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MIDDLE EAST UNIVERSITY
Amman - Jordan

# The Impact of Supply Chain Digitalization and E-commerce on the Fashion Retail Business Performance in Jordan

# أثر رقمنة سلسلة التوريد والتجارة الإلكترونية على أداء أعمال بيع الأزياء بالتجزئة في الأردن


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**Thesis Submitted in Partial Fulfillments of the Requirements for Master Degree in E-Business**


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# Dedication

I dedicate this thesis to

My wife and companion, **Razan, and my sons**, **Hisham and Omar**, for their unwavering support, patience, encouragement, and understanding during the period of my study and thesis.

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# The Impact of Supply Chain Digitalization and E-commerce on the Fashion Retail Business Performance in Jordan

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## Abstract

This study examines the impact of supply chain digitalization and e-commerce on Jordan's fashion retail industry, amidst global and local technological shifts. The research aims to understand how technologies like RFID (Radio Frequency Identification) along with e-commerce models, are transforming the operational landscape of fashion retail businesses in Jordan. It explores how digital tools enhance inventory management, operational efficiency, and customer engagement, thus influencing overall business performance and brand equity. Employing a mixed-methods approach, the study integrates qualitative insights from industry experts and quantitative data from 226 managers of international fashion retail brands in Jordan. The findings underscore that these significantly improves inventory accuracy, operational efficiency, and supply chain transparency. Additionally, a robust digital infrastructure supports these enhancements, facilitating the seamless integration of e-commerce strategies that effectively boost customer satisfaction and brand visibility. E-commerce adoption, through various models and social commerce, compels retailers to innovate their business models, influencing consumer behavior and sales outcomes. The study highlights the critical role of digitalization in aligning with market demands and enhancing competitive advantage. It recommends continued investment in digital infrastructure, strategic implementation of RFID, and the leveraging of e-commerce to optimize operational efficiency and customer engagement in Jordan’s fashion retail sector.

**Keywords: Supply Chain Digitalization, E-Commerce, RFID, Fashion Retail in Jordan, Business Performance.**

**أثر رقمنة سلسلة التوريد والتجارة الإلكترونية على أداء الأعمال التجارية في مجال بيع الأزياء بالتجزئة في الأردن**

**إعداد: بشار هشام المعشّر**

**إشراف: الأستاذ الدكتور أحمد عبد الله الغندور**

**الملخص**

تبحث هذه الدراسة أثر رقمنة سلسلة التوريد والتجارة الإلكترونية على مجال أعمال التجزئة بالأزياء في الأردن، وتحديدا في وسط التحولات التكنلوجية العالمية والمحلية. ويهدف البحث إلى فهم الكيفية التي تحوّل بها تكنولوجيات مثل التعريف بواسطة الموجات الراديوية إلى جانب نماذج التجارة الإلكترونية، المشهد التشغيلي لشركات تجارة التجزئة بالأزياء في الأردن. وإستكشاف الكيفية التي تعزز بها الأدوات الرقمية إدارة المخزون، والكفاءة التشغيلية، وإشراك العملاء، مما يؤثر على أداء الأعمال التجارية عموماً وعلى الأسهام في العلامات التجارية. وتدمج الدراسة، التي تستخدم نهجاً مختلطاً، الرؤى النوعية المستمدة من الخبراء في المجال والبيانات الكمية المستمدة من 226 مديراً عاملاً في شركات بيع الأزياء بالتجزئة في الأردن. وتؤكد النتائج أن هذه التحسينات تحسن إلى حد كبير دقة الجرد، والكفاءة التشغيلية، وشفافية سلسلة التوريد. وبالإضافة إلى ذلك، فإن وجود بنية تحتية رقمية متينة تدعم هذه التحسينات، مما ييسر التكامل السلس لاستراتيجيات التجارة الإلكترونية التي تعزز بشكل فعال رضا العملاء وقيمة العلامات التجارية. وان إعتماد التجارة الإلكترونية من خلال النماج المختلفة يجبر التجار على إبتكار نماذج أعمال تجارية للتأثير على سلوك المستهلك والتجاوب معه وتحسين نتائج المبيعات . وتسلط الدراسة الضوء على الدور الحاسم للرقمنة في مواءمة متطلبات السوق وتعزيز الميزة التنافسية. وتوصي الدراسة بمواصلة الاستثمار في الهياكل الأساسية الرقمية، والتنفيذ الاستراتيجي لقاعدة البيانات المتعلقة بالمصادر الأساسية، والاستفادة من التجارة الإلكترونية لتحقيق الكفاءة التشغيلية المثلى وإشراك العملاء في قطاع تجارة التجزئة في الأردن.

**الكلمات المفتاحية : رقمنة سلسلة التوريد، التجارة الإلكترونية، التعريف بإستخدام الترددات الراديوية ، تجارة التجزئة بالأزياء في الأردن ، إداء الأعمال التجارية.**

# CHAPTER ONE

## Study Background and Significance

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# CHAPTER ONE

## Study Background and Significance

## 1.1 Introduction

The fashion retail industry is a dynamic and expansive sector that requires constant adaptation and innovation, particularly in supply chain management and customer engagement strategies. This thesis explores these elements within the context of Jordan's fashion retail industry, focusing on international brands managed by national companies. These brands are unique in their operational needs, particularly in terms of ensuring timely and efficient distribution of new collections to meet customer expectations.

One of the central areas of this study is the impact of digitalization in supply chain management, specifically through the integration of RFID (Radio-Frequency Identification) which revolutionized inventory management by enabling faster and more efficient tracking of products from the manufacturer to the retail shelves. This technology allows individual items to be tagged and tracked throughout the supply chain, leading to improvements in stock management and distribution efficiency. This study aims to assess the practical benefits of RFID technology in real-world settings, contrasting it with traditional inventory management systems.

Another significant aspect of this thesis is the exploration of e-commerce adoption in the fashion retail sector. The shift towards online shopping platforms, including websites and mobile applications, has become a strategic consideration for many brands. This transition offers potential advantages, such as increased customer reach and enhanced shopping experiences. However, it also raises concerns about maintaining brand identity and the unique customer experience associated with physical stores. This research will particularly examine the decision-making process behind adopting e-commerce strategies

and its consequences, especially in terms of operational performance indicators like inventory turnover, order fulfillment times, and overall supply chain responsiveness.

The onset of digital technologies has ushered in a new era for the fashion retail. Technologies such as RFID, IoT (Internet of Things), and advanced analytics are now essential in managing complex supply chains and customer relationships (Bigliardi et al., 2022; Menanno et al., 2023). These technologies facilitate real-time tracking, improve inventory management, and enhance the accuracy of demand forecasting. Streamlining operations and building agility to withstand market fluctuations and disruptions are two benefits of digitalization in the supply chain (Ivanov, 2021).

Along with the growth of digital technologies, e-commerce has also grown, which has had a significant impact on the retail landscape. Fashion retailers in Jordan use e-commerce in a number of different ways, such as B2B and B2C models, as well as e-catalogues, social commerce, and their own online platforms. Due to the rise of online shopping, stores need to rethink not only their sales plans but also their whole business models, from their supply chains to their customer service processes (Gonzalo et al., 2020).

The Jordanian international fashion retail offers a great opportunity to study how digitalization, e-commerce, and retail performance interact. The study looks into different aspects of this interaction, such as how digital tools are used and their affect in supply chain management, how e-commerce models are strategically implemented, and how these changes affect consumer behavior and business performance metrics. As the international fashion retail industry in Jordan grows, digitalization of supply chain and e-commerce play a key role in changing the way business usually done. This study undertake on a serious journey to investigate how this industry is changing digitally. It

focuses on how the digitalization of supply chains, the strategic move into e-commerce, and the many different aspects of fashion retail performance are all connected.

RFID technology, a modern inventory management tool, enables real-time tracking and improved stock control in supply chain digitalization (Menanno et al., 2023). Along with RFID, there is an urgent need to investigate the digital infrastructure, which includes the systems and networks that enable fashion retailers to adapt to changing market conditions (Bigliardi et al., 2022). E-commerce, implemented and adopted strategically, embodies digital sales growth that has increased visibility and created direct customer interaction channels through personalized marketing and feedback. E-commerce's nuanced use helps fashion industry MSMEs (Medium and Small & Medium Enterprises) rise to the top through digital marketing (Sudirjo, 2023). In addition, regarding the performance of fashion retail businesses, it is reflected in the inventory management, operational efficiency, customer satisfaction, and brand equity. Inventory management efficiency emerges as a critical determinant of a business's ability to minimize overheads and optimize product availability (Rosca et al., 2023). Furthermore, the operational efficiency and customer satisfaction combine to influence the retailer's brand equity, an indication of the market's perceived value of the brand (Kim, 2022; Ogbiti, 2023).

This study investigate the supply chain digitalization of the fashion retail industry, focusing on the RFID technology impact along with the e-commerce transformation of the industry. This study investigates these shifts with the fashion industry experts through structured, detailed interviews along with comprehensive questionnaire distributed among the fashion retail managers in Jordan.

## 1.2 Study Problem

Based upon the researcher's obeservation that came from extensive experience in supply chain management within the international fashion industry, this study seeks to address two significant challenges that are pivotal for the success and sustainability of fashion retail businesses, particularly in the context of Jordan. supported by the literature, which provides sufficient evidence of the challenges faced by the fashion industry in digital transformation and e-commerce adoption. Research by (Unhelkar et al., 2022; Varriale et al., 2023), highlights the financial and logistical hurdles in incorporating RFID into supply (Gao et al., 2023) discuss the strategic complexities for luxury brands in online environments, from maintaining brand authenticity to combating counterfeit competition. These studies emphasize the necessary for this research that will addresses these complexities, aiming to guide the fashion industry towards a successful digital and e-commerce transformation in Jordan.

The first challenge centers on the adoption and implementation of Radio Frequency Identification (RFID) technology for inventory management in the fashion industry. Despite RFID's potential to revolutionize inventory tracking and management, its practical application has been hindered by high costs and integration difficulties with existing systems. These issues result in suboptimal inventory management, a critical concern in an industry characterized by rapidly evolving fashion trends and fluctuating customer preferences. The capacity to manage inventory efficiently, avoiding overstocking and understocking, is crucial for fashion retailers, where supply and demand dynamics are acutely sensitive to changing trends and consumer behaviors. This research aims to bridge the gap in the effective utilization of RFID, exploring ways to enhance the digitalization of the supply chain and realize its potential benefits.

The second key issue in this study relates to the adoption of e-commerce by well-known international and luxury fashion brands. Moving sales to online platforms can lead to growth and better interactions with customers. However, this shift also poses risks to the unique identity and perceived value of these brands in the online market. Based on the researcher's experience, it is vital for these brands to find a way to use the benefits of e-commerce without losing their unique brand identity. This is especially important because of the intense competition and the presence of counterfeit products online. It is essential to develop strategies that respond to changing customer shopping habits online and address the challenge of counterfeit products.

The technology could dramatically improve supply chain performance by reducing inventory levels, lead times, stock- outs, and shrinkage rates. It can also increase throughput, inventory visibility, inventory record accuracy, order accuracy, customer service, quality, and collaboration among supply chain members (Attaran, 2020; Tzeng et al., 2008). The digitalization of warehouse management is another aspect poised to redefine supply chain efficiency. However, the adoption of technologies such as sensors, cloud computing, and augmented reality in Jordanian warehouses and their influence on the overall supply chain have yet to be systematically assessed (Zaman, 2022). The interplay of these digital tools and their alignment with operational performance within the specific context of the international fashion retail business in the Jordanian market requires a deeper analysis to ensure that investments are channeled appropriately and yield the intended benefits.

In addition, in E-commerce, while it is known that digital marketing channels play a major role in getting people to engage with and buy things online, it is still not very clear what the impact of this transformation is on business performance (Kurdi et al., 2022).

There is still a lot to learn about the exact role of these channels and how they can be used to increase customers' intentions to buy.

## 1.3 Study Objectives

Empirical evidence suggests that technologies such as RFID and smart inventory systems significantly improve supply chain performance by increasing efficiency, reducing costs, and enhancing transparency, which are crucial for retailers (Kurdi et al., 2022; Zaman, 2022; Zaman et al., 2023). These technologies facilitate advanced inventory management and supply chain visibility, which are fundamental for optimizing operations in fashion retail.

Additionally, the role of digital infrastructure is paramount in supporting these technologies. It not only underpins the deployment of solutions like RFID but also integrates these solutions across the supply chain, thus driving performance improvements (Hamadneh et al., 2021). However, the strategic adoption and implementation of e-commerce also play a significant role in shaping retail performance, affecting everything from consumer interactions to sales outcomes. Reflecting on these insights, the objectives of this research are designed to provide a comprehensive analysis of the digital transformations in Jordan’s fashion retail:

1. To determine how supply chain digitalization using RFID affects the inventory management, operational efficiency and transparency of supply chains of the international fashion retail industry in Jordan.
2. To investigate the specific benefits of RFID technology and the digital infrastructure using the supply chain in enhancing inventory accuracy and reducing shrinkage in fashion retail settings.

3. To analyze the adoption and strategic implementation of e-commerce in enhancing the performance of fashion retail businesses.
4. To determine the overall impact of integrating digitalization of supply chain with e-commerce on the inventory management, operational efficiency, customer satisfaction, and brand equity for fashion retail businesses in Jordan.

## 1.4 Study Significance

### Study Significance

As per Jordan Chamber of Industry (2020) the textile sector in Jordan focusing on the particular importance to the leather and garment industries as one of the promising industrial sectors that can be used to promote economic and social development in the Kingdom with over than 1,000 establishment, 72,000 workers and over than 200 Million JOD capital. This study fills gaps in knowledge about how RFID, digital infrastructure, and e-commerce initiatives affect the international fashion retail's operational and competitive aspects in Jordan. Understanding these consequences is vital for merchants seeking capitalize on technology advances. This research will examine how these technologies and methods affect inventory management, operational efficiency, customer satisfaction, and brand equity.

### Theoretical Importance

Theoretically, this research fills a gap in the literature by examining the Middle Eastern retail environment through the lens of supply chain digitalization and e-commerce, two topics that are generally neglected in international academic discussions. This study adds to our understanding of digital SCM by delving into the realm of e-commerce, digital infrastructure, and RFID integration. It adds to the existing theoretical frameworks in supply chain

management, retail operations, and consumer behavior studies by providing a fresh viewpoint and connecting these technologies with concrete business outcomes.

### Practical Importance

Those involved in the industry, such as managers, company owners, and lawmakers in the Jordanian market and comparable economies, stand to gain a great deal from this study's conclusions. To help retailers make educated decisions about their technology investments, the study identifies the operational benefits and challenges of e-commerce, digital infrastructure adoption, and RFID. The study also includes suggestions for how to make the most of these technologies to boost sales and gain an edge in today's digital marketplace by improving customer experiences and brand value.

## 1.5 Study Questions and Hypotheses

### Study Questions

Based on the study problem, objectives, and hypotheses, the following research questions are formulated to guide the investigation into the digitalization impacts within Jordan's fashion retail:

Q1. Which extend does supply chain digitalization affect the overall performance of the fashion retail business in Jordan?

Q2. Which extend the integration of RFID technology, impact inventory management, operational efficiency, customer’s satisfaction and brand equity in the international fashion retail in Jordan?

Q3. What role does digital infrastructure play in supporting the inventory management, operational efficiency, customer needs and brand equity of fashion retailers in Jordan?

Q4. What is the impact of e-commerce on the overall performance of the business in Jordanian fashion retailers?

Q5. What is the impact of e-commerce adoption on the operational efficiency, customer Satisfaction and brand equity of Jordanian fashion retailers?

Q6. Which extend does the e-commerce strategies influencing the brand equity, customer's satisfaction and operational efficiency of the fashion retail business in Jordan.

Q7. What is the level of relationship between the digitalization of supply chain and the e-commerce in the fashion retail business in Jordan?

Q8. Which extend does supply chain digitalization and e-commerce strategies interact to affect the overall performance of the fashion retail business in Jordan?

**Study Hypotheses Development**

**H01: There is no statistically significant impact of supply chain digitalization on the performance of the fashion retail business in Jordan at (α=0.05).**

The first hypothesis is framed under the assumption that digital transformation, particularly the supply chains digitalization enhances the capabilities necessary for maintaining competitive performance in the fashion retail industry. Studies have identified that digitalization significantly boosts supply chain capabilities, which in turn mediates the relationship between digitalization and sustainable competitive performance (Ning & Yao, 2023). These technologies provide a granular understanding of the entire supply chain, enabling swift responses to disruptions, reducing lead times, and ensuring a seamless flow of products from manufacturers to consumers (Sagar, 2024).

**H01.1: There is no statistically significant impact for RFID integration on the performance of the fashion retail business in Jordan at (α=0.05).**

RFID technology's role in enhancing inventory management and streamlining supply chain operations has been widely acknowledged. Integrating RFID is expected to significantly

improve operational efficiencies by enabling better tracking and management of inventory, which is crucial for the dynamic demands of fashion retail (Gao, 2022). This integration expected to lead to better overall business performance by minimizing losses and enhancing the speed of operations. The deployment of RFID in supply-chain digitalization would allow both more efficient management of processing and warehousing data flows as well as an improved consumer purchasing experience (Barge et al., 2020).

