in its operation planning	2.82	1.13	-4.03	0.00	1	Medium
6	The company implements a structured process for seamless R&D	2.71	1.09	-6.87	0.00	6	Medium
7	The company incorporates strategic flexibility in formulating its strategies	2.77	1.12	-5.31	0.00	3	Medium
	Total of Demand Collaboration	2.76	0.97	-6.41	0.00	-	Medium

T-tabulated = 1.96

Notably, the implementation of a structured process for seamless R&D demonstrates the lowest t-value (-6.87), signifying a pronounced negative impact on the performance

of research and development processes. Conversely, engaging key stakeholders in operational planning exhibits a lower negative t-value (-4.03), suggesting a comparatively lesser negative impact on stakeholder involvement. Ranking positions and implementation levels offer additional context, with engaging key stakeholders securing the top ranking and the overall 'Medium' implementation level for Demand Collaboration.

In conclusion, the consistently negative t-values indicate critical areas for improvement in Demand Collaboration strategies. The narrow variation in mean values suggests a comparable average impact, reinforcing the need for holistic recalibration and strategic refinement to enhance overall collaboration efficiency within the organization.

Dependent Variable (Supply Chain Performance)

The comprehensive evaluation of supply chain performance processes encapsulated in Table (4.5), provides valuable insights into the organization's performance processes. The consistently negative t-values, ranging from -3.74 to -6.16, underscore the substantial impact of these strategies and emphasize the importance of a comprehensive approach to enhance supply chain performance. The narrow range of mean values (2.78 to 2.84) indicates a consistent average impact, prompting a closer examination of t-values for nuanced strategy refinement.

Table (4. 5) Mean, Standard deviation T-Values, Ranking, and implementation level toward Supply Chain Performance

No.	Item	Mean	S.D.	T	Sig.	Rank	Imp.
1	Inventory Control	2.78	0.94	-6.16	0.00	3	Medium
2	Supply Chain Agility	2.83	0.93	-4.82	0.00	2	Medium
3	Customer Satisfaction	2.84	1.08	-3.74	0.00	1	Medium
	Supply Chain Performance	2.82	0.92	-5.17	0.00	-	Medium

T-tabulated = 1.96

Inventory Control demonstrates the lowest t-value (-6.16), highlighting a significant negative impact on the inventory management processes. Conversely, Customer

Satisfaction exhibits a lower negative t-value (-3.74), suggesting a comparatively lesser negative impact on customer-centric processes. Ranking positions and implementation levels offer additional context, with Customer Satisfaction securing the top ranking and the overall 'Medium' implementation level for Supply Chain Performance.

In conclusion, the consistently negative t-values underscore critical areas for improvement in Supply Chain Performance strategies. The narrow variation in mean values suggests a comparable average impact, reinforcing the need for holistic recalibration and strategic refinement to enhance overall performance efficiency within the organization.

Inventory Control

Examining Table (4.6) about inventory control, the consistently negative t-values, ranging from -2.96 to -8.96, emphasize the significant impact of these strategies and highlight the need for a comprehensive approach to enhance inventory control. The narrow range of mean values (2.62 to 2.88) indicates a consistent average impact, prompting a closer examination of t-values for nuanced strategy refinement.

Table (4. 6) Mean, Standard deviations, T-value, Ranking, and implementation level toward Inventory Control

No	Item	Mean	S.D.	T	Sig.	Rank	Imp.
1	The company maintains a high inventory turnover rate	2.88	1.06	-2.96	0.00	1	Medium
2	The company maintains inventory that meets customer demands	2.85	1.20	-3.37	0.00	2	Medium
3	The company minimizes the duration between order placement and product arrival to customers	2.75	1.16	-5.57	0.00	5	Medium
4	The company assures uninterrupted production due to raw material shortages	2.79	1.18	-4.57	0.00	3	Medium
5	The company strategically manages expenses associated with holding inventory	2.77	1.11	-5.39	0.00	4	Medium
6	The company implements joint inventory management between suppliers and manufacturers	2.62	1.10	-8.96	0.00	6	Medium
	Inventory Control	2.78	0.94	-6.16	0.00	-	Medium

T-tabulated = 1.96

Maintaining a high inventory turnover rate demonstrates the lowest t-value (-2.96), suggesting a notable negative impact on the efficiency of inventory turnover. Conversely, assuring uninterrupted production due to raw material shortages exhibits the highest negative t-value (-8.96), indicating a pronounced negative effect on production stability. Ranking positions and implementation levels provide additional context, with maintaining a high inventory turnover rate securing the top ranking and the overall 'Medium' implementation level for Inventory Control.

In conclusion, the consistently negative t-values signify significant areas for improvement in Inventory Control strategies. The narrow variation in mean values suggests a comparable average impact, reinforcing the need for holistic recalibration and strategic refinement to enhance overall inventory management efficiency within the organization.

Supply Chain Agility

Analyzing Table (4.7) for Supply Chain Agility strategies provides crucial insights into the organization's agility in responding to dynamic market conditions.

Consistently negative t-values, ranging from -2.28 to -5.05, underscore the substantial impact of these strategies, emphasizing the necessity of a comprehensive approach to enhance supply chain agility. The narrow range of mean values (2.78 to 2.90) indicates a consistent average impact, prompting a closer examination of t-values for nuanced strategy refinement. Controlling the cost of goods sold exhibits the lowest t-value (-2.28), suggesting a significant negative impact on cost management processes. Conversely, switching suppliers to meet unexpected demand spikes demonstrates the highest negative t-value (-5.05), indicating a pronounced negative effect on supplier adaptation strategies. Ranking positions and implementation levels offer additional context, with controlling

the cost of goods sold securing the top ranking and the overall 'Medium' implementation level for Supply Chain Agility.

Table (4. 7) Mean, Standard deviations, T-values, Ranking, and implementation level toward Supply Chain Agility

No	Item	Mean	S.D.	t	Sig.	Rank	Imp.
1	The company's suppliers consistently meet our requirements	2.81	1.07	-4.55	0.00	4	Medium
2	The company switches suppliers to meet unexpected demand spikes	2.78	1.12	-5.05	0.00	7	Medium
3	The company responds to market changes promptly	2.81	1.13	-4.43	0.00	5	Medium
4	The company accurately forecasts market demand	2.80	1.05	-4.85	0.00	6	Medium
5	The company adjusts production scheduling based on demand fluctuations	2.82	1.21	-3.84	0.00	3	Medium
6	The company optimizes product development time	2.87	1.07	-3.25	0.00	2	Medium
7	The company controls the cost of goods sold	2.90	1.18	-2.28	0.02	1	Medium
	Total Supply Chain Agility	2.83	0.93	-4.82	0.00	-	Medium

T-tabulated = 1.96

In conclusion, the consistently negative t-values signify significant areas for improvement in Supply Chain Agility strategies. The narrow variation in mean values suggests a comparable average impact, reinforcing the need for holistic recalibration and strategic refinement to enhance overall agility in responding to market dynamics within the organization.