**H01.2: There is no statistically significant impact of digital infrastructure on the performance of the fashion retail business in Jordan at (α=0.05).**

The enhancement of digital infrastructure plays a critical role in supporting digital transformations within fashion retail. Investments in digital technologies such as cloud computing, automation, and advanced analytics are crucial for the modernization of supply chains, which supports efficient operations and profitability, thereby ensuring a competitive advantage (Špiler et al., 2023). The comprehensive digitalization of supply chain operations, facilitated by robust digital infrastructure, linked to improved operational performance and sustainability in the fashion industry (Assen, 2023). The relationship between IT integration and SCP within the workplace is significant where IT infrastructure is largely utilized. The integration of supply chain and data standards that evolves due to the implementation and integrated applications to increase the information flow from one department to another (Sakapas & Kittisak, 2019).

**H02: There is no statistically significant impact of e-commerce on the performance of the fashion retail business in Jordan at (α=0.05).**

E-commerce has transformed the fashion retail landscape by extending the reach of businesses and enhancing consumer engagement. This transformation is underscored by its ability to integrate with digital supply chain innovations, fostering operational efficiencies and extending market reach. Research highlights that e-commerce strategy, particularly those that

are consumer-centric and involve advanced digital platforms, are pivotal in driving business performance in the retail (Hellström & Olsson, 2024; Pereira et al., 2022). These strategies, when effectively implemented, are known to optimize consumer interactions and increase sales through personalized experiences and improved service delivery.

The study of Akanbi and Akintunde (2018) showed that e-commerce has potentials to improve the performance of SMEs operators.

**H02.1: There is no statistically significant impact of e-commerce adoption on the performance of the fashion retail business in Jordan at (α=0.05).**

The adoption of e-commerce within fashion retail is critical in harnessing the benefits of digital commerce. Studies suggest that thorough integration of e-commerce into business operations significantly enhances the visibility of products and services, thereby improving sales performance and customer reach. The strategic adoption of e-commerce technologies, such as AI and data analytics, is vital in adapting to consumer preferences and market demands, which in turn can lead to improved business performance and customer satisfaction (Špiler et al., 2023).

Additionally Nurlinda Nurlinda et al., (2020) study the impact of e-commerce adoption in improving performance in small, micro and medium enterprises.

**H02.2: There is no statistically significant impact of e-commerce strategy on the performance of the fashion retail business in Jordan at (α=0.05).**

E-commerce strategy encompasses a broader spectrum of activities including the alignment of digital marketing, customer relationship management, and online sales platforms. Effective e-commerce strategies leverage digital tools to enhance customer experience, streamline sales processes, and foster brand loyalty. Research has shown that comprehensive e-commerce strategies that include customer-centric approaches, such as

personalized marketing and responsive service systems, significantly contribute to business performance. These strategies are instrumental in building customer trust and enhancing the overall purchasing experience, which are critical factors in the competitive performance of fashion retail businesses (Casciani et al., 2022; Gao, 2022). As well, the incorporation of e-commerce complements the in-store experience, offering customers flexibility in how they engage with the brand (Sagar, 2024).

**H03: There is no statistically significant relationship between the supply chain digitalization and e-commerce in the fashion retail business in Jordan at ($\alpha$=0.05).**

The integration of digital technologies in SCM is pivotal for enhancing e-commerce capabilities within the fashion retail. Digital transformation, through technologies such as AI and Blockchain, not only improves the robustness and sustainability of supply chains but also significantly enhances e-commerce operations by streamlining logistics and facilitating better customer interactions (Gao, 2022). These improvements are crucial for maintaining competitiveness in the rapidly evolving retail landscape where e-commerce is becoming increasingly dominant.

**H03.1: There is no statistically significant impact of both the supply chain digitalization and e-commerce on the performance of the fashion retail business in Jordan at ($\alpha$=0.05)**

The synergistic impact of supply chain digitalization and e-commerce on retail performance is underscored by their collective contribution to operational efficiency and customer satisfaction. Studies have shown that the supply chain digitalization facilitates real-time inventory management and logistics optimization, which are essential for successful e-commerce strategies (Kilay et al., 2022). Moreover, the digitalization of supply chains directly contributes to enhancing e-commerce efficiency, thereby

improving the overall performance and competitive stance of fashion retail businesses in markets like Jordan (Szozda, 2023).

## 1.6 Study Model

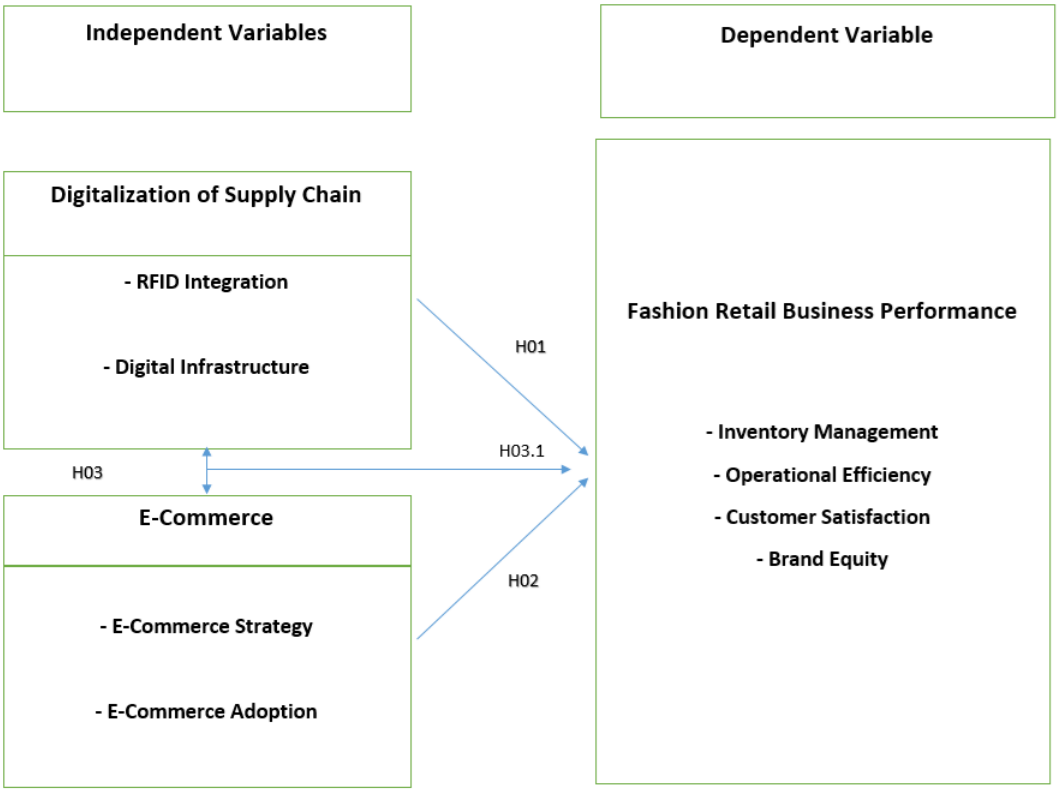



**Figure (1) the study model**

The study model shows how digitalization has changed the supply chain (Aish et al., 2020; Casciani et al., 2022) and the adoption of e-commerce, as well as how these changes have affected the performance of the fashion retail business. It shows that the independent variables are the supply chain digitalization, which includes RFID integration and digital infrastructure as well as e-commerce strategy and adoption. These factors all influence the dependent variable, which is the fashion retail business's performance. They do this through aspects like managing inventory, making sure operations are efficient, ensuring customers are happy, and building brand equity (Cuong, 2023).

Szozda (2023) had investigates the interrelationships among technologies in retail and how the supply chain digitalization was influences in the fashion industry, while (Menanno et al.

2023) explain how RFID could transform supply chain management. They found that RFID could boost supply chain performance at all stages when fully integrated with business processes in the fresh fruit industry. RFID integration makes inventory management and real-time visibility easier in fashion retail, which affects retailer performance. In addition Sakapas and Kittisak (2019) study the IT infrastructure impact on performance at all fronts including financial, operational, marketing and supply chain.

Kilay et al., (2022) analyze the operational efficiencies brought about by digital payment solutions and e-commerce integration within MSMEs (Medium, Small and Medium Enterprises). Additionally Gaudenzi et al., (2021) explores how fashion companies can successfully implement e-commerce strategies by configuring their e-supply chains.

Gao (2022) studies the effects of digital supply chain transformation on the operational performance of retail enterprises. While Asih (2020) shows that, the complexity of the information tends to influence the number and types of the performance indicators. Various information aspects such as data, cost, waste, satisfaction, web applications and supply chain improvement are considered.

In addition, Casciani et al., (2022) investigate the multifaceted impact of digital transformation on the fashion industry and (Cuong, 2023) states that brand awareness, along with loyalty, associations, and perceived quality, are important parts of brand equity that affect consumer's decision to buy and, by extension, the performance of the company.

Additionally, Sagar (2024) investigates the profound impact of digital transformation on both retail management strategies and consumer behavior. In the context of technological advancements and the rise of e-commerce, understanding the driving forces behind digital transformation in the retail sector is crucial.

Finally, K.P. Liu et al., (2022) suggest that retail businesses success depends on how digitalization and e-commerce work together. Even though large and small businesses may have different ways of improving their finances, digitalization in the supply chain and strategic e-commerce are necessary for growth and competitiveness in the digital age.

## 1.7 Study Limitation

The primary limitation is that the data are self-reported, which introduce base. Another problem is that technology changes so quickly that the results might not last long. Finally, because the study was cross-sectional, it is not possible to look at the long-term effects. Therefore, the following limitations were noticed upon completion of the study:

[1]. Reliance on self-reported data from businesses.

[2]. Rapid technological changes potentially making the findings obsolete.

[3]. Cross-sectional design limiting the assessment of long-term impacts.

## 1.8 Study Limits

Although the study aims to cover all aspects of the topic, specificity in research is highly recommended to reach accurate results, the study yet have some limits such as:

[1]. Time limits: This study was completed during the second semester of the year 2023/2024.

[2]. Human Limits: The study tool was distributed to all organizational levels, with a sample of managers in the fashion retail industry in Jordan.

## 1.9 Operational Definitions

In the study there are many key terms defined by the researcher to clarify their usage in the research context:

**Digitalization of Supply Chain**: Refers to the use of digital technologies solutions to optimize supply chain processes. This include the integration of systems to track inventory in order to enhance the performance of the fashion retail business by assessing their impact on inventory management, efficiency and customer experience.

**RFID Integration**: Refers to the process of incorporating Radio Frequency Identification (RFID) technology into various aspects of a company's operations to achieve specific objectives such as enhancing inventory tracking, streamlining the receiving shipments process, preventing product shrinkage, optimizing order fulfillment processes, and improving data analytics.

**Digital Infrastructure**: Encompasses the technological framework and systems implemented by a company It includes hardware, software, networks, and data. This infrastructure enables various functions such as providing stock visibility across supply chain stages, integrating data with supplier systems, offering real-time inventory stock visibility, and supporting e-commerce operations.

**E-Commerce**: Commercial transactions are conducted electronically on the internet.

**E-Commerce Adoption**: Refers to the extent to which a company embraces and implements e-commerce practices within its business operations. This includes integrating e-commerce with suppliers, providing user-friendly e-commerce platforms, effectively displaying products online, offering personalized product recommendations, and engaging customers through social media channels.

**E-Commerce Strategy**: Refers to the plan that outlines how a business will use e-commerce to achieve its overall objectives. It may involve combining online and offline sales channels and includes enabling customer comments and reviews to foster engagement and trust. It also entails ensuring secure transactions to protect both the company and its customers from fraud or data breaches safeguarding customer information to uphold privacy and regulatory standards and providing clear exchange and refund policies that extend from traditional stores to the online platform.

**Business Performance**: A broad term that encompasses the output of a business's activities to meet objectives, and deliver value to stakeholders. that includes non-financial outcomes of performance across diverse aspects of our fashion retail business from inventory management, operational efficiency, customer satisfaction and to brand Equity.

# CHAPTER TWO

## Literature Review and Previous Studies

2.1 Digitalization in Supply Chain Management

2.2 E-Commerce Evolution in Fashion Retail

2.3 Performance Metrics

2.4 Intersection of Digitalization and E-Commerce

2.5 Previous Studies

2.4 Research Gap

# CHAPTER TWO

# Literature Review and Previous Studies

## 2.1 Digitalization in Supply Chain Management

Digitalizing SCM is now an important part of modern businesses and has completely changed how things done in many industries, (Varriale et al., 2023) makes this point clear by introducing an information system architecture that combines IoT and Blockchain technology to make supply chain operations safer and more open in chees retail industry. This method shows how SCM is changing, with technologies like RFID and data analytics becoming more important for making business operations run more smoothly. The effects of digitization on retail and e-commerce supply chain systems have been the subject of a lot of research. For example, (Aamer et al., 2023) finds that the drivers for supply chain digitalization in organizations: IT infrastructure, cybersecurity systems, digitalization reskilling and upskilling, digitalization culture, top management support, digitalization and innovation strategy, integrated supply chain, digital innovation management, big data management and data analytics and government regulations.

Digitalization in SCM faces particular difficulties in developing nations like India. However, despite infrastructure limitations and digital disparities, there is a substantial opportunity to enhance operations and decision-making processes (Faridi & Malik, 2020). Regarding global business risks, these improvements are even more important, pushing for a digital logistics chain that makes things more reliable (K.P. Liu et al., 2022). Additionally, Aninda and Karyani (2022) finds that supply chain digitalization practices have a positive effect on operational performance but a negative effect on new revenue stream.

Kharun and Hrytsyna (2022) add to this by saying that digitalization helps to improve business models, communication with customers, and building a community in logistics services through digital platforms.

Digital transformation allows retailers to leverage customer data to create personalized and targeted experiences. By analyzing purchasing history, preferences, and behaviors, retailers can tailor marketing efforts, offer personalized promotions, and enhance the overall customer journey this level of personalization fosters stronger customer relationships, increases brand loyalty, and contributes to higher customer lifetime value (Sagar, 2024).

Al Shakarchi et al. (2022) also investigated the sustainable supply chain management (SCM) that is helped by Industry 4.0 technologies. They support the use of IoT, cloud computing, and Blockchain for responsible production and consumption. The need for environmentally friendly and socially responsible business practices is emphasized in the Sustainable Supply Chain Management (SCM) digitalization.

### 2.1.1 Integration of Digital Solutions in Inventory and Logistics

Figure (2) shows how cutting-edge digital solutions work together to change the way inventory and logistics management are done. The picture shows a group of systems that are all linked to each other. The first system is Supply and Demand Forecasting, which uses data analysis to guess how much inventory will be needed in the future. This leads to Real-Time Inventory Optimization, which makes sure that the right amount of stock is always on hand. Predictive Inbound Logistics makes things even easier by planning for and anticipating incoming goods. The Connected Fleet part is when transportation assets are linked together into a single network that can be managed and monitored using IoT technologies. (Fathom, 2024). Figure (2) also shows the idea of "Autonomous Things,"

which includes using AI-powered tools like drones or self-driving cars to improve delivery and movement in the supply chain. A Digital Supply Chain Twin is a computerized copy of the real supply chain. It can be used for testing and studying to help make better decisions. Robotic Process Automation is the use of software bots to do

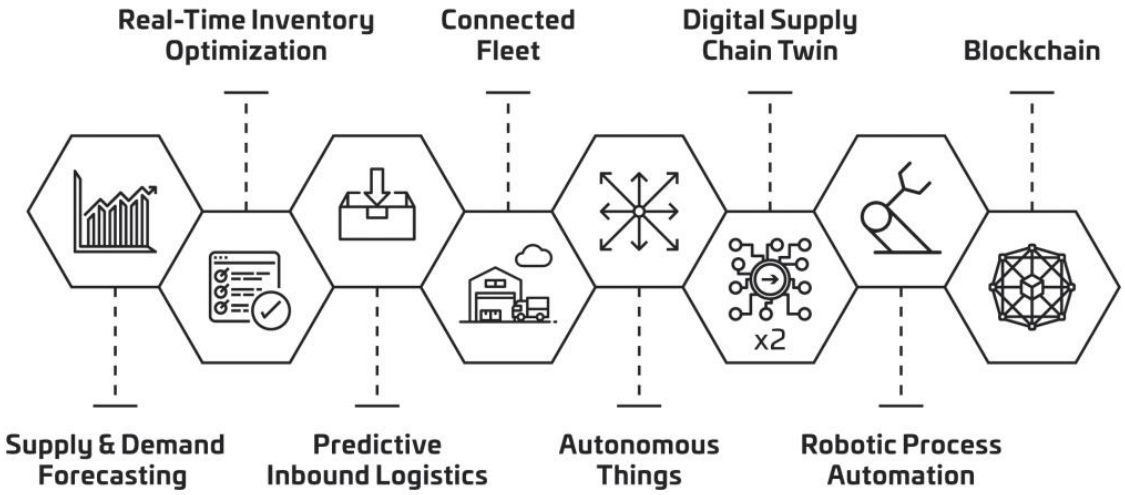



**Figure (2) digitalization for Supply Chains (Fathom, 2024)**

Boarding, repetitive tasks automatically, which makes them faster and more accurate. Finally, Block chain technology is used to keep transaction records safe and clear, which improves trust and traceability throughout the supply chain ecosystem.

Logistics management is going through a huge change as we move into the age of digital intelligence, (Guo, 2023) highlights that new technologies are being created and used to deal with the logistics industry's many problems, such as those related to technology, money, and people's views on politics and society.

Ma and Gao (2018) address how these new ideas are very important for making supply chain frameworks that work well and are responsive.

Bekmurzaev (2022) emphasize the importance of transportation and logistics to have a safe and effective digital infrastructure that makes transportation more efficient and increases safety, addressing concerns about data security and consumer privacy. Conversely, (Xie & Qiao, 2022) study how AI, advanced analytics, and automation can

work together to improve logistics management in the digital age also they examine how computer intelligence algorithms are used in logistics, showing how advances in data processing and predictive analytics are replacing old decision-making methods, resulting in significant savings and improve efficiency.