Customer Satisfaction

Examining Table (4.8), which outlines Mean, T-values, Ranking, Standard deviations, and Implementation level for Customer Satisfaction strategies, provides key insights into the organization's processes aimed at enhancing customer satisfaction.

Consistently negative t-values, ranging from -2.15 to -3.74, underscore the substantial impact of these strategies, highlighting the need for a comprehensive approach to elevate

customer satisfaction. The narrow range of mean values (2.82 to 2.91) indicates a consistent average impact, prompting a closer examination of t-values for nuanced strategy refinement. Proactively treating potential issues before they escalate demonstrates the lowest t-value (-2.15), suggesting a significant negative impact on issue resolution processes. Conversely, guaranteeing on-time delivery orders exhibits the highest negative t-value (-3.26), indicating a pronounced negative effect on timely delivery processes. Ranking positions and implementation levels offer additional context, with proactively treating potential issues before they escalate securing the top ranking and the overall 'Medium' implementation level for Customer Satisfaction.

Table (4. 8) Mean, T-values, Ranking, Standard deviations, and implementation level toward Customer Satisfaction

No	Item	Mean	S.D.	t	Sig.	Rank	Imp.
1	The company provides products that meet customer expectations	2.82	1.28	-3.74	0.00	6	Medium
2	The company responds to customer inquiries promptly	2.83	1.23	-3.67	0.00	6	Medium
3	The company guarantees on-time delivery orders	2.85	1.22	-3.26	0.00	2	Medium
4	The company prices the products according to the provided value	2.83	1.20	-3.60	0.00	4	Medium
5	The company proactively treats potential issues before they escalate	2.91	1.11	-2.15	0.03	1	Medium
6	The company fosters customer loyalty	2.84	1.21	-3.50	0.00	2	Medium
	Total of Customer Satisfaction	2.84	1.08	-3.74	0.00	1	Medium

T-tabulated = 1.96

In conclusion, the consistently negative t-values signify significant areas for improvement in Customer Satisfaction strategies. The narrow variation in mean values

suggests a comparable average impact, reinforcing the need for holistic recalibration and strategic refinement to enhance overall customer satisfaction within the organization.

Relationship between Independent and Dependent Variables

The Bivariate Pearson Correlation Test was employed to examine the relationships between variables, facilitating a comprehensive correlation analysis, as presented in Table (4.9), which illuminates the interrelationships between the independent and dependent variables within the context of supply chain processes.

Table (4. 9) Bivariate Pearson's Correlation (r) Among Independent Variables, Dependent Variables, and between Dependent and Independent Dimensions

Variables	Demand Forecasting	S&OP	Demand Collaborating	Demand Planning Processes	Inventory Control	Supply Chain Agility	Customer Satisfaction	Supply Chain Performance
No.	1	2	3	4	5	6	7	8
1								
2	.768**							
3	.756**	.823**						
4	.910**	.936**	.929**					
5	.728**	.791**	.761**	.822**				
6	.715**	.789**	.764**	.818**	.837**			
7	.690**	.787**	.729**	.796**	.785**	.841**		
8	.757**	.841**	.800**	.865**	.927**	.948**	.939**	

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

In Table (4.9), the focus is on the relationships between the independent variable, Demand Planning Processes, and three dependent variables: Supply Chain Performance, Inventory Control, Supply Chain Agility, and Customer Satisfaction. The correlation coefficients range from 0.690 to 0.948, all being statistically significant at the 0.01 level (2-tailed), revealing strong and meaningful associations.

Demand Planning Processes exhibit a robust positive correlation with Supply Chain Performance (0.841), indicating that as the organization refines its demand planning processes, there is a corresponding enhancement in the performance of its supply chain. This relationship underscores the pivotal role of effective demand planning in achieving a more integrated and streamlined supply chain.

Furthermore, the positive correlation between Demand Planning Processes and Inventory Control (0.761) suggests that improvements in demand planning processes are linked to more effective inventory control measures. Similarly, the correlation with Supply Chain Agility (0.837) implies that as demand planning processes become more refined, the organization is better equipped to respond swiftly to changes in the market and supply chain dynamics.

The correlation between Demand Planning Processes and Customer Satisfaction (0.939) underscores a strong connection between effective demand planning and heightened customer satisfaction. This suggests that as the organization improves its demand planning processes, it is likely to enhance its ability to meet customer expectations and demands. These findings collectively emphasize the centrality of Demand Planning Processes in influencing various dimensions of operational management, highlighting the cascading effects on Supply Chain Performance, Inventory Control, Supply Chain Agility, and Customer Satisfaction. The strong correlations emphasize the interconnected nature of these operational facets, underscoring the need for a holistic and coordinated approach to optimize organizational efficiency.

4.3 Hypothesis Testing

Upon establishing the validity, reliability, and correlation between independent and dependent variables, it is imperative to conduct the following tests to ensure the validity

of the regression analysis including normality, validity, reliability, absence of multi-collinearity, independence of errors, and correlation. These foundational presumptions establish the essential conditions for a thorough and meaningful exploration of the interrelationships among the specified variables (Sekaran, 2003).

Main Hypothesis:

H_{01}: Demand planning processes (Demand forecasting, sales and operation planning, and demand collaboration) do not affect supply chain performance in FMCG industries in Jordan, at α=0.05.