### 2.2.2 RFID Technology Integration in Supply Chain Operations

RFID technology has increasingly become a cornerstone in the evolution of supply chain management as in (Unhelkar et al., 2022) Its role in enhancing the performance of supply chains is rooted in its ability to generate a wealth of real-time data, which becomes a powerful asset in the pursuit of automation and improved decision-making processes. RFID systems composed of readers, tags, and data servers that create a dynamic framework for tracking and monitoring at various stages of the supply chain, including the scanning of raw materials, finished goods, transportation, and storage activities. In retail, finance, and consumer goods, RFID can transform processes. Sales, returns, and inventory tracking have improved productivity and efficiency thanks to it. RFID tracks goods accurately and safely and speeds up delivery routes. This helps companies reduce inventory, improve response times, and fulfill orders. RFID makes the supply chain more transparent, which may be its biggest impact. Clearer communication improves throughput recording, quality control, and stakeholder collaboration. These changes allow supply chains to handle more work and fill orders correctly, improving business performance.

Digitalization is ushering in a new era of supply chain management, where visibility, efficiency, and adaptability are paramount. Retailers are increasingly turning to technologies such as RFID (Radio-Frequency Identification) and IoT to monitor the movement of goods throughout the supply chain in real-time , These technologies provide a granular understanding of the entire supply chain, enabling swift responses to

disruptions, reducing lead times, and ensuring a seamless flow of products from manufacturers to consumers. (Sagar, 2024)

RFID technology lies in the interaction between RFID tags and readers. Tags attached to objects communicate with readers, transmitting information about the object's identity, location, and other relevant data points. This automatic identification process is integral to establishing a seamless and transparent supply chain flow, allowing for precise tracking and traceability of inventory. This feature makes it easier to manage supply chains and helps businesses stay ahead of the competition by making sure that their products are of higher quality.

RFID tags are different levels of sophistication. There are chapels' tags that use nanotechnology, passive tags that do not need an internal power source, and more advanced Ultra High Frequency (UHF) tags that follow specific protocols to prevent signal collisions and improve data transmission. RFID technology been used in many different industries since it was added to supply chain management. RFID been used to improve functions like inventory management, asset tracking, and customer service in the healthcare, hospitality, government, retail, and production sectors. With such a wide range of uses, RFID has shown how flexible and adaptable it is in improving operational efficiency.

Unhelkar et al., (2022) shows how RFID technology is used in different levels of supply chain management. It shows how the physical and data layers work together to make business operations run more smoothly. At the physical level, mobile and fixed RFID readers are used at key stages like purchasing, production, inventory management, sales and distribution, and reverse logistics to make sure that data is constantly collected so that everything is visible in real time. Then, this information is processed and used in the business layer for things like dynamic SKU management, warehouse management,

and optimizing crane schedules to make things run more smoothly. This organized method shows how RFID can be used strategically: operational data helps businesses make decisions, which makes managing work orders, vehicle deployment, and the dynamic assignment of stock-keeping units (SKUs) more efficient. (Xu et al., 2013).

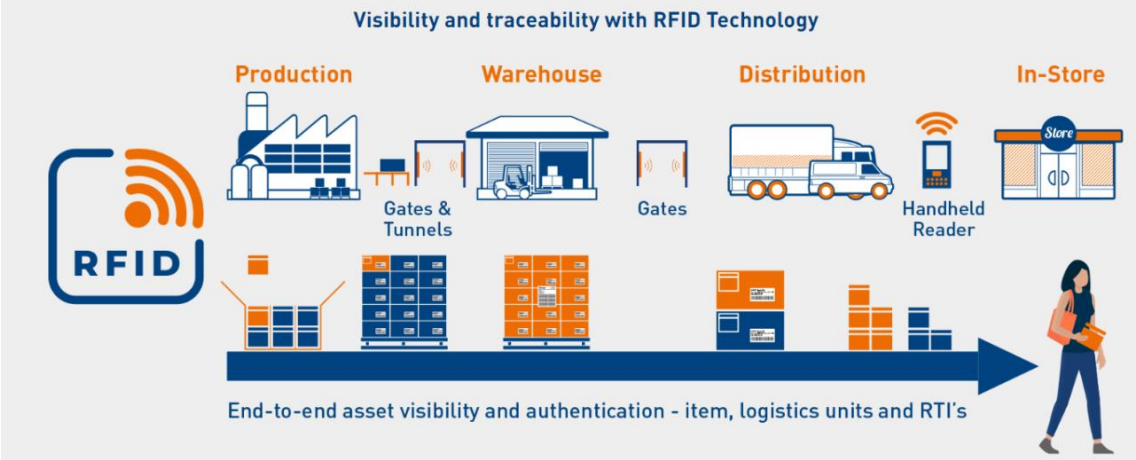



**Figure (3) product's full journey as it moves through the different stages of the supply chain (Unhelkar et al., 2022).**

Figure (3) shows a product's full journey as it moves through the different stages of the supply chain. Items are tagged from the beginning of production so they can be quickly identified and tracked. As items are brought to the warehouse, RFID readers in gates and tunnels keep track of them. This makes sure that inventory management is accurate. Transportation is part of distribution. RFID technology keeps track of the movement of goods, keeping a chain of custody and real-time visibility. Finally, in retail stores, handheld readers are used to keep track of stock and help customers, which makes shopping easier. From production to the point of sale, this end-to-end visibility and traceability makes sure that assets can be seen and verified, which makes the supply chain more efficient and safe (Unhelkar et al., 2022).

Several studies have shown that RFID technology improves the efficiency of the supply chain and the management of inventory. Some studies, like the one by (Pallathadka

et al., 2022), used mean and T-tests to clearly show how RFID helps to streamline supply chain processes and improve the accuracy of real-time inventory. These studies show how RFID has a huge impact on logistics and supply chain operations. Similarly, (Agarwal & Ankolikar, 2022) added to these results by looking at RFID's strategic value. They showed how this technology improves supply chains' efficiency and transparency, which leads to big cost savings and a competitive edge. In exploring RFID's application within the food supply chain, (Dong et al., 2022) employed a three-tier model to assess the effects of traceability on supply chain member incentives. Their analysis revealed that while RFID-induced traceability can lead to substantial revenue benefits, it necessitates careful management to prevent exploitation and increased contamination risks. These insights highlight RFID's dual role in enhancing supply chain operations while introducing new challenges that require strategic oversight.

As shown in Figure (4) the parts of an RFID system are connected to make an ecosystem for the flow of information and management of inventory. At their core, RFID tags are very important because they store and send important information about each product. These tags talk to reader hardware, which can be fixed in one place or moved around, to read the data that the tags send. The readers use antennas (sometimes built into the readers themselves, and other times connected from the outside to extend the system's range) to effectively figure out if a tag exists (Adhi at al., 2021). Further supporting this ecosystem, specialized software or services come into play, ensuring that tags are correctly encoded and that the data gathered by the RFID system is processed into a usable form for businesses. This digital infrastructure is key to translating raw RFID data into actionable insights that can inform inventory decisions and streamline operations. Lastly, testing and certification are important parts of the RFID setup because they make sure that tag inlays work and are reliable in a range of retail situations and

materials. For retailers and suppliers to be sure that the RFID technology will work as needed in real-world retail settings, this step is necessary. This keeps the supply chain honest and efficient (Adhi at al., 2021;M'bodj, 2021).

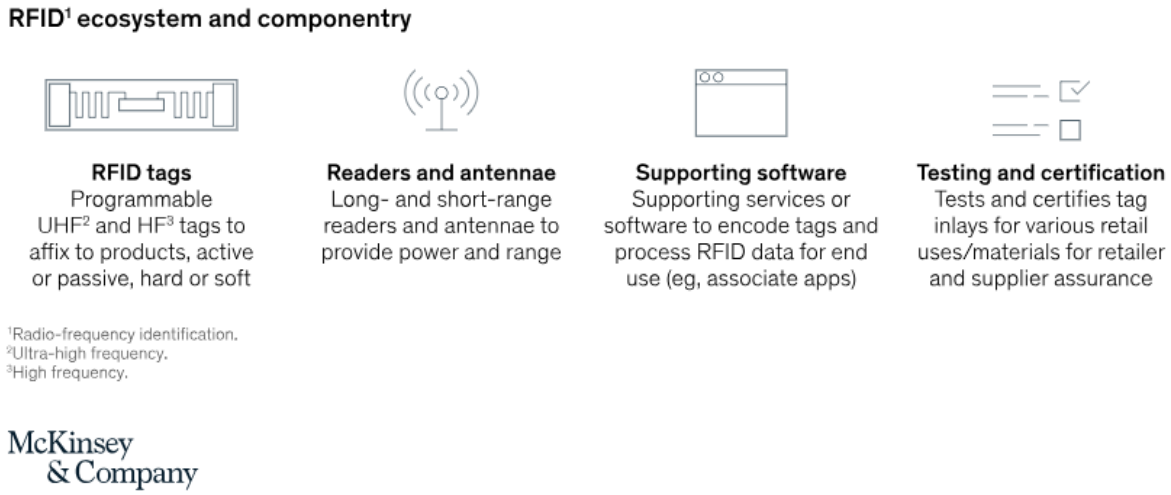



**Figure (4) RFID solutions key components (Adhi at al., 2021)**

Retail industry – RFID technology offers a very significant advantage over bar coding. Some big retailer's initiative and move in using the technology was heralded as the most important tech development for retailers since the barcode. RFID tags continually gather information as products move from shelves to the checkout counter. The technology not only helps the retailer to reduce labor and manual costs, it also curbs shoplifting and boosts store productivity the tags already help retailers with reordering, stocking, and keeping track of purchases. RFID technology is firmly establishing itself as the way forward for successful and sustainable supply chain operations. The promise of RFID technology is to help companies succeed in moving goods around efficiently, to cut costs and deliver a wealth of information that helps companies more efficiently predict and respond to customer demand. (Zelbst & Sower, 2021)

### 2.2.3 Digital Infrastructure for Fashion Retail

The concept of digital infrastructure has been applied in myriad of ways in the fields of information system, computer-supported cooperative work (CSCW), and Science and

Technology Studies, emphasizing different perspectives and orientations on large-scale socio-technical systems (Rodon Modol & Eaton, 2021). The fashion industry is different from other industries because trends change with the seasons, customers have high expectations, and getting clothes to market quickly is very important.

This infrastructure makes it possible for design, production, logistics, and sales to work together in a world that is becoming more and digital. It uses certain technologies, such as augmented reality-powered virtual fitting rooms, predictive analytics to find out what trends will happen, and Block chain to make SCM clear. These digital foundations support the Omni channel strategies of the industry, in which online and offline shopping are combined seamlessly to keep customers interested and coming back. As fashion brands try to be more environmentally friendly and ethical in their sourcing, digital infrastructure makes it easier to track clothes from where they are made to where they are sold. It is not enough for fashion retailers to just use technology; they also need to create a responsive, responsible, and meaningful brand experience in a complex and quickly changing industry (Lopes, 2019).

The integration of digital infrastructure in the fashion retail is becoming increasingly critical to drive innovation and maintain a competitive edge. Studies like (Akram et al. 2022) underscore the opportunities and challenges inherent in the implementation of digital technologies, suggesting that while there are considerable benefits to be harnessed, retailers must navigate obstacles such as cost, integration complexity, and the need for skilled personnel.

Additionally, Faulconbridge (2020) provides an insight into how digital service firms, including those in the online fashion retailing space, are operating within 'business code/spaces', merging the physical and digital aspects of their service offerings. This

research suggests that to succeed in today is market; fashion retailers must effectively manage both their digital presence and their physical logistics to create a seamless customer experience. Digital infrastructure is about improving customer interaction and optimizing internal processes.

Inventory management has been revolutionized by implementing digital solutions such as RFID tags. This technology enables precise tracking and management of inventory levels in real-time, providing fashion retailers with a detailed understanding of stock movements. Mango, for example, has implemented RFID across its 700 stores globally, resulting in enhanced inventory accuracy and supply chain efficiency (Frith, 2024; M'bodj, 2021)

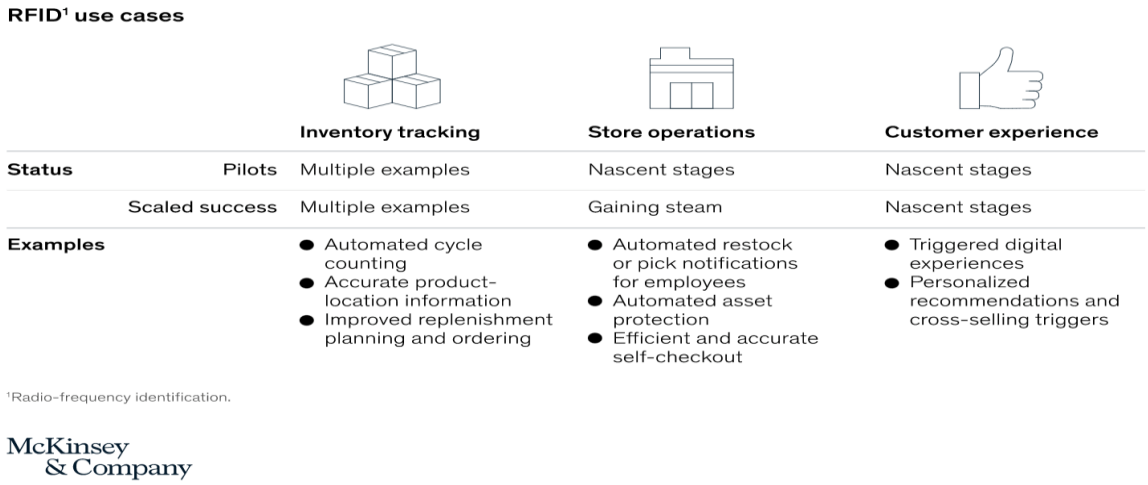



**Figure (5) Use cases for RFID (M'bodj, 2021)**

Figure **(** (5) shows a range of ways RFID technology can be used in retail, showing how it has grown from pilot projects to widespread use. Inventory tracking is one of the most developed uses of RFID. It uses well-established methods like automated cycle counting to make inventory assessments more accurate. These systems improve the accuracy of where products are located and make planning and ordering stock easier. This leads to a more streamlined inventory management process that requires less work from people and more accuracy (M'bodj, 2021).

RFID is becoming more and more useful for store operations. As systems for automatically protecting assets become more common, features like systems that remind staff when to restock or pick items are becoming more common. These improvements are changing how things are done in stores, ensuring that items are restocked on time, keeping assets safe, and improving self-checkout systems. This change is meant to make retail spaces more operationally efficient, which will help keep things running smoothly (M'bodj, 2021).

On the customer side, RFID is still in its early stages when it comes to improving the customer experience, but it has a lot of potential. Stores are using RFID to try out immersive digital experiences and personalized suggestions that could make shopping a very personal experience. Because RFID can cause such personalized interactions, it's possible that in the future, it will not only make things run more smoothly but it will also make shopping a lot more fun by adapting to each customer's individual tastes and habits.

Supply chain transparency is another critical application area. Block chain technology in the fashion industry is used to ensure product authenticity and ethical sourcing. The brand Eveline uses Block chain to track the production of its clothing, ensuring that each item can be traced back to its source, providing transparency and building trust with consumers (Divea & Surjit, 2022).

Table 2 ***1*** shows how smart contracts in a Blockchain infrastructure can streamline supply chain management. This model automates and validates transactions and goods movements across a decentralized ledger, eliminating the need for separate record-keeping systems. RFID tracks goods and triggers smart contracts to execute pre-defined agreements based on data. Payments, ownership transfers, and compliance checks could be automated without human intervention. (Prause, 2019)

**Table 2 1 Smart Contracts for the Supply Chain status (Prause, 2019)**

| Element | Current State | Future State |
|---|---|---|
| **Factory** | Barcoded items leaving the factory | Items leave the factory with RFID tags |
| **Outbound Logistics** | RFID tracking initiated | RFID tracking with direct links to smart contracts |
| **Transit** | Periodic RFID scans during transit | Continuous tracking via RFID; automated updates via block chain |
| **Reception** | Items received with barcode scan | Items received and verified against smart contracts |
| **Store** | Shelves monitored via RFID | Integrated RFID and smart contract system for real-time tracking |
| **Data Handling** | Global tracking system updated at each stage | Unified block chain system automatically updates all records |
| **Future Integrations** | | Smart contracts automate payments and compliance based on RFID data |

In current supply chain management, barcode scans and RFID technology track products from factory to store shelf. These tools provide traceability, but they are part of a fragmented system with multiple checks and updates through different stages, each stage, from outbound logistics to transit, reception, and store placement, requires global tracking system updates. This future vision fits Block chain's definition as a community-validated database. Each block contains transactional records linked by a secure hash function, creating a transparent, tamper-resistant chain of information that provides real-time visibility and trust to all participants. Block chain's authenticity, traceability, and efficiency enable a more responsive and interconnected global supply chain as it digitizes.

E-commerce platforms infrastructure the e-commerce ecosystem is quickly becoming an essential infrastructure, enabling the easy purchase and sale of goods and services online. This ecosystem's-built design is made up of a variety of components, each of which is critical to the overall functionality and user experience. (Laudon & Traver, 2020)

1. At the front-end, user interfaces (UI) and experiences (UX) are meticulously crafted to provide an intuitive journey for customers navigating online platforms. This is achieved through the harmonious blend of web development languages

such as HTML, CSS, and JavaScript, with sophisticated frameworks like React or Angular adding a dynamic edge to the consumer interaction.