Normality: Figure (4.1) illustrates the normal distribution of the data, as the residuals do not have an impact on it.
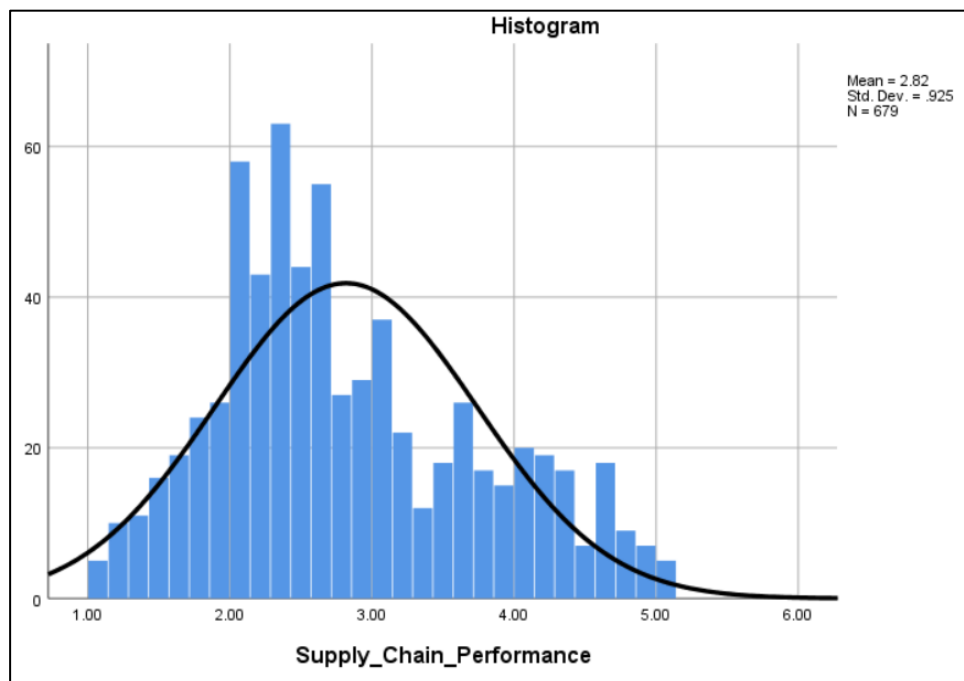
Figure (4. 1) Normality Test

Linearity Test: figure (4.2) shows that there is a linear relationship between independent and dependent variables. In such a case, the model does not violate this assumption.
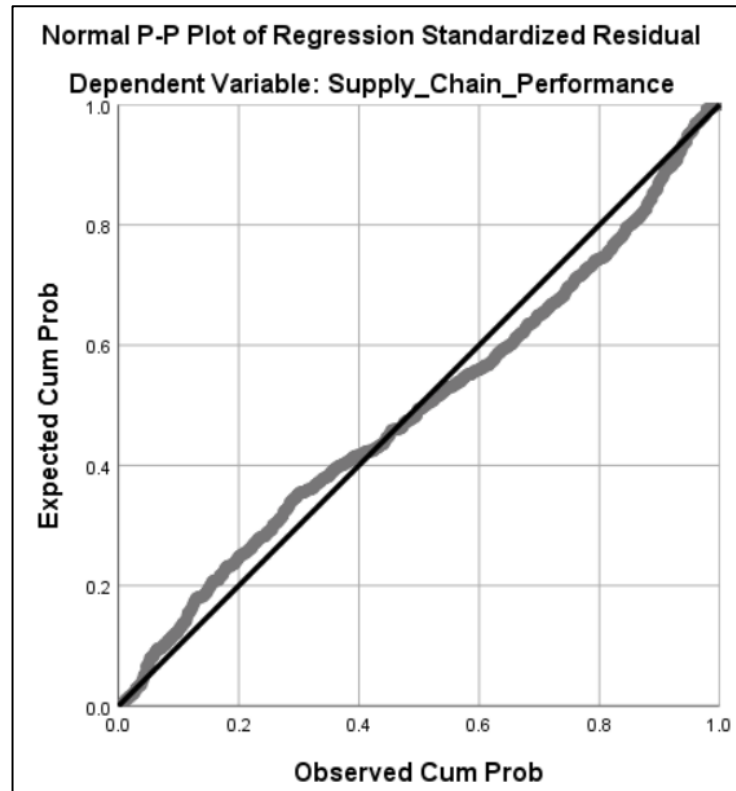
Figure (4. 2) Linearity Test

Equal variance (homoscedasticity): Figure (4.3) illustrates that the errors dispersed around the mean, indicating an absence of a discernible relationship between errors and predicted values. In such cases, the model does not contravene this assumption.
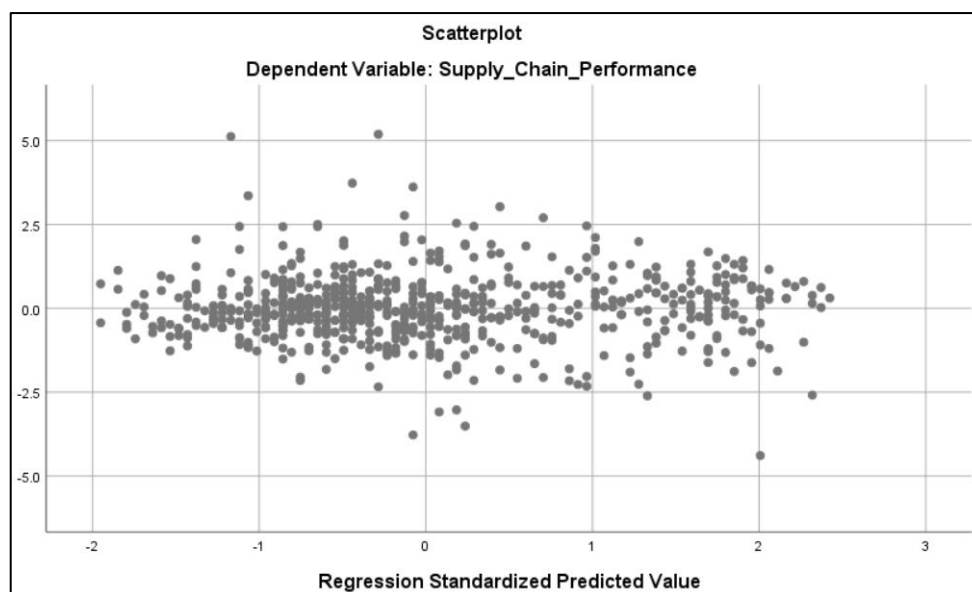

Figure (4. 3) Equal variance (homoscedasticity)

Multi-Collinearity: To ensure the appropriateness of the data for hypothesis testing, the researcher conducted tests for the absence of linear collinearity among the dimensions of demand planning processes in Jordanian FMCG industries by employing the Variance Inflation Factor (VIF) and testing the allowable variance, while adhering to the constraint that the VIF should not exceed 10, Brace. et. al (2003), and the tolerance value should exceed 0.05. Gujarati and Porter (2009), The test results presented in Table (4.10), the results indicate low levels of multi-collinearity among the independent dimensions.