2. In the back-end, server-side programming languages like Python and PHP integrate with databases such as MySQL and PostgreSQL to process and store critical data. APIs act as communication lifelines between these backend systems and external services, allowing for smooth transactions and interactions (Yunfeng et al., 2019).
3. The hosting infrastructure is a testament to the robustness of e-commerce platforms. Cloud hosting services from AWS, Azure, or Google Cloud ensure scalability and reliability. At the same time, CDN networks guarantee faster content delivery, enhancing the overall user experience (Yixin & Liuzhu, 2016).
4. Crucial components like payment gateways secure online transactions, while security systems protect sensitive data against cyber threats. Analytics and reporting tools provide actionable insights, guiding businesses to fine-tune strategies for optimal performance (Xiaoqiong, 2020).

The choice of platform, whether open-source like Magento or SaaS options like Shopify, offers businesses tailored solutions to meet their unique needs. Supporting these complex operations are infrastructures like ONDC, which democratize digital commerce, especially aiding SMEs and MSMEs in their growth and sustainability (K. M. et al., 2022).

Meanwhile, innovations in payment processing platforms continue to streamline the financial transactions essential to e-commerce (Xiaoqiong, 2020). In addition, when talking about Internet platforms like Amazon and Google have it become global and very well-known and used, acting as both prime mover and gatekeepers of online commerce (Krisch & Hiltgartner et al., 2019). Moreover, the rise of digital platforms has reshaped the social infrastructure of marketplaces, influencing the interplay of work and trade in unique ways (Aspers & Darr, 2022). In Germany, platforms like Amazon are not just

infrastructure providers but influential actors in the digitalization of retail spaces (Sina, 2018). They have begun to build both the physical and digital, enhancing their power and role in the retail ecosystem. In addition, e-commerce service platforms that equipped with user terminals, merchant modules, logistics, and evaluation systems, further ensure that online operations are carried out with maximum efficiency and convenience for the customers (Yunfeng et al., 2019).

The e-commerce ecosystem is a complex web of systems, each designed to make running an online business easier and more efficient. The six main systems in this ecosystem are shown in Figure (6) they are Management, Marketing, Accounting, Shipping, Payment, and foundational parts like E-commerce Infrastructure, Platform, Development, and Marketplace. The Management System organizes different tasks to make sure that the whole e-commerce business works well. Marketing Systems' outreach arms use strategic campaigns and data analytics to get and keep customers, which increases sales and brand involvement. The Accounting System keeps accurate records of all activities, which is important for keeping the business's finances in good shape. (Chloe Le, 2021; Laudon & Traver, 2020; Yunfeng et al., 2019)As an important part of logistics, the Shipping System combines order handling with courier and logistics networks to make sure packages arrive on time. As safe entry points for transactions, Payment Systems handle funds quickly and securely, keeping private financial information safe. All of these working systems are supported by the E-commerce Infrastructure, which is made up of computers, databases, and cloud services that make the system reliable and scalable. The E-commerce Platform makes it easier to trade goods and services by blending a strong design with an easy-to-use layout. E-commerce Development includes constant new ideas and improvements to technology, in order to keep up with changing market needs and technological progress. The E-commerce Marketplace works like a

regular marketplace, but with the added reach and ease of use, that digital technology provides. It helps business grow by connecting sellers and buyers.(Hardaker, 2022; Xiaoqiong, 2020; Yixin & Liuzhu, 2016)


**Figure (6) Ecommerce Ecosystem Model (Chloe Le, 2021)**

## 2.2 E-Commerce in Fashion Retail

### Adoption of E-Commerce Practices by Fashion Retailers

Electronic commerce, commonly known as e-commerce can be regarded as the utilization of electronic systems such as the internet and other computer networks to aid the sharing of business information among trading partners, coordination and implementation of business transactions (Akanbi & Akintunde, 2018). The adoption of e-commerce practices has significantly reshaped the fashion industry landscape, as evidenced by empirical research from various global contexts. In Durban, South Africa, small and medium-sized fashion enterprises have utilized platforms like Facebook and Instagram not only for advertising but also as essential sales channels, enhancing market reach and engagement and facilitating trend analysis, despite challenges such as low-profit margins and internet fraud risks (Kaur, 2022). In Denpasar City, the positive impact

of e-commerce on MSMEs' fashion product sales highlights its role as a catalyst for expanding market reach and increasing sales volumes, a finding supported by statistical analysis using simple linear regression (Gede et al., 2023). Concurrently, the evolution of Block chain-Enabled E-commerce Platforms (BEEP) has enabled second-hand apparel retailers to connect with sustainability-conscious consumers, linking consumer motives and technology acceptance factors to promote a circular economy within the industry (Jain, 2022). Additionally, the integration of digital technology has addressed online shopping sizing issues, reducing returns and enhancing customer satisfaction (Pookulangara et al., 2021). This digitalization underscores a shift towards more sustainable and circular business models, as digital solutions facilitate incremental changes that enhance circularity and sustainability in the fashion industry (Colombi et al., 2018; Henao-Ramírez & Lopez-Zapata, 2021).

As a major business model during global crises like the COVID-19 pandemic, e-commerce has also been hailed as a key factor in fashion retailers' ability to continue to grow and stay in business (Bilińska-Reformat & Dewalska-Opitek, 2021). Adopting digital platforms strategically has helped retailers expand internationally, learn more about how customers behave, and improve overall business operations (Guercini et al., 2018; Witek-Hajduk et al., 2022).

Fashion retailers' use of self-service technologies (SSTs) that make customers feel like they can interact with them shows their desire to improve customers' experiences in physical stores and their dedication to streamlining retail processes through digital interfaces that are responsive and user-controlled (Colombi et al., 2018). The addition of SSTs shows a trend toward using digital tools to improve customer engagement in-store. The study on consumer behavior and online shopping trends shows that e-commerce has changed the way fashion stores work by meeting the growing need for eco-friendly

methods and new ways of doing business (Casciani et al., 2022; Colombi et al., 2018). More and more, retailers are trying to make their digitalization efforts more in line with their sustainability goals. The integration of e-commerce with suppliers is critical for the digitization and efficiency of the fashion retail industry. One effective method is the use of electronic commerce brokerage systems, which act as intermediaries between suppliers and sellers, managing aspects ranging from product information to payment transactions, thus enhancing the collaborative dynamics between e-commerce platforms and their suppliers (Jong, 2019). In the context of SMEs, supplier integration is further enhanced through innovative e-design and e-negotiation systems, which improve interactions and negotiations, crucial for performance enhancement and cost reduction. SMEs adopting these technologies achieve greater integration and streamlined e-commerce operations (Madzimure, 2020).

Also In e-commerce, especially when choosing a supplier, it is important to use advanced decision-making tools that combine qualitative and quantitative analyses. Two important techniques used are Quality Function Deployment (QFD) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). These make it easier to find suppliers who always meet high quality standards and provide excellent products and services. (Chen et al., 2018).

Retail stores are used as distribution points by innovative systems, which offer flexible pricing based on delivery locations and use real-time sales data to improve distribution (Nemati, & Nazarian, 2019). In e-commerce, carefully choosing and qualifying suppliers is very important. This includes building strategic partnerships and constantly reviewing performance to make sure it meets retailer standards for customer satisfaction and business success (Rickardo, 2023) .

Moreover, the integration of e-commerce into retail supply chains necessitates a thorough understanding of stakeholder requirements and optimization of information flows, often requiring business process redesign to enhance supply chain value (Roberts & Thomas, 2003).

E-commerce platforms offer a wide range of specialized solutions that all meet the different and changing needs of the fashion retail industry. These platforms are no longer just places where transactions can happen. They have grown into complex ecosystems that combine cutting-edge technology with customer-focused services to offer the highest levels of convenience, security, and efficiency. (Jeong et al., 2022; Kang et al., 2017) talks about how important these digital platforms are for improving customer service and giving people around the world access to a wide range of goods and services. (Kang et al., 2017; Xiaoqiong, 2020) agrees and stated that these platforms are also very important for helping the economy recover through effective digital marketing and location-based services.

Research across various studies indicates that integrating intelligent payment processing systems within e-commerce platforms enhances the transaction experience, making it seamless and efficient for users, as demonstrated by (Xiaoqiong, 2020; Dragomirov, 2020) states that these platforms are important for SCM because they include logistics, marketing, and financial processes as well as transactional functions. For fashion retailers to stay successful in the digital market, they need to manage their relationships with buyers, sellers, and logistics providers in a complete way. In addition, the systems talked about by (Xin & Ningbin, 2019; Yunfeng et al., 2019) combine many different operational modules, such as data support, application management, logistics, and after-sale services. This makes sure that running an online business is both quick and safe.

### 2.2.2 Strategic E-Commerce Models and Their Effectiveness in Retail

E-Commerce refers to such business behavior as conducting trades on a virtual network through the Internet. The core elements contributing to the success of online

stores include not only the web-based presentation and the low-price strategy but the quality of online service as well. Importance-Performance Analysis is a method frequently used to evaluate performance and analyze competition strategies (Wu, C.-H. 2020). Adopting different strategic e-commerce models has a big impact on retail, showing a range of interactions from corporation to corporation (B2B), consumer-to-consumer (C2C), and business to consumer (B2C). Each model is tailored to a different part of the market and can handle a range of transactional needs and operational sizes. When businesses trade with each other, B2B models focus on large transactions and long-term contracts. On the other hand, B2C models focus on marketing and customer relations for individual consumers (Yaşlıoğlu, 2019; Yu, 2018).

Innovative models such as the brokerage and advertising models play pivotal roles by enhancing transaction capabilities and generating revenue through targeted ads, respectively. These models, as well as direct, infomidairy, merchant, and subscription models, diversify the revenue streams and interaction dynamics within e-commerce (Burunova et al., 2019). The effectiveness of these models often hinges on their integration with advanced technologies such as block chain for security, and AI for personalized shopping experiences, proving critical for sustaining competitive advantage and enhancing consumer engagement (Akin, 2021; Huo & Mu, 2017).

Critically, the implementation of these e-commerce models has been transformed by the digital evolution, characterized by the shift towards more integrated and user-centered approaches. For example, the use of e-contracts in the e-service environment underscores a significant shift towards automating engagement and ensuring compliance across diverse e-commerce platforms (Burunova et al., 2019). Furthermore, logistics models like Drop shipping have developed inventory management by minimizing the need for large

warehouse spaces, thus reducing overhead costs and enhancing operational efficiency (Witkowski et al., 2020).

Making the switch to these more advanced e-commerce models is not easy, though. E-commerce businesses are always at risk because of things like cybersecurity, protecting customer data, and the need to keep updating technology. Additionally, these business models can reach a large market and possibly lower costs, but they need big investments in technology and training, which can be a problem for smaller stores (Rasheed, 2022). As e-commerce models move forward, they are likely to continue to focus on integrating technology and being environmentally friendly. Models that combine new technologies with strong business plans are likely to be at the forefront of shaping the next stage of e-commerce development. This ongoing change is not just about implementing new technologies; it is also about changing the way business is done to be more open, efficient, and customer focused.

As e-commerce and traditional clothing stores become more integrated, it gains more power to completely change the retail industry. Another important part of this change is making the in-store and online experiences more interactive, so that customers can easily switch between the two (Agarwal & Dixit, 2020; Sinha, 2019). Remarkably, point-of-sale systems are now connected to e-commerce platforms. This makes transactions run more smoothly and gives customers the chance to look over their purchases, check their store credits, and interact with the store using digital devices (Sina, 2018).

Furthermore, the ability of customers to leave comments and reviews directly on the e-commerce platform adds a layer of transparency and community engagement that traditional stores alone have struggled to provide. This feedback mechanism is crucial for quality control and brand reputation management, enhancing consumer trust and

facilitating informed purchasing decisions (Guercini et al., 2020). E-commerce platforms employ security measures to protect these interactions and transactions, integrating advanced encryption protocols and secure payment gateways to ensure that consumer data is protected against unauthorized access and cyber threats (Zhang & Guo, 2021). Multichannel strategies show that e-commerce and traditional stores are becoming more and more connected, especially in the fashion industry. These plans make sure that interactions with customers stay the same across all platforms, like in-store and online. This improves the overall customer experience and grows the market by collecting and analyzing data strategically (Hauser, 2020).

Sagar (2024) Find that Zara's digital transformation has enabled the brand to stay ahead in the fast-paced fashion industry. The ability to rapidly respond to changing trends and produce new collections has contributed to Zara's success. The incorporation of e-commerce complements the in-store experience, offering customers flexibility in how they engage with the brand. Zara's case illustrates how a digitally enabled supply chain can revolutionize traditional industries and redefine consumer expectations.

### 2.2.3 The Major Drivers of E-Commerce Adoption

E-commerce is growing faster than ever because of a number of important factors that help it grow in the digital economy. These drivers, which have been found through a lot of research and studies, help us understand how e-commerce is changing. In particular, economic growth plays a big role. For example, e-commerce has seen a big rise in its share of GDP in places like Russia, where it has greatly improved the economy's functionality (Karpunina et al., 2021).

Perceived value and customer satisfaction also play critical roles in propelling e-commerce growth. These elements significantly influence consumer behavior, fostering

robust relationships within the e-commerce sector and driving repeated engagements and loyalty (Subhashini & Hemamalini, 2016).

The digital marketplace enhances this dynamic by providing a platform for sellers that supports growth through services that leverage network effects, market size, and defensibility, ensuring sustained business progression (Dragomirov, 2020). Moreover, marketplaces themselves are instrumental drivers of e-commerce growth. Platforms like Wildberries, OZON, and Yandex.Market offer variety and extensive customer reviews, facilitating increased transactions and customer trust, thus driving further e-commerce adoption (Радмила Магомедова, 2023).

E-commerce growth is also significantly driven by sophisticated payment systems that integrate seamlessly with other platform services, thus enhancing user experience and ensuring transaction security, which in turn attracts more users to e-commerce platforms (paytrail, 2023). The integration of e-commerce with traditional retail strategies also plays a crucial role, as it allows businesses to leverage their existing physical infrastructure to augment their online presence, thereby creating an Omni channel customer experience that aligns with modern consumer expectations (Agarwal & Dixit, 2020).

## 2.3 Performance Elements of Fashion Retail Business

Asih (2020) show that the complexity of the information tends to influence the number and types of the performance indicators. Various information aspects such as data, cost, waste, satisfaction, web applications, supply chain improvement, etc. often result in varying metrics. Studies relating to performance metrics vary in terms of research objectives and emphasis; hence, outcomes may differ as well, resulting in various types of performance indicators.

The idea of performance in online commerce is complex, encompassing the evaluation and improvement of numerous operational aspects to determine efficacy, efficiency, and quality. With an emphasis on RFID, digital infrastructure and e-commerce in the fashion retail industry; this section seeks to outline the non-financial results produced by investments in technology. These technologies are crucial for improving performance in various essential areas of company operations.

### 2.3.1 Inventory Management

Inventory management is an essential function within organizations that involves overseeing and controlling the order, storage, and utilization of components essential for production and sales. It aims to maintain optimal stock levels to prevent excessive or insufficient inventory, which can influence operational efficiency and performance.

Inventory management is described as the regulation of stock levels, encompassing raw materials, work-in-progress (WIP), and finished goods to ensure availability and cost-efficiency. Effective management of inventory is crucial for balancing stock availability with financial costs, thus supporting continuous production and sales, and enhancing organizational efficiency through proper supplier selection and the automation of inventory processes (Maiorova & Balashova, 2023; Yoshida et al., 2007).

Traditional inventory management systems, characterized by manual tracking and periodic stock checks, are giving way to more sophisticated and technologically advanced solutions. Digital inventory management systems leverage real-time data analytics to optimize stock levels, mitigate stock outs, and enhance overall supply chain efficiency. The result is a more responsive and agile retail ecosystem capable of adapting to fluctuations in consumer demand and market trends (Sagar, 2024).

Having good inventory management systems is a key part of keeping costs low and profits high. They use different methods and tools, like Economic Order Quantity (EOQ), ABC analysis, and inventory turnover ratios, to check how well inventory is being handled and make it more efficient. For example, adding machine-learning algorithms to inventory systems has changed how they predict stock and made them more adaptable to changes in supply and demand (Gooijer & Hahr, 2014).

Many other business systems, including financial, customer relationship management, and supply chain management are interdependent on inventory management. Demand characteristics for instance, affect inventory decisions and in turn, the operational context in which inventory is handled (Munyaka & Yadavalli, 2022). Demand characteristics can be either deterministic or dependent on a number of factors.

Gooijer and Hahr (2014), find that an inventory management system with late transaction, processing is outlined, including phases for count, recount, and authorization. This system ensures that late transactions are processed without disrupting the ongoing accuracy of stock counts. It employs snapshots and a staging table to provide updates during these stock count phases, reflecting an intelligent approach to inventory discrepancies that may arise from delayed transactions.

Arvind Jaggi (1996) research examines the stages of processing inventories in the durable sector, particularly focusing on work-in-progress and materials inventories and how production period lengths affect them.

Muharremoglu and Yang (2010) study introduces stages for determining base-stock levels in systems with stochastic lead times and computing costs based on threshold policies.

### 2.3.2 Operational Efficiency

Operational Efficiency, defined as a focal firm's responsiveness to customers and improvements in productivity relative to its competition (Wu et al., 2015). Digital technologies streamline various operational aspects, leading to enhanced efficiency. Inventory management systems utilizing real-time data analytics minimize stockouts and overstock situations, optimizing supply chain logistics (Sagar, 2024).