Table (4. 10) Results of testing the strength of multi-collinearity between independent variables dimensions.

Dimension	Collinearity Statistics	
	Tolerance	VIF
Demand Forecasting	0.363	2.758
Sales and Operation Planning (S&OP)	0.273	3.662
Demand Collaboration	0.284	3.515

Durbin-Watson value and Variance Inflation Factor

The Tolerance values for Demand Forecasting, Sales, and Operation Planning (S&OP), and Demand Collaboration are 0.363, 0.273, and 0.284, respectively. These demonstrated values are well the above acceptable threshold of 0.05, indicating that the risk of collinearity is minimal. Additionally, the Variance Inflation Factor (VIF) values are 2.758, 3.662, and 3.515 for the respective dimensions, further affirming the absence of severe collinearity issues. Overall, these results confirm that the chosen independent variables are independent, ensuring the reliability of the regression analysis in the study, and the Variance Inflation Factor (VIF) value is less than 10, and tolerance is more than 10%, in such cases the Collinearity model does not violate this assumption.

Main Hypothesis Test: H₀₁: Demand planning processes (demand forecasting, "sales and operation", and demand collaborating) do not impact supply chain performance in FMCG industries in Jordan, at α=0.05.

The multiple regression results for the overall hypothesis demonstrated in Table (4.11) indicate a substantial relationship between demand planning processes and supply chain performance in Jordan's FMCG sector.

Table (4. 11) Multiple Regression of Demand Planning Processes Sub-Variables on Supply Chain Performance

Model	R	R^2	Adjusted R^2	F	Sig.
1	.870a	0.756	0.755	698.924	.000b

    a. **Predictors: (Constant), Demand Forecasting, S&OP, Demand Collaborating**
    b. **Dependent Variable: Supply Chain Performance**

Table (4. 12) Multiple Regression of Demand Planning Processes Sub-Variables on Supply Chain Performance (ANOVA)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std Error	Beta		
(Constant)	0.403	0.056	0.000	7.134	0.000
Demand Forecasting	0.180	0.030	0.192	6.072	0.000
Sales and Operation	0.438	0.033	0.481	13.232	0.000
Demand Collaboration	0.247	0.034	0.259	7.269	0.000

    a. **Dependent Variable: Supply Chain Performance, T-tabulated=1.96**
    b. **Predictors: (Constant), Demand Forecasting, S&OP, Demand Collaborating**

The R-squared value of 0.756 suggests that approximately 75.6% of the variation in supply chain performance can be explained by the demand planning processes under consideration. This high R-squared value signifies a robust model fit, indicating that demand planning processes collectively play a pivotal role in shaping the degree of performance within the FMCG supply chain in Jordan.

Furthermore, the statistically significant F-statistic of 698.924 ($\alpha = 0.05$) adds weight to the overall model's significance. This implies that the joint impact of demand forecasting, sales and operation planning (S&OP), and demand collaboration significantly influence the supply chain performance within the FMCG industry in Jordan. In summary, the analysis suggests that demand planning processes, when considered together, have a meaningful and statistically significant impact on the performance of the FMCG supply chain in Jordan.

Sub Hypothesis

► $H_{01.1}$: Demand forecasting does not impact supply chain performance in the Jordanian FMCG industries, at $\alpha=0.05$.

The analysis as shown in Table (4.12) reveals a positive standardized coefficient ($\beta = 0.192$) and a t-statistic of 6.072 ($\alpha = 0.05$). These findings provide compelling evidence to reject the null hypothesis. The positive beta coefficient implies that an increase in demand forecasting is associated with a proportional increase in supply chain performance. This indicates that accurate demand forecasting plays a statistically significant role in influencing the performance of the FMCG supply chain in Jordan.

The t-statistic of 6.072 is well above the critical threshold for statistical significance, further confirming the rejection of the null hypothesis at the specified alpha level ($\alpha= 0.05$). In practical terms, this suggests that improvements in demand forecasting methodologies and accuracy can lead to a significant enhancement in the overall performance of the FMCG supply chain in the Jordanian context.

In summary, the reanalysis reinforces the rejection of H01.1, indicating that demand forecasting indeed has a statistically significant impact on supply chain performance in the Jordanian FMCG industries at the specified alpha level ($\alpha = 0.05$). Accurate

forecasting processes emerge as a critical factor influencing the efficiency and coordination within the FMCG supply chain in Jordan.

►**$H_{01.2}$: Sales and operation planning (S&OP) does not impact supply chain performance in the Jordanian FMCG industries, at α=0.05.**

The analysis of this sub-hypothesis is based on the multiple regression results provided in Table (4.12). In the table, sales and operation planning (S&OP) demonstrate a substantial positive standardized coefficient (β = 0.481) and a high t-statistic of 13.232 (α = 0.05). These findings provide robust evidence to reject the null hypothesis. The positive beta coefficient implies that an increase in S&OP is associated with a significant increase in supply chain performance. This underscores the strategic importance of coordinating sales and operational planning for achieving a more integrated and responsive supply chain in the FMCG sector in Jordan. The t-statistic of 13.232 significantly exceeds the critical threshold for statistical significance, reinforcing the rejection of the null hypothesis at the specified alpha level (α =0.05). Practically, this implies that investments in and enhancements of S&OP processes are crucial for driving improvements in the overall performance of the FMCG supply chain in the Jordanian context.

In summary, the reanalysis affirms the rejection of H01.2, indicating that sales and operation planning (S&OP) indeed has a statistically significant impact on supply chain performance in the Jordanian FMCG industries at the specified alpha level (α =0.05).