The efficient flow of goods from production to consumer is of the utmost importance in the fashion retail industry, where supply chain operational efficiency is paramount. The efficiency can be measured using a variety of Key Performance Indicators (KPIs) that consider societal, environmental, and economic factors. These key performance indicators are crucial for evaluating sustainable supply chain management (SSCM).

The Supply Chain Operations Reference (SCOR) model is one such framework that assists in determining these weighted criteria. It works in conjunction with methods like the Analytical Hierarchy Process (AHP) and Objective Matrix (OMAX), which are analytical tools for examining KPI results and thus supply chain performance (apics, 2017).

In supply chain management, a list of KPIs is often used to show how well operations are running. Researchers consider these KPIs to be important metrics. One of these is the quality of the service and product, which shows that supply chain practices work. Service quality, which can be measured by things like on-time deliveries and correct order fulfillment, has been emphasized as a key factor in keeping customers happy and satisfied. At the same time, product quality, which is measured by the number of defects and returns, is thought to show how well quality control measures are built into the supply chain (Marek et al., 2020; Maté et al., 2016; Muharremoglu & Yang, 2010).

It is closely examined to see how much of an effect it has on a company's bottom line. It is thought that carefully balancing these costs is a key part of making a supply chain that is both reliable and cost-effective (Patidar et al., 2022).

Also, Sager (2024) find that the digital transformation landscape presents a myriad of opportunities for retailers to enhance customer engagement, operational efficiency, and market reach.

### 2.3.3 Customer Satisfaction

A series of indicators that properly reflect company performance should be set up to fully utilize the function of performance measurement. These indicators can be quantifiable or unquantifiable. For example, an indicator such as lead-time is understood as a quantifiable (financial) measure whereas the degree of customer satisfaction is categorized as an unquantifiable (or nonfinancial) measure.

Asih et al., (2020) focus on KPIs to improve the satisfaction, better service, educations, product, SCM, business process, maintenance, a decrease of the case's in environment problem, identification of critical point in banking, financial audit, control targets, increase productivity, safety indicator and even a prototype for best organizations' performance.

Overall satisfaction is an evaluative judgement of the last purchase occasion and based on all encounters with service provider. Thus, overall satisfaction is an aggregation of all transaction-specific satisfaction with service encounters. Transaction-specific satisfaction is likely to vary from experience to experience while overall satisfaction is a moving average that is relatively stable and most similar to an overall attitude towards purchasing a brand This conceptualization is notable because overall satisfaction is a better indicator of future loyalty and business performance (Nam et al., 2011).

Schneider et al., (2005) use (customer satisfaction) as a measure in their study, which provided on the diagonal of employees, provided ratings of service leadership and service climate. While (Hansemark & Albinsson, 2004) explore how the employees of a company experience the concepts of customer satisfaction and retention using phenomenological method, allowing the informants' own interpretations to be discovered. They disused Satisfaction from three perspectives: definition of the concept, how to recognize when a customer is satisfied, and how to enhance satisfaction.

Many models can be used to measure and improve customer satisfaction, which is a complicated topic. Li et al., (2023) created a system for measuring customer satisfaction that uses the grey fuzzy theory to improve the time it takes to respond to evaluations greatly. Zhang and Qin (2022) uses the Ordered Logistic Regression model, which is a basic way to compare how satisfied people are with different goods or services.

Okike and Mosanako (2020) research shows how Qualification Weighted Customer Opinion with Safeguard (QWCOS) and Flexible Qualification Weighted Customer Opinion with Safeguard (FQWCOS) models can be used to find out how satisfied customers are with software products and services. This shows how important these models are for measuring user satisfaction. Apornak (2017) study combines the SERVQUAL model with the Kano and QFD approaches. This helps educational institutions find and categorize customer needs to improve satisfaction levels.

Indang and Taib (2017) also stated that the Kano Model has been used to measure customer satisfaction in places like the UUM Sultanah Bahiyah Library. This has helped us learn more about what customers expect in service-based industries (Indang & Taib, 2017).

Lewis and Mazvancheryl (2017) use the American Customer Satisfaction Index framework to create a Network DEA model to measure how efficient the customer

satisfaction process is in the auto industry. The goal is to make the process more efficient. In addition, (Kamaruddin et al., 2016) suggest measuring customer satisfaction through speech analysis using the Valence-Arousal approach, employing Mel Frequency Cepstral Coefficient (MFCC) and Adaptive Neuro Fuzzy Inference System (ANFIS), thus introducing a novel approach to quantifying customer satisfaction.

Wu et al., (2015) finds that the customer perspective is comprised of product leadership, customer satisfaction, and Firm image, all of which were measured by the customer view of a firm's products and services, their overall satisfaction level, and how they perceive the firm image reflecting customer requirements.

### 2.3.4 Brand Equity

Brand equity is a general term that refers to how consumers and other important people in a brand's life see and value it. Trustworthy ranking groups measure brand equity, and it shows that a company's intangible assets and market value are growing, according to (Oliveira-Dias et al., 2023).

Nana et al., (2019) stated that rebranding projects could improve company performance by making customer experiences better and strengthening brand associations, even though they do not directly change brand equity. (Keller, 1993) take a deep look at the causes and effects of brand equity. They show how a strong brand equity gives a company a big advantage over its competitors and makes it more valuable, (Cuong, 2023) says that brand awareness, along with loyalty, associations, and perceived quality, are important parts of brand equity that affect consumer's decision to buy and, by extension, the performance of the company.

Shamma and Hassan (2011) support a method for measuring brand equity that includes both customer-based and corporate perspectives. This would result in a total

brand equity valuation that takes into account both consumer relationships and engagement with a wider range of stakeholders. It is thought that this all-around approach will have a big effect on how well a company does.

Also According to (Jeon, 2017), brand equity is affected by both the brand concept and the emotional attachment and commitment of customers. These factors work together to affect the brand's equity and, in turn, the company's loyalty and market performance.

Chandrasekhar and Sinha (2008) use Structural Equation Modelling to find out how much brand equity there is and how much customers are willing to pay more for branded products compared to unbranded ones. This shows that brand equity is directly related to company performance.

In addition, Grosu and Cosmulese (2019) study the brand equity by looking at the returns on investments in the brand. They stated that strong brand equity could bring in customers and improve business performance. Gluhović (2020) uses the Inter-brand method to measure brand equity. This method looks at financial results, the role of the brand in buying decisions, and the brand's strength against competitors (Gluhović, 2020; Shamma & Hassan, 2011).

This shows how strong brand equity can affect company performance through investors, employees, and customers.

Shamma and Hassan (2011) again highlight the integration of Product and Corporate Brand Equity into Total Brand Equity, linking it to market, social, and financial performance indicators, providing a thorough understanding of brand equity's overall impact on a company's success.

## 2.4 Intersection of Digitalization of Supply Chain and E-Commerce

The intersection of digitalization of SC and e-commerce is characterized by significant innovation and growth. This field is fundamentally changing traditional retail into an industry that is more connected, efficient, and customer-centric. In the discussion about using digital technologies in stores, (Kondratev, 2022) discussed how blockchain technology improves safety and efficiency by combining data from online and offline channels in smart stores, especially when it comes to digital copyright registrations. Additionally, (Song et al., 2021) research shows how digitalization and the development of human capital can help integrate the supply chain in Omni-channel retailing.

Further examination by Dutta and Sandhane (2022) dissects digitalization within the retail sector, highlighting the imperative for retailers to embrace digital tools to augment customer experiences and meet evolving consumer demands.

Complementarily, Mak and Shen (2021) delineate the successful application of JD.com's innovative Consumer-to-Manufacturer (C2M) model that digitally connects consumers with manufacturers, displaying an effective implementation of digitalization in e-commerce.

Meanwhile, Pushkin (2018) presented the digital business models employed by online retailers, where technologies such as RFID are utilized for optimizing logistics, exemplified by Wal-Mart's leadership in digital innovation.

Finally the study of Hagberg et al., (2014) state that digitalization has an impact on more than just e-commerce; it affects communication, transactions, and distribution, leading to a larger digitalization in the retail sector.

## 2.5 Previous Studies

The investigation into the impact of supply chain digitalization and e-commerce on the performance of fashion retail businesses in Jordan has been greatly informed by prior academic research. This research section focuses on several critical studies that examine different aspects of how digital transformations influence retail operations, supply chain management, and overall business performance.

**1. Study of Shim et al., (2000) entitled**

**"Business-to-business e-commerce frameworks"**

In this influential paper, Shim et al. tackled the issue of integrating security and efficiency in B2B e-commerce platforms. The methodology focused on analyzing existing digital certificate systems and standards-based business strategies through a technical lens. Their findings highlighted the critical role of robust e-commerce frameworks in enhancing supply chain management. The study's implications stress the need for continuous improvement in e-commerce platforms to maintain security and operational efficiency.

**2. Study of Anderson and Lee, (2000) entitled**

**"The internet-enabled supply chain: From the first click to the last mile"**

Anderson and Lee examined the transformation of supply chains from initial customer engagement to the final delivery, integrating e-commerce at every step. Their method involved a comprehensive analysis of case studies across multiple industries where e-commerce tools had been implemented. The results confirmed that an internet-enabled supply chain offers greater synchronization and efficiency. The implications of their findings indicate that embracing full digital integration into supply chain operations can significantly enhance responsiveness and customer satisfaction.

**3. Study of Johnson and Whang, (2002) entitled**

**"E-business and supply chain management: an overview and framework"**

Johnson and Whang provide an extensive overview of how e-business influences supply chain management, focusing on digital storage challenges and solutions. Their study offers valuable case studies, including one from Mass Fashion, a Greek apparel company, demonstrating how digital solutions can alleviate traditional supply chain constraints and enhance overall efficiency. The relevance of their research to the Jordanian context lies in the potential application of similar digital strategies to overcome logistical challenges and improve supply chain resilience.

**4. The study by Heuer et al., (2015) entitled**

**"Brand competition in fashion e-commerce"**

The study looks into how brand competition works in the online fashion retail. The focus is on looking at how price promotions affect sales of different brands in an online shopping setting. To do this, regression analysis is used to estimate cross-price elasticities in two separate product categories. Using a unique data-set with more than 3.3 million observations which was provided by a leading European e-commerce company.

The goal of this method is to find out how big the brand substitution effects are that pricing strategies cause. Key findings from the study include:

This study is important because it challenges some common ideas about how competition works online and how people act when they shop online. It seems to say that even though it is easy to compare prices and products online, people are less likely to switch brands when it comes to fashion items because they have a high value and people are loyal to their favorite brands. Due to the "look-and-feel" nature of fashion items,

where physical features greatly affect buying decisions and these features cannot fully be understood without touching the item, this could be the reason.

**5. The study of Sakapas and Kittisak, (2019) entitled**

**“Supply Chain in Digital Era: Role of IT Infrastructure and Trade Digitalization in Enhancing Supply Chain Performance”**

The Study investigates how Digitalization influencing all industries but manufacturing industry is responding comparatively lesser than the other sectors. Poor IT infrastructure can lead towards diminishing performance at all fronts including financial, operational, marketing and supply chain. Trade digitalization can emerge as a savior in industry digitalization era. This study is focused to analyze the influence of IT standardization and integration on supply chain performance in mediating role of trade digitalization. Questionnaire-based survey was conducted in Thailand's manufacturing industry where almost 47 firms' employees were taken as sample and their responses. Findings have revealed that both dimensions of IT infrastructure have significant impact on supply chain performance and mediating role of trade digitalization was flagged significant, this study has its implications for academia, industry and government as IT infrastructure has to be developed in not only Thailand's industry but in all countries locating at Asian belt to enhance supply chain performance.

**6. The study of Gaudenzi et al., (2021) entitled**

**"Hitting or missing the target: Resources and capabilities for alternative e-commerce pathways in the fashion industry"**

This paper explores how fashion companies can successfully implement e-commerce strategies by configuring their e-supply chains. Conducted through in-depth interviews with 35 participants from four Italian fashion companies over 2011-2019, the research uses Resource-Based View (RBV) and Dynamic Capabilities (DC) to examine the

interplay between resources, capabilities, and e-commerce strategy evolution. The study has identified two important resources, namely network structure and service architecture, as well as four essential capabilities. These capabilities include relationship governance, exploitation of information asymmetry, core logistics, and e-CRM and digital capabilities. Understanding these elements is crucial for companies as they navigate their e-commerce journey. It suggests that effective e-commerce strategies depend on aligning these resources and capabilities to environmental and competitive pressures. The research presents a theoretical framework and proposes a model outlining how firms navigate the complexities of e-commerce, providing insights relevant not only to the fashion industry but also applicable to other sectors looking to enhance their e-commerce presence.

**7. Study by Kilay et al., (2022) entitled**

**"The Influence of E-Payment and E-Commerce Services on Supply Chain Performance: Implications of Open Innovation and Solutions for the Digitalization of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia".**

This study conducted a comprehensive study to assess the impacts of e-payment and e-commerce services on the supply chain performance of micro, small, and medium enterprises (MSMEs). Their research methodology involved analyzing the operational efficiencies brought about by digital payment solutions and e-commerce integration within MSMEs. The findings from this study reveal a significant enhancement in supply chain responsiveness and reduction in transaction costs, which in turn foster operations that are more streamlined and improved market access for these enterprises. This research is particularly pertinent as it provides a roadmap for leveraging digital solutions to bolster supply chain efficiencies in Jordan's burgeoning MSME sector.

**8. Study by Al Mashalah et al., (2022) entitled**

**"The impact of digital transformation on supply chains through e-commerce: Literature review and a conceptual framework"**

In their study, Al Mashalah and colleagues explore the profound impacts of digital transformation on SCM within the context of e-commerce. Utilizing a systematic literature review and developing a conceptual framework by reviewing 153 publications from 1999 to 2019, their researchers highlighted how digital tools and e-commerce platforms facilitate enhanced supply chain integration, agility, and customer responsiveness. The findings underscore the transformative potential of digital technologies in redefining traditional supply chain operations, developing analytical centered; modelling based ecosystem for environment; leveraging data mining to enhance sustainability; balance between growth and sustainability; consumer demand and uncertainty; coordination in e-commerce logistics; last mile alternatives and cost management of innovative technique implementations.

**9. Study by Gao (2022) entitled**

**“the Effects of Digital Supply Chain Transformation on the Operational Performance of Retail Enterprises”**

This paper first analyzes the current situation of Chinese retail enterprises and expounds on the significance of digitalization. Use the literature to study the role of digital technology on the development of retail enterprises and analyze the problems existing in the supply chain of retail enterprises under the background of digitalization.. His research shows that transformation pain points can be improved through the intervention of consumer-centric supply chain value, digital infrastructure, trust mechanisms, Omni-channel logistics platforms, and national policy support. Holding that integrating digital

technology may significantly boost retail businesses' performance as well as their fundamental competitiveness.

**10. Study by Casciani et al., (2022) entitled**

**"Exploring the nature of digital transformation in the fashion industry: opportunities for supply chains, business models, and sustainability-oriented innovations"**

This study investigate the multifaceted impact of digital transformation on the fashion industry, particularly focusing on its implications for supply chain management, business model innovation, and sustainability practices. Their study employs a mixed-method approach, integrating case studies and theoretical analysis to illustrate how digital technologies like AI, blockchain, and IoT are pivotal in promoting sustainability and efficiency across fashion supply chains. The research highlights the critical role of digitalization in fostering sustainable practices and improving operational efficiencies, these capabilities also drive multicentred business-model innovations and thus affect value creation and delivery and capture changes. In addition, the analysis shows that digital transformation affects the four dimensions of sustainability that are interconnected intrinsically across supply-chain processes. Offering valuable lessons for Jordanian fashion retailers aiming to integrate sustainability into their business strategies.

**11. Study by Szozda (2023) entitled**

**“Omni channel as a driver of digitalization evidence from the emerging market in the fashion industry”**

This study investigate the interrelationships among technologies in retail web rooming and showrooming purchase intentions and customer experience. A sample of 628 customers of an Omni channel clothing store and analyzed the data using cluster analysis Based on his

study, it was concluded that out-store technologies are positively associated with Omni channel purchase intentions and positively associated with cognitive and affective customer experience.

The results reveal three different segments: reluctant Omni shoppers, Omni channel enthusiasts, and indifferent Omni shoppers; and significant differences in gender, age, income level, and Omni channel behavior among these segments.

**12. Study by Špiler et al., (2023) entitled**

**"Investments in digital technology advances in textiles"**

This study investigate the investments in digital technologies, which expected to have a major impact on the textile and fashion companies' sustainability and competitiveness.

Representatives of 423 textile and fashion companies were asked about their investments in various digital technologies in the previous three years and their digital transformation status Motivated by these trends empirical research on investments of the fashion and textile companies in ICT technologies-based advancement in textile and fashion companies.

The research findings show that investments in cloud computing, IT, energy management, automation, robotics, and machine learning technologies have a significant impact on the digital transformation of companies.

Additionally, the research finds that the investments in the companies' digital transformation can be seen in the significance of the textile's digital technology implementation, which enables manufacturers and retailers to respond directly to market demand by reducing product lead time and cost, increasing supply chain efficiency and profitability, and promising in terms of ensuring competitive advantage in the risk and challenging business environment.

**13. Study by Sagar (2024) entitled**

**"The Impact of Digital Transformation on Retail Management and Consumer Behavior"**

The study investigates the profound impact of digital transformation on both retail management strategies and consumer behavior. A critical review of existing literature forms the foundation, delving into key concepts such as omni-channel retailing, data-driven decision-making, and the integration of emerging technologies. The exploration of digital transformation in retail management will dissect changes in operational practices, supply chain optimization, and the adoption of technologies like artificial intelligence.

Against the backdrop of technological advancements and the rise of e-commerce, and understanding the driving forces behind digital transformation in the retail, examining challenges encountered by traditional retailers, and analyzing the evolving landscape of consumer expectations and behaviors. The exploration of digital transformation in retail management that dissect changes in operational practices, supply chain optimization, and the adoption of technologies like artificial intelligence. The study scrutinize alterations in consumer behavior within the digital era, encompassing shifts in shopping patterns, the influence of online reviews, and the role of social media in shaping preferences. Challenges and opportunities arising from this transformative shift, Shedding light on the obstacles faced by traditional retailers and the avenues for enhancing customer engagement, operational efficiency, and market reach.

## 2.6 Research gaps

This study is one of the unique studies that merges many main fields in the special sector of fashion. It differentiates itself from previous studies in several key aspects:

1. While the existing body of research primarily addresses global or non-Middle Eastern contexts, this study specifically focuses on Jordan.
2. This study goes into detail about Jordan's fashion brands stores. It looks at specific digital tools and strategies that are useful for this industry, like how to use RFID and adapt e-commerce, so that the results are more useful for people in the industry.
3. What Strategies used for the Adoption of e-commerce in the fashion retail business.
4. The relationship between the supply chain digitalization and the e-commerce.

These gaps are filled through mixed methods using semi-structured interviews with the sector experts along with a quantitative method, a questionnaire designed to collect data from managers in the fashion industry. The full methodology and research design will be detailed in Chapter 3.

# CHAPTER THREE

## Study Methodology

3.1 Study Design

3.2 Study Population

3.3 Sample Size

3.4 Data Collection Methods

3.5 Validity and Reliability

3.6 Data Suitability for Statistical Methods Used

3.7 Study Variables

3.8 Study Procedures

# CHAPTER THREE

# Study Methodology

## 3.1 Study Design

This study employs a mixed-methods design, integrating both qualitative and quantitative approaches to comprehensively examine the impact of digitalization in the supply chain and e-commerce on the performance of fashion stores in Jordan. The rationale for using a mixed-methods approach lies in its ability to leverage the strengths of both methodologies, facilitating a holistic analysis that would be unattainable through a single method.

Incorporating a triangulated framework, this design enhances the robustness and validity of the research findings. By collecting and analyzing data from multiple sources and perspectives, the study ensures a richer and more nuanced understanding of the phenomena under investigation. This triangulation of data mitigates biases and increases the reliability of the results, providing a well-substantiated foundation for conclusions drawn.

The study's multi-faceted approach not only broadens the scope of inquiry but also allows for cross-validation of findings, thereby enhancing the credibility and depth of the insights into how digital transformation influences the operational and strategic business performance of Jordanian fashion retailers.

### 3.1.1 Qualitative Component

The qualitative aspect of the study involves conducting semi-structured interviews with experts from international fashion brands operating in Jordan. These interviews are designed to gather in-depth insights into the strategic implementation of RFID technologies and e-commerce solutions within their operations. Participants were selected based on their expertise and roles in supply chain and operations, (stock control, operations managers, brand managers, assistance and store managers). These roles are

directly engaged with digital tools and processes; this method provides contextual depth to the study, offering nuanced understandings of the digital transformation processes and their perceived effectiveness in the fashion retail.

Conducting ten interviews each interview last for 25 to 30 minutes it allowed obtaining sufficient information and all interviews were recorded after approval from the interviewers.

### 3.1.2 Quantitative Component

Concurrently, the quantitative part of the study utilizes a structured questionnaire distributed among branch managers and their assistants, brands managers, operations managers and stock control managers across various fashion retail brands in Jordan.

These managers have a comprehensive understanding of how digitalization affects daily operations. They can provide valuable insights into the efficiency, challenges, performance metrics influenced by digital tools, they are knowledgeable about key performance indicators (KPIs) related to their areas, making them well-equipped to quantify the effects of digitalization and e-commerce on various aspects of the business.

The questionnaire measures the expectations, experiences, and perspectives related to RFID integration, digital infrastructure, e-commerce adoption and strategies. The questions are designed to quantitatively assess the impact of these technologies on inventory management, operational efficiency, customer satisfaction, brand equity and overall business performance. This component provides statistical data that can be analyzed to identify trends, correlations, and impacts of digitalization and e-commerce on the performance.

Integrating mixed methods in digital transformation research in the fashion retail provides a comprehensive approach to understanding complex phenomena. Digitization in retailing transforms business patterns by integrating technological advances to improve

customer experiences and organizational sustainability, highlighting the importance of mixed-method research to capture these multifaceted changes (Llorens et al., 2022). Moreover, exploring user experiences through advanced data analytics and mixed methodologies offers insights into digital consumer behaviors and improves retail environments (Tupikovskaja-Omovie, 2022). Through a strategy called "concurrent triangulation," the mixed-methods approach combine qualitative and quantitative data at the same time (Greene & McClintock, 1985). With the help of expert interviews and questionnaire responses, the study can give a more complete picture of how digital transformation has affected the fashion retail industry in Jordan. This methodological synergy helps answer the research questions from different point of view, which leads to a complete understanding of the topic. The following table summarizes the variables, constructs, and article numbers.

**Table (3.1) questionnaire model**

| Variable | Construct | Survey Items |
|---|---|---|
| **Independent variable 1. Digitalization of Supply Chain** | | |
| | 1.1 RFID integration | 1-5 |
| | 1.2 Digital Infrastructure | 6-10 |
| **Independent variable 2. E-Commerce** | | |
| | 2.1 E-Commerce Adoption | 11-15 |
| | 2.2 E-Commerce Strategy | 16-20 |
| **Dependent variable Performance** | | |
| | Inventory Management | 21-25 |
| | Operational Efficiency | 26-30 |
| | Customers Satisfaction | 31-35 |
| | Brand Equity | 36-40 |

## 3.2 Study Population

The study population comprises professionals working in managerial roles within the fashion retail industry in Jordan. As per (Alarab, 2023) There are around 60-70 fashion brands with around 180 branches in Jordan. These brands operate through a combination of direct ownership and franchise models (Alarab, 2023; Jordan Chamber of Industry, 2020).

This study estimates that around 500 Mangers fit the profile of managers at different levels within the international fashion retail brands Such as Mango, Parfois, adl, Twist, Bershka, Okaidi, Aldo, Pull and Bear, H&M, Zara, US Polo, American eagle, Levis, converse, Nike, Adidas, Oysho and Massimo Dutti that are present in major shopping centers like City Mall, Taj Mall, Abdali Mall, Galleria Mall, Mecca Mall and Irbid City Center. These Brands identified based on their international presence, brand recognition and Number of Branches.

The Population for this study is specifically drawn from the managerial staff of fashion retail brands in Jordan the roles targeted in this study include:

- **Store Manager and Assistant Store Manager:** Responsible for daily store operations, customer service, and direct supervision of retail staff. 180*2 =360
- **Brand Manager:** Handles the overall performance of a specific brand within a region, focusing on compliance with global brand standards. 60-70
- **Operations Manage**: Oversees operational aspects across multiple stores or a region, ensuring operational efficiency and alignment with corporate objectives. Each operation manager operate around 5 stores 180/5=36
- **Stock Control Manage**: Manages inventory levels, stock distribution, and logistical coordination to balance supply and demand effectively. Also, control Loss & Prevention. Each stock manager control around 5 stores 180/5=36

The sampling strategy involves comprehensive sampling to obtain data from individuals experiencing every possible manager within the population who have direct experience and insights into the digitalization and e-commerce strategies of their respective brands.

## 3.2 Demographic analysis

**Table (3.2): Demographic Analysis**

| Characteristic | Category | Frequency | Percentage% |
|---|---|---|---|
| Gender | Female | 110 | 48.7% |
| | Male | 116 | 51.3% |
| **Total** | | **226** | **100%** |
| Age | Under 25 | 112 | 49.6% |
| | 25-30 | 60 | 26.5% |
| | 31-35 | 19 | 8.4% |
| | 36-40 | 15 | 6.6% |
| | 40 and above | 20 | 8.8% |
| **Total** | | **226** | **100%** |
| Experience in the Fashion Industry | Less Than 5 Years | 123 | 54.4% |
| | 6-10 | 56 | 24.8% |
| | 11-15 | 14 | 6.2% |
| | 16-20 | 14 | 6.2% |
| | More than 20 Years | 19 | 8.4% |
| **Total** | | **226** | **100%** |
| Current Role | Assistant Store Manager | 118 | 52.2% |
| | Store Manager | 50 | 22.1% |
| | Brand Manager | 25 | 11.1% |
| | Operation Manager | 21 | 9.3% |
| | Stock Control Manager | 12 | 5.3% |
| **Total** | | **226** | **100%** |

The frequencies and percentages of the demographic variables for the study resonance were computed and are displayed in Table (3.2)

Most of the Participants have less than five years' experience that's indicate that the managers working in stores are fresh and young and could be response to the new technologies , divided equally between both genders most of them are assistants or store managers over 70%. Less numbers of brand, operation and stock managers they are more experience as for each five to ten stores, there is one of these positions in the field.

Considering the finite population of 500 managers, the sample size adequately compensates for the population size and ensures that the survey results are both statistically valid and generalizable to the population of managers within the fashion retail in Jordan. For this study, the 226 managers participate agers was determined based on guidelines from (Sekaran & Bougie, 2016).

## 3.4 Data Collection Methods

### 3.4.1 The interview

The qualitative data collection relied on expert's interviews, (we conduct the interview with **Ten** experts in the field) to gather information from managers of well-known international fashion brands with a presence in Jordan. These in-depth interviews aimed to explore the strategic, operational, and technical elements of digitalization in the retail fashion industry.

The interview questions were meticulously designed to explore several critical domains: RFID integration, digital infrastructure, e-commerce adoption, the influence of e-commerce on brand identity, and performance metrics evaluation. For instance, questions regarding RFID integration such as the improvements observed from its implementation and challenges faced were framed in the context of existing literature that highlights RFID's role in enhancing inventory efficiency and effectiveness, as discussed by (Denuwara et al., 2019; Nazmi & Ahmad, 2021; Voipio et al., 2021; Wolbitsch et al., 2020). Similarly, discussions around digital infrastructure drew on insights from (Alkhatib & Momani, 2023; M. Pereira et al., 2022).

In addition, the parts of the survey that dealt with the implementation of electronic commerce took into account Jordan's preparedness and current efforts to strengthen e-commerce infrastructure, which were corroborated by the evaluation done by (United Nations Conference on Trade and Development, 2022). With this background, we can better grasp the strategic choices that led to e-commerce integrations and how they affected our ability to reach and satisfy customers. Additionally, the larger context of digital market opportunities and challenges within the Jordanian market landscape

informed the exploration of how e-commerce impacts brand identity in the presence of counterfeit products. The following table summarizes the questions of the interview.

Each participant's formal consent was obtained before the interviews were conducted. Academics will use the data collected for academic purposes, and the participants were informed about the measures taken to protect their privacy. The interviews followed a predetermined format and were expected to last around twenty to thirty minutes to cover all the necessary ground.

We digitally recorded the interviews with the participants' consent to guarantee precise data collection and make detailed transcription easier. The audio recordings were painstakingly transcribed word for word so that the written text could be examined with NVivo software; this software enabled thematic analysis, which allowed for a thorough examination of the topics covered.

Interview questions in shown in appendix three.

**3.4.2 The study questionnaire:**

A full quantitative questionnaire with a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree) was made based on the previous studies (Shim et al., 2000; Heuer et al., 2015; Sakapas & Kittisak, 2019; Gaudenzi et al., 2021; Kilay et al.,2022; Gao, 2022; Szozda, 2023; Spiler et al., 2023; Sagar, 2024).

Professional expert’s f feedback from the interviews and academic experts reviews to find out how the supply chain digitalization and e-commerce affect the performance of fashion stores in Jordan. This scale was used to find out what managers in the industry thought and felt about RFID integration, digital infrastructure, and the use of e-commerce.

1. Demographic Questions: The questionnaire began with demographic questions to capture essential data about the respondents, including gender, age, experience in the fashion industry, and current role. This information helps contextualize the responses and allows for demographic analysis of the data.
2. RFID Integration: RFID technology's role in transforming inventory and supply chain management was a primary focus. The questionnaire items related to RFID explored its impact on enhancing inventory tracking, streamlining shipment processes, preventing product shrinkage, optimizing order fulfillment, and improving data analytics. The relevance of RFID in achieving operational efficiencies was backed by literature that highlights RFID's contribution to reducing discrepancies and improving real-time data accuracy.
3. Digital Infrastructure: Questions on digital infrastructure examined how technological frameworks support supply chain operations. This section aimed to uncover how hardware, software, and network resources aid in managing supply chain dynamics, enhancing e-commerce capabilities, and ensuring seamless operations across organizational boundaries. The significance of robust digital infrastructure in supporting operational efficiency and scalability.
4. E-Commerce Adoption and Strategy: E-commerce adoption was scrutinized through questions on the integration of e-commerce platforms with traditional retail operations, the effectiveness of online product displays, and the impact of e-commerce on customer engagement and satisfaction. The strategic implementation of e-commerce was discussed, highlighting how digital sales platforms can extend market reach and improve customer service.
5. Performance Metrics: Finally, the questionnaire addressed non-financial performance metrics such as inventory management, operational efficiency,

customer satisfaction, and brand equity. This section aimed to measure the tangible outcomes of digitalization efforts on the overall business performance, referencing key non-financial performance indicators (KPIs) that are crucial for sustained growth and competitiveness.

The questionnaire is shown in **appendix three.**

## 3.5 Validity and Reliability

The tool`s validity was confirmed by using two methods: Face Validity, and construct validity.

### 3.5.1 Face Validity:

To ensure the face validity of the research instrument by incorporating the insights of ten esteemed individuals a combination of experienced and full professors and PhD holders in relevant fields. Names of the experts is shown in **appendix one**.

The researcher gathered feedback from these experts and utilized their collective expertise to refine and shape the questionnaire. Each participant provided invaluable input, offering perspectives informed by their extensive academic backgrounds and professional experiences. Their feedback mainly on the formulation of the questions guided the development of the questionnaire, ensuring that it comprehensively captured the dimensions of the variables under investigation while also being clear and understandable to respondents.

By incorporating the insights of these respected individuals, the researcher bolstered the credibility and relevance of the research instrument, enhancing its face validity. This rigorous approach not only strengthens the overall quality of the study but also instills confidence in the accuracy and appropriateness of our measurement tool for assessing the targeted construct.

It was presented also to a panel of three experts in the fields of fashion retail. These experts evaluated the clarity, relevance, and overall appropriateness of the questions to ensure they were understandable and effectively designed to capture key aspects of digital integration in fashion retail. Their feedback facilitated refinements in the questionnaire, confirming its suitability for the study.

### 3.5.2 Factor Analysis:

Exploratory Factor analysis: The table above shows the factor loadings of the items in the study tool with eight factors five questions for each Factor, independent factors digitalization of supply chain two factors (RFID integration and digital infrastructure), E-commerce two factors (e-commerce adoption and e-commerce strategy) and the dependent variable which is the performance with its four factors (inventory management, operational efficiency, customers satisfaction and brand equity)

The correlation between each item and the factor. High loadings, which are typically >0.5, indicate that the item is a good indicator of the factor (Gorsuch, 2015). Moreover, each factor can be interpreted based on the specific items that had a high loading on the row.

Table (3.4) and Table (3.5) show the loading factor of the items for the dimensions (Independent and Dependent) of the study tool. The table shows item Loadings, showing the presence of eight factors explaining performance.

**Table (3.3): Exploratory Factor Analysis. Independent Variables**

| # | Item | RFID | DI | ECA | ECS |
|---|---|---|---|---|---|
| 1 | The company uses RFID to enhance inventory tracking. | **0.547** | | | |
| 2 | The company uses RFID to streamline the shipments receiving Process | **0.606** | | | |
| 3 | The company uses RFID to prevent products shrinkage | **0.66** | | | |
| 4 | The company uses RFID to streamline the order fulfillment process | **0.655** | | | |
| 5 | The company Uses RFID to enhance data analytics | **0.633** | | | |
| 6 | The company digital infrastructure provides stock visibility into supply chain stages | | **0.657** | | |
| 7 | The company digital infrastructure integrates Data with our suppliers system | | **0.634** | | |
| 8 | The company digital infrastructure provides on-time inventory stock visibility | | **0.657** | | |
| 9 | The company digital infrastructure supports e-commerce operations | | **0.683** | | |
| 10 | The company digital infrastructure provides data access through the internet from anywhere | | **0.584** | | |
| 11 | The company integrates E-commerce with suppliers | | | **0.709** | |
| 12 | The company E-commerce Platforms are easy to use | | | **0.714** | |
| 13 | The company E-commerce displays our products effectively | | | **0.721** | |
| 14 | The company E-commerce provides personalized product recommendations | | | **0.734** | |
| 15 | The company E-commerce engages customers through social media | | | **0.738** | |
| 16 | The company E-commerce integrates with traditional Stores | | | | **0.668** |
| 17 | The company E-commerce platform ability to customer comment reviews | | | | **0.695** |
| 18 | The company E-commerce ensures security transactions | | | | **0.703** |
| 19 | The company E-commerce ensures the safeguarding of customer's information | | | | **0.718** |
| 20 | The company E-commerce provides (an exchange and Refund Policy) from Traditional Store | | | | **0.622** |

**Table (3.4): Exploratory Factor Analysis. Dependent Variable**

| # | Item | IM | OE | CS | BE |
|---|---|---|---|---|---|
| 21 | The company ensures timely Stocks replenishment | **0.749** | | | |
| 22 | The company reduces stockout | **0.732** | | | |
| 23 | The company optimizes inventory turnover rates | **0.783** | | | |
| 24 | The company ensures required products availability | **0.748** | | | |
| 25 | The company ensures suitable inventory stock level | **0.732** | | | |
| 26 | The company ensures on-time seasonal restocking | | **0.631** | | |
| 27 | The company forecasts demand accurately | | **0.716** | | |
| 28 | The company adapts to market trends quickly | | **0.713** | | |
| 29 | The company faces rarely experiences disruptions for the operations due to technical issues or system downtimes | | **0.492** | | |
| 30 | The company ensures seamless delivery from the supplier to the stores | | **0.677** | | |
| 31 | The company E-commerce witnesses attracting new customers | | | **0.692** | |
| 32 | The company witnesses' customers repeatedly purchasing through various channels | | | **0.701** | |
| 33 | The company E-commerce ensures timely delivery | | | **0.632** | |
| 34 | The company E-Commerce fosters active customer engagement | | | **0.695** | |
| 35 | The E-Commerce increases loyal customers | | | **0.686** | |
| 36 | The company increase positive reviews of the Brand | | | | **0.628** |
| 37 | The company enhances brand recognition | | | | **0.717** |
| 38 | The company increases brand awareness | | | | **0.701** |
| 39 | The company enhances its accreditable brand reputation | | | | **0.619** |
| 40 | The Company enhances the perceived value for the Brand | | | | **0.67** |

**Exploratory Factor analysis**: the EFA was conducted using SPSS; the analysis involved the principal component method with a Varimax rotation to achieve a simpler and interpretable factor structure. The factor loadings were evaluated to ensure they were

significant and adequately high (preferably above 0.5) to substantiate the relevance of the items to the factors.