► **$H_{01.3}$: Demand collaborating does not impact supply chain performance in the Jordanian FMCG industries, at α=0.05.**

The analysis of this sub-hypothesis is grounded in the multiple regression results provided in Table (4.12). In the table, demand collaborating demonstrates a positive

standardized coefficient (β = 0.259) and a t-statistic of 7.269 (α =0.05). These findings provide compelling evidence to reject the null hypothesis. The positive beta coefficient implies that an increase in demand collaboration is associated with a meaningful increase in supply chain performance. This emphasizes the importance of collaborative efforts in demand-related activities for achieving a more integrated and efficient supply chain in the FMCG sector in Jordan. The t-statistic of 7.269 significantly exceeds the critical threshold for statistical significance, confirming the rejection of the null hypothesis at the specified alpha level (α = 0.05). In practical terms, this suggests that initiatives promoting collaboration in demand planning activities, involving stakeholders such as suppliers and distributors, can be instrumental in enhancing the overall performance of the FMCG supply chain in Jordan. In summary, the reanalysis affirms the rejection of H01.3, indicating that demand collaborating indeed has a statistically significant impact on supply chain performance in the Jordanian FMCG industries at the specified alpha level (α = 0.05). The detailed results can be found in Table (4.12).

Chapter Five

Result's Discussion, Conclusion and Recommendations

5.1 Results' Discussion

Descriptive Results Discussion on Independent Variable

The analysis of demand planning processes in the FMCG industries of Jordan indicates a moderate mean score, suggesting a balanced perception among respondents. However, the negative t-value accompanying this finding implies a statistically significant departure from a neutral stance. This negative t-value signifies that, on average, respondents lean towards a less favorable view of demand planning processes. When delving into the dimensions, a similar pattern emerges. Demand Forecasting, Sales, and Operation Planning (S&OP), and Demand Collaboration all exhibit moderate mean scores, reflecting a collective stance with variations in perspectives. The negative t-values associated with these dimensions reinforce the statistical significance of the departure from a neutral standpoint, indicating that, on average, respondents express less favorable opinions across these specific dimensions. Practically, these results suggest a need for targeted interventions to address the areas where perceptions are less favorable. Stakeholders should focus on understanding the specific challenges and concerns highlighted by respondents, working towards improvements tailored to the nuances of each dimension within demand planning processes in the FMCG sector of Jordan.

Descriptive Results Discussion on Dependent Variable

In examining the results for the dependent variable, Supply Chain Performance, the mean score reflects a moderate perception among respondents. The negative t-value, with statistical significance, indicates a substantial departure from a neutral standpoint, suggesting that, on average, respondents tend towards a less favorable view of supply chain performance in the FMCG industries of Jordan.

Moving to the individual dimensions, Inventory Control, Supply Chain Agility, and Customer Satisfaction, similar patterns emerge. Each dimension exhibits a moderate mean score, indicating varying perceptions across these specific aspects of supply chain performance. The negative t-values underscore the statistical significance of these departures from neutrality, emphasizing that respondents, on average, express less favorable opinions on Inventory Control, Supply Chain Agility, and Customer Satisfaction within the context of supply chain performance. From a practical standpoint, these findings imply a need for targeted efforts to enhance the specific dimensions of supply chain performance where perceptions are less favorable. Stakeholders should delve into the nuances of Inventory Control, Supply Chain Agility, and Customer Satisfaction, addressing the identified concerns to optimize supply chain performance in the FMCG sector of Jordan.

Hypothesis Results Discussion

The multiple regression analysis in Table 5.1 illuminates the substantial impact of demand planning processes and their sub-variables on supply chain performance. Each facet of demand planning processes, namely demand forecasting, sales, and operation planning (S&OP), and demand collaboration, exhibits a significant positive influence on supply chain performance. This suggests that the adept implementation of demand planning processes plays a crucial role in positively shaping various dimensions of supply chain performance, encompassing inventory control, supply chain agility, and customer satisfaction. The inclusion of plus signs in the corresponding columns emphasizes the affirmative and notable effect of demand planning processes on enhancing diverse aspects of supply chain performance within the Fast-Moving Consumer Goods (FMCG) industries in Jordan.

Table (5. 1) Summary of Multiple Regression of Demand Planning Processes Sub-Variables on Supply Chain Performance

	Supply Chain Performance	Inventory Control	Supply Chain Agility	Customer Satisfaction
Demand Planning Processes	+	+	+	+
Demand Forecasting	+	+	+	+
Sales and Operation Planning (S&OP)	+	+	+	+
Demand Collaboration	+	+	+	+

+ Significant Impact

H_{01}: Demand Planning Processes do not affect Supply Chain Performance in the FMCG industries in Jordan, at $\alpha=0.05$.

The multiple regression analysis of Demand Planning Processes on Supply Chain performance demonstrates a strong and significant relationship. The model's high R-squared value indicates that a substantial proportion of the variability in supply chain performance is explained by the predictors: Demand Collaboration, Forecast Accuracy, and Sales Operation. The adjusted R-squared value supports the model's reliability after accounting for predictors, and the highly significant F-statistic confirms the overall significance of the model. Examining the coefficients, it is evident that each predictor contributes significantly to the variance in supply chain performance. Sales and Operation (S&OP) exhibit the highest standardized coefficient, indicating its prominent role, followed by Demand Collaboration and Demand Forecasting. The positive coefficients signify a positive impact, emphasizing the importance of these demand planning dimensions in influencing supply chain performance positively. These findings affirm the study's thesis but also resonate with prior research, such as Awanga (2018) and Basson, et. al. (2019), emphasizing the enduring importance of effective demand-planning processes across diverse contexts. In conclusion, this research provides valuable insights for practitioners seeking to enhance their demand planning processes, thereby optimizing supply chain performance and overall organizational success.

Sub Hypotheses Testing

H$_{01.1}$: Demand forecasting does not impact supply chain performance in the Jordanian FMCG industries, at α=0.05.

In examining the impact of demand forecasting on supply chain performance within the Jordanian FMCG industries, the analysis reveals a substantial and meaningful relationship. The rejection of the null hypothesis implies that demand forecasting significantly influences the performance dynamics of the supply chain. This finding underscores the intricate interplay between forecasting accuracy and the overall coordination of the FMCG supply chain in Jordan. From a practical standpoint, this result holds considerable importance for industry stakeholders. Accurate demand forecasting is not merely a logistical detail but emerges as a pivotal driver shaping the interconnectedness and efficiency of the supply chain. Improved forecasting allows for more precise inventory control, which aligns with the study of Wamoto, Kwasira, and Ndolo (2023) and demand forecasting's positive impact extends to supply chain agility which matches with Bai and Kybernetes (2023) study as well as demand forecasting impacts customer satisfaction which aligned with Boone, Ganeshan, Jain, and Sanders (2019) also the study of (Balderas, Araiza, Peña, and Villarreal, 2019).

In conclusion, the outcome of the analysis supports the idea that demand forecasting is a key determinant in the performance of the FMCG supply chain in Jordan which aligns with previous studies by Abou Maroun, Zowghi, and Agarwal (2019) and Subramanian (20)

H$_{01.2}$ Sales and operation planning (S&OP) does not impact supply chain performance in the Jordanian FMCG industries, at α=0.05.

The results represent a substantive and meaningful relationship between S&OP and supply chain performance. This finding underscores the strategic significance of coordinating sales and operational planning for achieving a more integrated supply chain in the FMCG sector in Jordan. From a practical standpoint, the rejection of the null hypothesis holds significant implications for industry practitioners. The positive impact of S&OP on supply chain performance aligns with contemporary literature emphasizing the pivotal role of integrated planning processes in optimizing supply chain performance. The coordination inherent in S&OP processes contributes to a more synchronized and efficient supply chain, enabling organizations to align their operational strategies with market demand and internal capacities. This strategic alignment, facilitated by effective S&OP, enhances the overall performance of the FMCG supply chain in Jordan. effective S&OP contributes to optimized inventory control which aligned with the study of Santa Cruz, Torres, and Ibañez (2019), it also has a positive impact on supply agility and customer satisfaction which aligned with a previous study conducted by Danese, Molinaro, and Romano (2018).

This finding highlights the strategic significance of sales and operational planning for achieving a more integrated supply chain in the FMCG sector in Jordan which aligned with previous studies conducted by Goh and Eldridge (2019) as well as the study of Cedillo and García (2019).

H$_{01.3}$: Demand collaborating does not impact supply chain performance in the Jordanian FMCG industries, at α=0.05.

The study reveals a significant relationship between demand planning processes with specific dimensions of demand forecasting, S&OP, demand collaborating, and supply chain performance. This finding underscores the importance of collaborative efforts in demand planning activities for achieving a more integrated supply chain which aligned with the previous studies conducted by Isa and Dweiri (2019) and (Tutuhatunewa, Surachman, and Santoso, 2019).

5.2 Conclusion

This study thoroughly examined the complexities surrounding demand planning processes and supply chain performance within Jordan's Fast-Moving Consumer Goods (FMCG) sector. The primary goal was to uncover the relationship between these processes and assess their impact on achieving supply chain performance in terms of inventory control, supply chain agility, and customer satisfaction. The main hypothesis underwent further investigation through three sub-inquiries, exploring the effects of demand forecasting, Sales and Operation Planning (S&OP), and demand collaborating. Data for this research were collected via an extensive questionnaire distributed among FMCG companies in Jordan, with meticulous testing for validity and reliability to ensure the robustness of the collected data.

The findings indicated a moderate implementation level for both demand planning processes and supply chain performance among companies in the FMCG sector in Jordan, implying that while these processes are acknowledged within the industry, companies are contending with challenges, highlighting a pressing need for improvement and strategic refinement.

The relationship analysis revealed a robust and substantial connection between demand planning processes and supply chain performance, emphasizing the intricate interplay between these elements within the FMCG industry in Jordan.

Moreover, the impact analysis underscored the significant impact of demand planning processes on supply chain performance. This held not only for the overarching demand planning processes but also for their sub-dimensions, namely demand forecasting, Sales and Operation (S&OP), and demand collaborating. The study demonstrated a substantial impact on achieving a well-integrated supply chain, solidifying the strategic importance of addressing challenges and refining specific aspects of demand planning processes.

5.3 Recommendations

Considering the comprehensive analysis conducted in this study, several key recommendations emerge to fortify the supply chain performance within the FMCG industries in Jordan:

1. Invest in digital systems for demand forecasting to improve forecasting accuracy by leveraging historical data, competitor monitoring, and real-time updates for more reliable predictions.

2. Conduct a regular cross-functional meeting involving marketing, sales, operations, procurement, and finance teams (it is recommended to be every month at minimum) this structured meeting will serve as a platform to synchronize production priorities, address deviations, and seamlessly integrate operational plans into the profit and loss.

3. Implement a robust system for tracking the financial impact of operational plans, ensuring seamless performance with profit and loss statements to enhance financial visibility and decision-making.

4. Promote collaborative behaviors within teams, encouraging information sharing, idea exchange, and shared decision-making.

5. Conduct frequent market surveys and gather real-time customer feedback to promptly adapt production plans based on evolving market preferences and demands.

6. Foster regular and structured communication channels with key suppliers, promoting open exchange of information to enhance transparency, build trust, and facilitate collaborative problem-solving.

7. Establish and integrate real-time reporting mechanisms to promptly communicate shifts in demand to management. Facilitate seamless coordination between the sales and planning teams, especially during the preparation of promotional offers.

5.4 Future Studies

Exploring the intricacies of supply chain dynamics within the FMCG industry, the study suggests various directions for future research:

1. Conduct longitudinal studies to track the evolution of demand planning processes over an extended period. This can provide insights into the effectiveness and sustainability of implemented strategies.

2. Explore the influence of emerging technologies, such as artificial intelligence and machine learning, on-demand planning processes, and their subsequent impact on supply chain performance.

3. Assess the impact of external factors, such as geopolitical events or natural disasters, on supply chain agility, and explore strategies to build resilience in the face of unforeseen disruptions.

4. Validate the quantitative findings of this research through qualitative methodologies, ensuring a more comprehensive understanding of the intricacies involved in demand planning processes and supply chain performance.

5. Conduct a sector-specific investigation to uncover nuances and industry-specific factors that may influence the relationship between demand planning processes and supply chain performance. This would provide tailored insights for different sectors.

6. Investigate the impact of product variety on supply chain performance to explore how a diverse product range may impact demand planning processes and their effectiveness in achieving seamless performance within the supply chain.

These recommendations and future study areas aim to guide FMCG industries in Jordan toward strategic enhancements and provide avenues for further research to contribute to the continuous improvement of supply chain processes in the region.

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Appendices

Appendix (1): Letter and Questionnaire of Respondents

Dear Esteemed Ladies and Gentlemen,

It is with great pleasure that I extend an invitation to you to participate in our survey, focusing on the impact of demand planning processes in achieving supply chain performance within the fast-moving consumer goods (FMCG) industries in Jordan.

In today's world, the supply chain goes beyond simple logistical operations; it serves as a foundational pillar for the sustainable success of companies. Achieving performance within this chain is a key factor in business success and promotes effective competition in the market.