This analysis helps in understanding how well the factors extracted from the factor analysis correspond to the expected constructs derived from the theoretical framework. The process involved examining the factor loadings, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, Bartlett's test of sphericity, and the commonalities among the items.

**Table (3.5) KMO and Bartlett's Test ( CFA SPSS result)**

| **KMO and Bartlett's Test** | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .947 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 6692.092 |
| | DF | 703 |
| | Sig. | .000 |

The sample size is both sufficient and favorable to generating trustworthy factor analysis results, as shown by the high value of 0.947 obtained from the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. In addition, Bartlett's Test of Sphericity returned a p-value less than 0.000, substantiating the appropriateness of the dataset for structure detection.

However, Kaiser Meyer Olkin (KMO) is used to measure sampling adequacy, harmony, and inter-correlations, KMO values between 0.8 and 1 indicate that a high sampling is an adequacy, and is accepted if it exceeds 0.6. Another indicator is Bartlett's of Sphericity used for the determination of the suitability of data and correlation, where if the significant value of data is less than 0.05 at a 95% confidence level that indicates a useful factor analysis. Variance percentage shows the explanation power of factors.

### 3.5.3 Reliability Analysis:

The data reliability is examined through Cronbach's alpha, the reliable tools have a Cronbach's alpha above 0.70 and are accepted if it exceeds 0.60 (Hair, et. al. 2014). Table (3.14) shows that the reliability of the Digitalization of Supply Chain variables ranges between 0.900 and 0.916, the reliability of the E-Commerce variables ranges between 0.833 and 0.887, and for Performance dimensions is between 0.814 and 0.924.

**Table (3.6): Reliability Test for all Variables.**

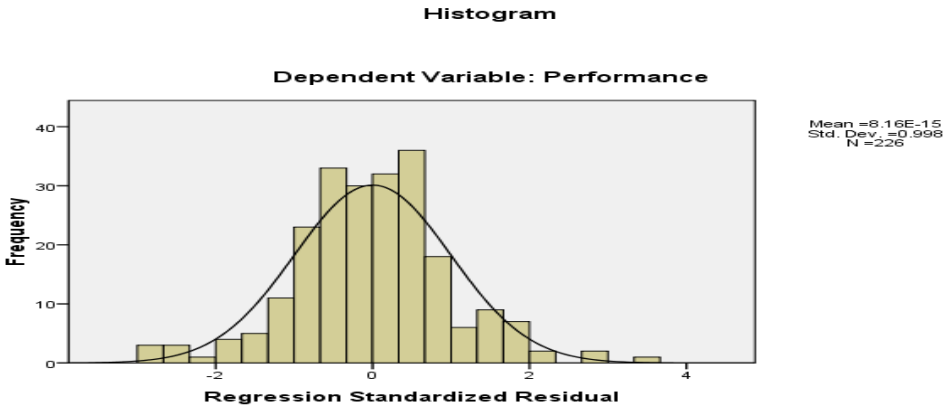
| Variable | Items/Sub-Variables | Cronbach's Alpha |
|---|---|---|
| **Digitalization of Supply Chain** | **10** | **0.932** |
| RFID integration | 5 | 0.916 |
| Digital Infrastructure | 5 | 0.900 |
| **E-Commerce** | **10** | **0.916** |
| E-Commerce Adoption | 5 | 0.887 |
| E-Commerce Strategy | 5 | 0.833 |
| **Performance** | **20** | **0.951** |
| Inventory Management | 5 | 0.924 |
| Operational Efficiency | 5 | 0.814 |
| Customers Satisfaction | 5 | 0.908 |
| Brand Equity | 5 | 0.909 |

## 3.6 Data Suitability for Statistical Methods Used

This section included evaluating the suitability of the statistical models used in the study by conducting a series of diagnostic tests. These tests are crucial for verifying the underlying assumptions of different statistical methods and ensuring the strength and reliability of the findings. The analyses encompassed assessments for normality, linearity, and multi collinearity.

### 3.6.1 Normality test

**Normality**: Figure (3.1) drawing shows that the shape follows the normal distribution; in such case, the model does not violate this assumption.




### 3.6.2 Multicollinearity Testing

**Multi-Collinearity**: the VIF (Variance Inflation Factor) value is less than 10, and tolerance is more than 10%, in such case the Collinearity model does not violate this assumption. VIF quantifies how much the variance of a regression coefficient is inflated due to multicollinearity.

**Tolerance** is the inverse of VIF (i.e., Tolerance = 1/VIF) and indicates the proportion of variance in an independent variable that is not explained by other independent variables, a tolerance value below 0.1 indicates high multicollinearity,

Multicollinearity testing was conducted to ascertain if high correlations existed between independent variables in multiple regression models. The presence of multicollinearity can distort and inflate the variance of predicted coefficients, leading to unreliable and unstable estimates of parameters. This subsection discussed Variance Inflation Factor (VIF) and Tolerance as measures to detect multicollinearity, ensuring that the regression models provided valid and interpretable results. The results suggest that

the regression models resist multicollinearity, enabling accurate interpretation of the coefficients. The following table summarizes the findings:

**Table (3.7): Tolerance and Variance Inflation Factor**

| Sub-Variables | Collinearity Statistics | |
|---|---|---|
| | **Tolerance** | **VIF** |
| **Digitalization of Supply Chain** | 0.538 | 1.860 |
| RFID integration | 0.483 | 2.069 |
| Digital Infrastructure | 0.398 | 2.511 |
| **E-Commerce** | **0.6247** | **1.596** |
| E-Commerce Ado | 0.327 | 3.059 |
| E-Commerce Strategy | 0.387 | 2.583 |

## 3.7 Study Variables

• Independent variables:

1- Supply chain digitalization (RFID integration, digital infrastructure).

2- E-commerce (e-commerce adoption, e-commerce strategy)

• Dependent variables: Performance (inventory management, operational efficiency, customer satisfaction, brand equity.

## 3.8 Study Procedures

### 3.8.1 The qualitative data analysis

The qualitative data analysis within this study involved a meticulous examination of interviews conducted with ten experts in the field. These procedures were systematically structured to ensure comprehensive and rigorous analysis using NVivo, a powerful qualitative data analysis software. The following steps outline the procedures used in the analysis:

1. Data Collection:
   - Interviews were conducted with ten industry experts who have significant experience and knowledge in the study's subject area.
   - Each interview was semi-structured, allowing for both guided questions and open-ended responses to encourage detailed insights.

- All interviews were audio-recorded with the consent of the participants to ensure accuracy in data capture.

2. Transcription:
   - Audio recordings of the interviews were transcribed verbatim. This transcription process was crucial to ensure that all verbal expressions were captured accurately.
   - Transcriptions were reviewed and verified for accuracy against the audio recordings to correct any discrepancies.
3. Data Importation:
   - Transcripts were imported into NVivo software. This step involved organizing the data within the software to facilitate efficient coding and analysis.
4. Auto-coding:
   - Using NVivo's auto-coding feature, data was initially coded based on the software's ability to recognize and categorize data into broad themes automatically.
5. Manual Coding and Thematic Analysis:
   - Following auto-coding, manual coding was performed to delve deeper into the data. This step involved refining the themes identified by auto-coding and discovering new sub-themes by examining the transcripts.
   - Thematic analysis was conducted to identify, analyze, and report patterns (themes) within the data, ensuring a nuanced understanding of the expert insights.
6. Validation and Reporting:
   - The validity of the coding process was enhanced through peer reviews and, where feasible, feedback from interview participants.
   - Findings were documented with a focus on how the themes related to the research objectives, with important quotes highlighted to illustrate key points and provide empirical evidence.

### 3.8.2 The quantitative data analysis

On-line questionnaire was distributed by the below link: https://docs.google.com/forms/u/1/d/1ascwHzLAt3S6mzGPJedR3Ove6q9DSpWOmYp7isfcqaI/edit?usp=sharing_eip_se_dm&ts=662412ce and received 226 responses from 500 Managers from the Target population.

The data was entered into the program (SPSS V.23) and the following statistical analyzes were used:

1. Verifying the construct validity of the study tool using exploratory factor analysis.
2. Verifying the Reliability of the study tool using Cronbach's alpha coefficients.
3. Normality Test and Multicollinearity Testing (Tolerance, VIF).
4. Calculating frequencies and percentages for demographic study variables.
5. Calculating descriptive statistics: Mean, Standard Deviation, t-value, Ranking, and The relative importance of the items.
6. Calculating the values of correlation coefficients between the independent and dependent study variables; Bivariate Pearson Correlation Test.
7. Use simple linear regression analysis; to answer the study hypotheses, which include one independent variable and one dependent variable.
8. Use multiple linear regression analysis; to answer the study hypotheses, which include several independent variables and one dependent variable.
9. Verifying assumptions using regression analysis, by checking the normal distribution of the data.

# CHAPTER FOUR
# STUDY RESULTS

4.1 Qualitative Analysis Results

4.1.1 Summary of Thematic Insights

4.1.2 Detailed Analysis of Each Theme

4.2 Quantitative Analysis Results

4.2.1 Descriptive Statistics Analysis

4.2.2 Independents Variables

4.2.3 Dependent Variables

4.3 Relationship between Independents and Dependent

4.4 Testing Hypothesis

# CHAPTER FOUR

# STUDY RESULTS

## 4.1 Qualitative Analysis Results

### 4.1.1 Summary of Thematic Insights

Thematic analysis of interviews with fashion retail professionals in Jordan gives useful information about how RFID technology is being used and how to make the most of e-commerce strategies. This study goes into detail about how these technologies are changing how inventory is managed and how markets are reached, showing a complex mix of benefits, problems, and strategic choices.

The implementation of RFID technology has had a significant impact on the transformation of inventory management within the Jordanian fashion retail. This technology has been found to improve the efficiency of tasks like stocktaking and shipment handling, while also increasing the accuracy of inventory levels. This improvement is essential for ensuring real-time updates on stock availability, which will greatly minimize the occurrence of out-of-stock scenarios and ultimately boost sales. The challenges related to RFID adoption, including the upfront expenses, the requirement for comprehensive employee training, and the incorporation into current workflows, have been recognized. In addition, the importance of physical stores in improving customer experience has been emphasized, indicating the need for a well-rounded combination of online and offline retail methods to accommodate various consumer preferences and behaviors.

Brands have embraced e-commerce to varying degrees, customizing their strategies based on their market position and available resources. It has been noted that one of the main reasons for the increasing popularity of e-commerce is the goal of expanding customer reach beyond traditional brick-and-mortar stores. This allows businesses to tap

into new markets and target different customer segments. Although e-commerce provides numerous opportunities, there are concerns about how online platforms affect physical store traffic and consumer trust in online transactions.

**Key Themes Identified**

**1. RFID Implementation and Inventory Management**

Among the most important topics were RFID Implementation and Inventory Management, which showed a big change in how the industry works. Important people like a store manager and stock control manager stressed how important RFID is for making inventory management more efficient. These professionals pointed out that RFID technology has drastically reduced the time needed for tasks such as stocktaking and shipment handling. A brand manager described the transformative impact of RFID, noting, "RFID makes a huge difference in inventory management. If we knew what was coming, we knew what would come out and what was missing in the warehouses." This encapsulates the broader industry view that RFID not only streamlines operations but also enhances forecasting and inventory accuracy.

RFID is also a key part of improving sales because it gives real-time information about stock levels. This makes sure that products are available when and where they are needed and which items should be promoted, which cuts down on sales lost due to running out of stock. Another operation manager talked about the operational benefits, saying, “Today, RFID is used to configure all branches, it will show you if the item was sold from this store and what is available in this store." This capability significantly improves customer satisfaction and sales efficiency.

Despite these benefits, RFID implementation comes with its set of challenges, including the initial cost, the need for staff training, and integrating the system into

existing workflows. However, the potential for RFID to further enhance customer service through applications like loss prevention and self-checkout points to exciting future possibilities for retail operations.

**2. E-Commerce Adoption and Customer Reach**

Commerce Adoption and Customer Reach were other critical themes. Adoption levels varied among brands; some have fully integrated online stores like Zara, while others like Mango and Parfois have adopted partial solutions incorporating e-catalogues and social media sales. This variation underscores the strategic choices that companies make based on their market positioning, customer base, and resource availability. The primary driver for e-commerce adoption is to expand customer reach beyond traditional physical limitations, allowing brands to access new markets and customer segments.

However, moving to online platforms raises several concerns, including the cost implications of setting up and maintaining e-commerce operations, the potential impact on physical store traffic, and issues related to consumer trust in online transactions. A store manager highlighted the continued relevance of physical stores for enhancing the customer experience, pointing out, "Opportunities are that this is the period in which we dispense with both online and offline stores... because the factors surrounding us tell us, no, we still need some offline stores for customer experience."

**3. Brand Identity and Value**

Remains a top priority, with all interviewees stressing the importance of maintaining brand identity and value online. Strategies to sustain brand loyalty and reputation include managing online content effectively, ensuring product quality, and implementing solid customer service policies. The challenge of counterfeit products also surfaced, with proactive steps being discussed to educate consumers and strengthen brand protection measures.

**4. Digital Infrastructure**

- Supporting RFID and e-Commerce: Robust digital infrastructure, including reliable internet connectivity, appropriate hardware, and integrated software systems, is essential for enabling RFID technology and e-commerce platforms.
- Operational efficiency and Responsiveness: Digital tools streamline daily operations, automate tasks, and provide real-time data, leading to improved efficiency and responsiveness to customer demands and market trends.

**Inter-theme Relationships**

**1. RFID Implementation and E-commerce Operations**

RFID technology plays a pivotal role in streamlining e-commerce operations by enhancing the accuracy of inventory management. This accuracy is crucial for ensuring that online customer expectations are met, particularly in reducing errors during order fulfillment and minimizing stock outs. A store manager articulates the transformative impact of RFID on inventory management, noting, "RFID makes a huge difference... If we knew what was coming, we knew what would come out and what was missing in the warehouses." This insight highlights how RFID feeds real-time data into e-commerce systems, facilitating better stock management and ultimately improving customer satisfaction.

**2. E-commerce Adoption and Brand Identity/Value**

E-commerce adoption significantly contributes to expanding a brand's reach and enhancing its identity. This digital extension allows brands to penetrate new markets and solidify their presence in the competitive fashion industry. A store manager remarks on the potential of online platforms to elevate brand visibility: "Online will certainly help in spreading the name of the brand more on the websites we are on... people still don't know the brand as well as we say." This statement underscores the relationship between e-

commerce and brand identity, suggesting that digital platforms are crucial for brand differentiation and value enhancement.

**3. Brand Identity/Value and Customer Satisfaction**

A robust brand identity supported by reliable e-commerce and RFID systems directly influences customer satisfaction by ensuring consistent product availability and quality. A brand manager reflects on the customer experience improvements brought about by these integrations: "The indicators are... customer satisfaction, of course, number one... brand has made a lot of difference... it has Space, it has availability, it has color, it has design, it has basics." Such enhancements in the shopping environment and product accessibility contribute significantly to customer loyalty and brand perception.

**4. Digital Infrastructure and RFID/E-commerce Implementation**

The backbone of successful RFID implementation and e-commerce operations is a strong digital infrastructure. This infrastructure supports the seamless integration of technology that enhances operational efficiencies and customer engagement. A brand manager details the critical role of infrastructure in supporting RFID systems: "RFID... works. It has an excellent system or software... you need the software and hardware." This integration is essential not only for RFID but also for the broader digital initiatives that underpin e-commerce strategies.

**5. Interconnected Digital Strategies and Supply Chain Responsiveness**

The synergy between e-commerce and supply chain operations is evident in the enhanced responsiveness to market demands. A brand manager discusses the direct impact of digital sales data on supply chain decisions: "Today, even this technology has the ability to sometimes analyze how this thing happens... if I sell an item on the first day of Receiving, the order will not be for one pill, it will be for 3 or 4..." This adaptive supply

chain response is crucial for maintaining stock levels that meet real-time consumer demand, highlighting the intricate link between e-commerce activity and inventory management.