Your opinions and experiences are invaluable to us, and we hope for your active participation as an essential contribution to this study. Your insights will play a crucial role in guiding future recommendations aimed at benefiting the consumer goods industries in Jordan.

We appreciate your time and the valuable efforts you dedicate to this endeavor which is a vital component of the requirements for obtaining a master's degree in business administration from the Middle East University

Researcher: Najlaa Fareed Ghanayem

Supervisor: Prof. Abdulaziz Ahmed Al-Shorabati

Part One: Demographic Information

Age (Years):	□ Less than 30	□ 30- Less than 35	□ 35-Less than 40	□ 40 and above
Experience:	□ Less than 5	□ 5- Less than 10	□ 10-Less than 15	□ 15 and above
Education:	□ Diploma	□ Bachelor	□ Master	□ Ph.D.
Position:	□ General Manager/Deputy General Manager	□ Department Manager/Head of Section	□ Supervisor	□ Officer

Part Two: Company Background

Company Field: مجال العمل:	□ Food and Beverages الاطعمة والمشروبات	□ Health and Personal Care Products منتجات الصحة والعناية الشخصية	□ Household and Cleaning Products المنظفات ومنتجات العناية بالمنزل
The company has an ERP system such as SAP, ORACLE, NetSuite هل يوجد في الشركة ERP System مثل: SAP, ORACLE, NetSuite	□ Yes نعم	□ No لا	
The company has a digital Customer Relationship Management (CRM) system لدى الشركة نظام إدارة علاقات العملاء (CRM) الرقمي:	□ Yes نعم	□ No لا	
The company has a digital Supplier Relationship Management (SRM) system لدى الشركة نظام إدارة علاقات الموردين (SRM) الرقمي:	□ Yes نعم	□ No لا	
Approximately, how many stock-keeping units (SKUs) does your business unit operate with كم عدد المنتجات التي تسوقها الشركة:	□ Less than 100	□ 100-250	□ Above 250

Part Three: Independent Variable (Demand Planning Processes)

الجزء الثالث: المتغير المستقل (عمليات تخطيط الطلب)

Demand planning processes refer to the procedures employed by companies to predict future product demand, these processes are evaluated based on three key dimensions: demand forecasting, planning sales and operations, and demand collaboration.

وهي الإجراءات التي تستخدمها الشركات لتقدير الطلب المستقبلي على منتجاتها باستخدام التقنيات الرقمية والتي سيتم قياسها من خلال ثلاثة ابعاد: التنبؤ بالطلب، تخطيط المبيعات والعمليات والتعاون في تخطيط الطلب

	Never Implemented	Slightly Implemented	To Some Extent	Most Implemented	Highly Implemented
Demand forecasting is a technique used to estimate future product demand based on past sales and market needs, involves responding to demand changes, monitoring emerging markets, and developing a comprehensive customer database for efficient supply and demand management **التنبؤ بالطلب:التنبؤ بالطلب هو تقنية تستخدمها الشركات لتقدير الكميات المستقبلية المتوقعة من منتجاتها معتمدة على دراسة المبيعات السابقة وتحليل احتياجات السوق المستقبلية، تشمل استجابة الشركة للتغييرات في الطلب ومراقبة الأسواق الناشئة، اضافة الى تطوير قاعدة بيانات شاملة للعملاء لضمان فعالية إدارة العرض والطلب**					
1 The company employs a digital system for demand prediction تستخدم الشركة انظمة رقمية للتنبؤ بالطلب					
2 The company relies on historical data for demand predictions تعتمد الشركة على بيانات الفترات السابقة لتوقع الطلب المستقبلي					
3 The company monitors competitor activities تراقب الشركة انشطة المنافسين					
4 The company tracks emerging markets ترصد الشركة حركة الأسواق الناشئة					
5 The company develops a customer database تمتلك الشركة قاعدة بيانات للعملاء					
6 The company monitors economic indicators for forecasting ترصد الشركة المؤشرات الاقتصادية للتنبؤ بالطلب					
7 The company regularly updates the demand forecasting results تحدث الشركة نتائج التنبؤ بالطلب بشكل دوري					
Sales and Operations Planning (S&OP): is a process aimed at achieving a balance between supply and demand through regular meetings between company departments like sales, development, manufacturing, and finance to coordinate the expected demand forecasts and the company's capacity to fulfill them **تخطيط المبيعات والعمليات (OP&S): هي عملية تهدف إلى تحقيق التوازن بين العرض والطلب، وتشمل الاجتماع الدوري بين أقسام الشركة المختلفة مثل المبيعات، التسويق، التطوير، التصنيع ، والمالية حيث يتم التنسيق بين توقعات الطلب وقدرة الشركة على تحقيقه**					

		Never Implemented	Slightly Implemented	To Some Extent	Most Implemented	Highly Implemented
8	The company generates regular reports about customer feedback تنشئ الشركة تقارير دورية حول آراء العملاء					
9	The company develops products in response to market research تطور الشركة المنتجات بناء على أبحاث السوق					
10	The company aligns production priorities based on market needs تضع الشركة اولويات الانتاج بناء على احتياجات السوق					
11	The company engages procurement in the production planning process تدمج الشركة قسم المشتريات في عملية تخطيط الانتاج					
12	The company reconciles deviations in the operational plan and financial forecasts تّسوي الشركة الانحرافات بين خطة التشغيل والتوقعات المالية					
13	The company holds monthly meetings to balance demand and rough-cut capacity تعقد الشركة اجتماعا شهريا لموازنة الطلب والقدرة الانتاجية					
14	The company incorporates operational plans into profit and loss تربط الشركة خطة العمليات بالربح والخسارة					
Demand collaboration: is a structured approach to collaborating with internal teams and external partners, it fosters flexibility in strategy, encourages idea exchange, and involves key stakeholders to enhance process integration and efficiency **التعاون بالطلب: يشير إلى العملية المنهجية للتعاون بين الفرق الداخلية والشركاء الخارجيين، تتضمن المرونة في صياغة الاستراتيجيات والتشجيع على تبادل الأفكار بين أعضاء الفريق ومشاركة أصحاب المصلحة الرئيسيين لضمان التكامل والكفاءة في العمليات**						
15	The company mandates the sales team to inform management about demand changes تلزم الشركة فريق المبيعات بإبلاغ الإدارة بأي تغيير في الطلب على منتج معين					
16	The company necessitates informing the planning team when preparing promotional offers تلتزم الشركة بابلاغ فريق التخطيط عند إعداد عروض ترويجية					
17	The company openly exchanges information with its key suppliers تتبادل الشركة معلوماتها مع الموردين الرئيسيين بشفافية					
18	The company encourages idea-sharing among team members تشجع الشركة على تبادل الأفكار بين أعضاء الفريق					

		Never Implemented	Slightly Implemented	To Some Extent	Most Implemented	Highly Implemented
19	The company engages key stakeholders in its operational planning تشرك الشركة اصحاب المصالح الرئيسيين عند تخطيط عملياتها					
20	The company implements a structured process for seamless R&D تنفذ الشركة عملية ممنهجة في البحث والتطوير					
21	The company incorporates strategic flexibility in formulating its strategies تتبنى الشركة المرونة الاستراتيجية في صياغة استراتيجياتها					

Part Four: Dependent Variable (Supply Chain Performance)
الجزء الرابع: المتغير التابع (أداء سلسلة التوريد)

Supply chain performance refers to the coordination and collaboration between different entities involved in a supply chain to streamline processes, share information, and work towards common goals, measured through inventory control, supply chain agility, and customer satisfaction
التكامل في سلسلة التوريد: يشير إلى التنسيق والتعاون بين الاطراف المشاركة في سلسلة التوريد لادارة العمليات، ومشاركة المعلومات، والعمل نحو أهداف مشتركة. سيتم قياسه من خلال الابعاد التالية: التحكم بالمخزون، المرونة في سلسلة التوريد، ورضا العملاء

		Never Implemented	Slightly Implemented	To Some Extent	Most Implemented	Highly Implemented
	Inventory Control: involves maintaining appropriate stock levels to meet customer demands, avoiding excess or shortages by coordinating with suppliers and reducing inventory-related costs **التحكم بالمخزون: الاحتفاظ بمستويات المخزون مناسبة لتلبية احتياجات العملاء وتجنب المخزون الزائد أو النقص بالتنسيق مع الموردين، كما يشمل تقليل التكاليف المتعلقة بالمخزون**					
22	The company maintains a high inventory turnover rate تحافظ الشركة على معدل دوران مخزون مرتفع					
23	The company maintains inventory that meets customer demands تحتفظ الشركة بمخزون يلبي طلب العملاء					
24	The company minimizes the duration between order placement and product arrival to customers تقلل الشركة من المدة بين وقت تقديم الطلب إلى وصول المنتج للعميل					

		Never Implemented	Slightly Implemented	To Some Extent	Most Implemented	Highly Implemented
25	The company assures uninterrupted production due to raw material shortages تضمن الشركة عدم حدوث ارتباك بالانتاج بسبب نقص المواد الولية					
26	The company strategically manages expenses associated with holding inventory تدير الشركة بشكل استراتيجي النفقات المرتبطة بالمخزون					
27	The company implements joint inventory management between suppliers and manufacturers تدير الشركة المخزون بتنسيق عمليات التصنيع مع الموردين					
Supply Chain Agility: refers to the ability to respond quickly and effectively to changes and disruptions in the business environment, it involves being flexible, adaptive, and responsive in adjusting supply chain operations to meet customer demands, market conditions, and unforeseen events. **مرونة سلسلة التوريد: تشير إلى القدرة على الاستجابة بسرعة وبفعالية للتغيرات والاضطرابات في البيئة التجارية، وتشمل القدرة على التكيف والاستجابة في ضبط عمليات سلسلة التوريد لتلبية طلبات العملاء وظروف السوق والأحداث الغير متوقعة**						
28	The company's suppliers consistently meet our requirement يلبي الموردين متطلبات الشركة					
29	The company switches suppliers to meet unexpected demand spikes تبدل الشركة بين الموردين لتلبية الطلبات غير المتوقعة					
30	The company responds to market changes promptly تستجيب الشركة لمتغيرات السوق بالوقت المناسب					
31	The company accurately forecasts market demand تتنبأ الشركة باحتياجات السوق بشكل دقيق					
32	The company adjusts production scheduling based on demand fluctuations تعدل الشركة جدولة الانتاج حسب تقلبات الطلب					
33	The company optimizes product development time تقلل الشركة من وقت تطوير المنتج					
34	The company controls the cost of goods sold تتحكم الشركة بتكلفة البضاعة المباعة					
Customer Satisfaction: Meeting customer expectations through product quality, prompt responses to inquiries, timely deliveries, and value-appropriate pricing. Emphasizing problem-solving and attracting new customers **رضا العملاء: تلبية توقعات العملاء من حيث جودة المنتجات والرد السريع على استفساراتهم، مع تسليم الطلبيات في الوقت المحدد وأسعار تناسب القيمة المدفوعة، مع التركيز على حل المشاكل وجذب عملاء جدد**						
35	The company provides products that meet customer expectations توفر الشركة منتجات تلبي توقعات العملاء					
36	The company responds to customer inquiries promptly تستجيب الشركة لاستفسارات العملاء بالوقت المناسب					

		Never Implemented	Slightly Implemented	To Some Extent	Most Implemented	Highly Implemented
37	The company guarantees on-time delivery orders تسلّم الشركة طلبيات العملاء في الوقت المحدد					
38	The company prices the products according to the provided value تسعر الشركة منتجاتها بما يتناسب مع القيمة المقدمة للعملاء					
39	The company proactively treats potential issues before they escalate تتعامل الشركة مع المشاكل المتوقعة قبل حدوثها					
40	The company fosters customer loyalty تعزز الشركة من ولاء العملاء					

Appendix (2): Panel of Referees Committee:

No.	Name	Qualification	Organization
1	Prof. Dr. Ahmad Ali Saleh	Professor	Middle East University
2	Prof. Dr. Ali Al-Adaileh	Professor	Middle East University
3	Prof. Dr. Azzam Abou-Moghli	Professor	Middle East University
4	Dr. Murad Samhouri	Associate Professor	German Jordanian University
5	Dr. Amjad Al Sakarneh	Associate Professor	Al Yarmouk University
6	Dr. Rafaat Hammad	Doctor	Al Yarmouk University
7	Dr. Ahmad Fadel	Associate Professor	Hashemite University
8	Dr. Ali Malkawi	Associate Professor	Al Yarmouk University
9	Dr. Eyad Al-Azzam	Associate Professor	Al Yarmouk University
10	Ahmad Al Roud	General Manager	National Poultry Company