**6. Data Analytics and Enhanced Decision-Making**

Data analytics derived from RFID and e-commerce platforms provide valuable insights that enable retailers to refine their inventory strategies and customer outreach efforts. A brand manager highlights the proactive capabilities enabled by analytics: "We are a little bit into our stores as Automated... Automatically, the system goes to the supplier He sends us goods in return without anyone being involved in them." This automated, data-driven approach optimizes the inventory lifecycle and enhances the overall efficiency of retail operations.

**Expert Opinions on Industry Practices**

The interviews reveal a range of perspectives on the current state and future direction of digitalization and e-commerce within the Jordanian fashion retail. Experts highlight both the significant benefits and challenges associated with these technological advancements.

Adoption of RFID Technology: Experts from leading brands such as Zara and Stradivarius have reported significant benefits from incorporating RFID technology into their inventory management systems. This technology improves inventory accuracy, reduces stockouts, and enhances operational efficiency, all of which are essential for staying competitive in the fast-paced retail industry. These improvements are crucial for brands that are looking into RFID technology or adopting alternative digital systems to make their operations more efficient.

E-commerce: The level of e-commerce adoption differs greatly among different brands. Some businesses have developed extensive online platforms, while others utilize

social media and other digital channels to support online sales. This variation highlights the strategic approaches to reaching a wider range of customers and adjusting to evolving consumer behaviors. A store manager emphasizes the strategic significance of e-commerce, stating and “Online is undoubtedly the primary focus in today's digital and social media-driven world. Having an online presence will definitely contribute to increasing the visibility of the brand...” This approach is considered crucial for boosting brand awareness and catering to the changing preferences of today's consumers.

Transitioning to digital-first operations presents several challenges, including substantial initial investments, the necessity for robust digital infrastructure, comprehensive employee training, and the management of cybersecurity risks. A brand manager for multi brands, points out the economic aspect of this transformation: "The cost will be high... I don't expect that most companies are doing high key technique only a limited number do you have." These challenges are compounded by concerns about the impact on traditional retail formats and potential job displacements within the industry.

Data analytics is crucial in understanding customer behaviors, improving inventory management, and guiding strategic decision-making. Utilizing the information obtained from digital tools and e-commerce interactions can provide valuable insights to customize marketing strategies, improve product offerings, and increase customer satisfaction. A brand manager highlights the immense analytical capabilities of digital tools. "Today, with technological advancements, it is now possible to analyze how things occur. For instance, when I sell an item on the first day of receiving, the order is not just for one pill, but for 3 or 4..."

Emphasizing Customer Experience: The unwavering focus on customer experience remains a top priority throughout all technological and strategic initiatives. It is essential to prioritize a seamless omnichannel shopping experience, flexible return policies, and

reliable delivery options to support customer satisfaction and loyalty. A brand manager considers the effects of these strategies at the brand: "Customer satisfaction is our top priority to the brand. Our customers have noticed a significant improvement in their shopping experience. The brand now offers more space, a wider range of products, colors, stylish designs, and essential basics."

### 4.1.2 Detailed Analysis of Each Theme

**1. RFID and Inventory Management: Efficiency and Data**

The integration of RFID technology within inventory management systems marks a pivotal shift towards enhanced operational efficiency. The technology's ability to provide real-time data on stock levels revolutionizes traditional inventory practices, significantly reducing the time and labor associated with manual stocktaking and replenishment activities. This efficiency gain not only speeds up internal processes but also enhances data accuracy, forming a solid foundation for data-driven decision-making.

A brand manager articulates the direct impact of RFID on operational time efficiency, stating, "The first thing, and the best thing, is time... Now, the productivity will be 290 [pieces per hour per employee]." This statement underscores the link between the RFID application and enhanced inventory management, illustrating how the technology streamlines processes and boosts productivity.

**2. Inventory Management and Supply Chain Optimization**

RFID helps with efficient inventory management, which is a key part of making the supply chain work better as a whole. RFID technology makes it easier to predict demand, cuts down on lead times, and lowers the chance of overstocking or running out of stock by providing accurate and up-to-date data. These changes make sure that products are quickly available to meet customer demand, which makes the supply chain work better overall.

A stock control manager discusses the transformative impact of RFID on supply chain dynamics: "Today, even this technology has the ability to sometimes analyze how this thing happens... the system goes to the supplier, he sends us goods in return without anyone being involved in them." This observation links the 'inventory management' and 'supply chain' themes, highlighting how RFID-driven data facilitates automated stock replenishment processes that are critical for maintaining continuous product availability without manual intervention.

**3. Inventory Management and Customer Satisfaction**

The relationship between effective inventory management and customer satisfaction is profoundly impacted by RFID technology. By ensuring accurate stock levels, RFID helps retailers prevent stockouts and maintain product availability, which is crucial for meeting customer expectations and enhancing their shopping experience.

A store manager talks about how RFID technology builds trust with customers by making it easier to see what is in stock: "Customers have become trusted with H&M... because these are hardware things... a customer started to complain about the system... they started asking." This reflection ties together the theme of "customer confidence" with "inventory management." It shows how RFID's ability to keep accurate records of stock builds trust and satisfaction among customers.

Implementing RFID, integrating e-commerce, and strategic brand management in Jordan's fashion retail all work together to show a complex but clear picture of how technology is changing and how businesses are coming up with new ideas. The qualitative insights from the thematic analysis show how important new technologies are for improving operational efficiency, the way the supply chain works, and the way businesses interact with their customers. There is a lot of interconnectedness between the themes;

they are all pushing the sector toward more advanced, data-driven, and customer-focused business models. This connected analysis not only shows how the industry is doing right now, but it also shows possible paths for future strategic efforts.

**4. E-Commerce and Brand Identity**

The integration of e-commerce platforms within retail strategies offers expansive opportunities to reach new customer bases and enhance brand visibility. However, this digital transition also presents challenges, particularly in maintaining a consistent brand image and protecting against the dilution of brand value through counterfeit products. A brand manager articulates the critical balance required in digital investments: "Today you want to see if you are ready to invest in this thing. Will the impact behind it cover what you are seriously investing in?" This reflection ties directly to concerns about how e-commerce can alter brand perception and underscores the necessity of strategic planning to preserve brand equity in the digital realm.

**5. E-Commerce and Customer Behavior**

Understanding customer behavior in the digital marketplace is pivotal for creating effective e-commerce strategies. The digital shopping environment demands a keen understanding of consumer preferences, from the browsing phase to the final transaction. A brand manager for highlights the alignment of online presentation with customer expectations: "The possibility of his success in the brand is much greater and much greater because the picture is enough to give a clear idea to the customer about what product you are buying." This statement underscores the importance of how products are presented online and suggests that accurate and attractive product imaging can significantly influence purchasing decisions. It connects the 'e-commerce' code with 'customer behavior', illustrating the necessity for e-commerce strategies to resonate with and adapt to evolving consumer preferences.

**6. E-commerce and Supply Chain**

The seamless integration of e-commerce platforms with existing logistical and supply chain systems is essential for the efficient processing and fulfillment of online orders. The complexity of managing digital transactions, inventory, and delivery requires a robust infrastructure that can handle real-time data exchanges and support streamlined logistics operations. Stock control manager emphasizes the critical need for integrated communication systems: "Any separation in Communication, the Internet Connection, and Data Communication... the entire system crashes." This insight connects the 'e-commerce' theme with both 'supply chain' and 'digital infrastructure', highlighting the indispensable role of advanced technological frameworks in sustaining the efficacy and reliability of e-commerce operations.

**7. Brand Equity**

An operation manager agreed that brand identity is very important for building trust with customers. On all platforms, he talks about how important it is to keep the same brand image: "Maintaining the brand identity is linked to the brand itself... Customer confidence and brand identity are enhanced; it is reliable that the piece is not fake if this statement is through the brand partner itself." This statement shows how important official channels are for building trust with customers and making sure products are real, which is very important in a market where fake goods are common. Official channels not only strengthen brand identity, but they also protect the brand's reputation by making sure that the products being sold are real.

**8. Brand Equity and E-Commerce**

E-commerce plays a big part in building brand equity because it helps brands reach and serve more people, which improves the customer experience and satisfaction. A store manager talks about the good things that happen when you have a bigger online presence: "It will

definitely grow because every time you've grown and are present everywhere, it means experience." This suggests that a strong e-commerce strategy not only brings in more customers, but also makes the brand more visible and present, both of which are important for building brand equity. Companies can use digital platforms to improve their market position and customer engagement by making their brand easier to find and see online.

**9. Brand Partner Relationships**

The collaboration with brand partners is fundamental in the seamless integration of technologies like RFID, which directly influence inventory management and overall supply chain efficiency. A brand manager details the operational benefits of such partnerships: "Today, RFID is used to configure all branches... The item was sold at this store. I will show you what is available there."

**10. Supporting RFID and E-Commerce**

The essence of digital infrastructure's role is particularly highlighted by an operation manager who emphasizes the necessity of stable and strong internet connectivity as critical for the deployment of RFID technologies: "The infrastructure, what you need, [is] the Internet. Using the Internet connection, of course, in Jordan, connecting to the Internet is very stable. It is strong and meets the needs, but you need to have a strong Internet connection and be present in the exhibitions that you want to apply to these matters."

He details the specific hardware needs for RFID effectiveness, "RFID Reader, Special Devices, we bring it to read the RFID barcode with high efficiency," and notes the importance of environmental adjustments to ensure precision in RFID functionality, "I also ask us to insulate the walls of the exhibitions with a special material so that the Arms are not read from other stores."

**11. Operational Efficiency and Responsiveness**

Both a stock control manager and a store manager articulates how integrated digital tools facilitate operational responsiveness and efficiency, especially in inventory management and replenishment: "First of all, let me take a look at one store. We know that we have the store, we have the Shop floor, and we have the Stock room. Today, these devices are helping us a lot with the topic of Replenishment." He elaborates on the automation processes enabled by digital tools, "Let me tell you that today is Demand Planning-- We are a little bit into our stores as Automated. I mean, today the store is selling Item. There is a reading for the item. Bring it to the store."

**12. Streamlined Logistics Processes**

The conversation with a store manager further underlines the integration of e-commerce platforms with digital infrastructure, highlighting the crucial role of various digital devices in daily operations: "The infrastructure we use in general, the Internet. Devices, for example, we talk about scanners, which is Bluebird, iPad and Zebra. These are the things we use." He notes the direct impact of these tools on logistical efficiency, “We address e-commerce topic, for example, such as Replenishment. The one who connects us. Just support me. The System, which is in general. The one who is riding with us. Just sold the item."

**13. E-Commerce Integration and Brand Expansion**

A brand manager talks about how digital infrastructure supports both RFID and e-commerce projects, which are important for growing brands and getting customers involved: "Right now, we're using cash in the store." Of course, software called Hypos came after the cash. This is what RFID has to do with. The iPod software is being used. "Software from Inditex for Bacon." He says that using certain software tools is linked to better brand management and seeing what is in stock. "Saved to your iPad, iPhone, or

other device. On the other hand, tell me what bluebird is. We use these things. Or the software that lets us talk to the RFID."

## 4.2 Quantitative Analysis Results

### 4.2.1 Descriptive Statistical Analysis

The data were entered into the SPSS program (V.23), and the following statistical analyzes were performed: The mean, standard deviation, t-value, ranking, and implementation level was used to describe the respondents' perception and the degree of implementation of each variable, dimension, and item.

The implementation level is divided into three categories based on the following formula: $\frac{5-1}{3}$ = 1.33. Therefore, the implementation to be considered high if it is within the range of (3.67-5.00), medium if it is between (2.34 - 3.66) and low implementation is between (1.00 - 2.33).

#### 4.2.1.1 Independent Variable (Digitalization of Supply Chain):

Table (4.1) shows that the average mean is 4.05, which indicates that the respondents are highly aware and concerned about the Digitalization of Supply Chain. The means of Digitalization of Supply Chain sub-variables ranges from 4.03 to 4.06 with a standard deviation between 0.86 and 0.97. This indicates that respondents agree with the high implementation of Digitalization of Supply Chain sub-variables that supported rated by high t-value compared the T-tabulated, where the t-value is 18.629>T-tabulated = 1.960.

**Table (4.1): Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Digitalization of Supply Chain.**

| No. | Dimensions | M. | S.D. | t | Sig. | Rank | Impl. |
|---|---|---|---|---|---|---|---|
| 1 | RFID integration | 4.03 | 0.97 | 16.045 | 0.00 | 2 | High |
| 2 | Digital Infrastructure | 4.06 | 0.86 | 18.407 | 0.00 | 1 | High |
| | **Digitalization of Supply Chain** | **4.05** | | **18.629** | **0.00** | **High** | |

**T-tabulated=1.960**

#### 4.2.1.2 RFID integration:

Table (4.2) shows that the average mean is 4.03, which indicates that the respondents are highly aware and concerned about RFID integration. The means RFID integration items range from 3.98 to 4.08 with a standard deviation between 1.06 and 1.19, this indicates that respondents agree on high implementation of RFID integration items; this is supported by a high t-value compared to T-tabulated, where the t-value is 16.045>T-tabulated = 1.960.

**Table (4.2): Mean, Standard Deviation, t-value, Ranking, and Implementation Level of RFID integration.**

| No. | Items | M. | S.D. | t | Sig. | Rank | Impl. |
|---|---|---|---|---|---|---|---|
| 1 | The company uses RFID to enhance inventory tracking. | 4.01 | 1.19 | 12.721 | 0.00 | 3 | High |
| 2 | The company uses RFID to streamline the shipments receiving Process | 4.08 | 1.12 | 14.432 | 0.00 | 1 | High |
| 3 | The company uses RFID to prevent products shrinkage | 4.07 | 1.06 | 15.088 | 0.00 | 2 | High |
| 4 | The company uses RFID to streamline the order fulfillment process | 4.07 | 1.10 | 14.527 | 0.00 | 2 | High |
| 5 | The company Uses RFID to enhance data analytics | 3.98 | 1.11 | 12.856 | 0.00 | 4 | High |
| | RFID integration | 4.03 | | 16.045 | 0.00 | **High** | |

**T-tabulated=1.960**

#### 4.2.2.3 Digital Infrastructure:

Table (4.3) shows that the average mean is 4.06, which indicates that the respondents are highly aware, and concerned about Digital Infrastructure. The means of Digital Infrastructure items range from 3.98 to 4.15 with a standard deviation between 0.98 and 1.09, this indicates that respondents agree on high implementation of Digital Infrastructure items, this is supported by a high t-value compared to T-tabulated, where the t-value is 18.407>T-tabulated = 1.960.

**Table (4.3): Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Digital Infrastructure.**

| No. | Items | M. | S.D. | t | Sig. | Rank | Impl. |
|---|---|---|---|---|---|---|---|
| 1 | The company digital infrastructure provides stock visibility into supply chain stages | 4.08 | 0.98 | 16.508 | 0.00 | 2 | High |
| 2 | The company digital infrastructure integrates Data with our suppliers system | 4.00 | 1.01 | 14.903 | 0.00 | 3 | High |
| 3 | The company digital infrastructure provides on-time inventory stock visibility | 4.08 | 0.98 | 16.508 | 0.00 | 2 | High |
| 4 | The company digital infrastructure supports e-commerce operations | 4.15 | 1.04 | 16.618 | 0.00 | 1 | High |
| 5 | The company digital infrastructure provides data access through the internet from anywhere | 3.98 | 1.09 | 13.498 | 0.00 | 4 | High |
| | **Digital Infrastructure** | **4.06** | | **18.407** | 0.00 | **High** | |

**T-tabulated=1.960**

### 4.2.1 Independent Variable (E-Commerce):

Table (4.4) shows that the average mean is 4.10, which indicates that the respondents are highly aware, and concerned about the E-Commerce, the means of E-Commerce sub-variables ranges from 4.05 to 4.15 with a standard deviation between 0.75 and 0.87. This indicates that respondents agree with the high implementation of E-Commerce sub-variables that supported rated by high t-value compared the T-tabulated, where the t-value is 21.713>T-tabulated = 1.960.

**Table (4.4): Mean, Standard Deviation, t-value, Ranking, and Implementation Level of E-Commerce.**

| No. | Dimensions | M. | S.D. | t | Sig. | Rank | Impl. |
|---|---|---|---|---|---|---|---|
| 1 | E-Commerce Adoption | 4.05 | 0.87 | 18.209 | 0.00 | 2 | High |
| 2 | E-Commerce Strategy | 4.15 | 0.75 | 23.008 | 0.00 | 1 | High |
| | **E-Commerce** | **4.10** | | **21.713** | **0.00** | **High** | |

**T-tabulated=1.960**

#### 4.2.2.1 E-Commerce Adoption

Table (4.5) shows that the average mean is 4.05, which indicates that the respondents are highly aware and concerned about E-Commerce Adoption. The means E-Commerce Adoption items range from 4.01 to 4.08 with a standard deviation between 1.00 and 1.08,

this indicates that respondents agree on high implementation of E-Commerce Adoption items, this is supported by a high t-value compared to T-tabulated, where the t-value is 18.209>T-tabulated = 1.960.

**Table (4.5): Mean, Standard Deviation, t-value, Ranking, and Implementation Level of E-Commerce Adoption.**

| No. | Items | M. | S.D. | t | Sig. | Rank | Impl. |
|---|---|---|---|---|---|---|---|
| 1 | The company integrates E-commerce with suppliers | 4.01 | 1.07 | 14.219 | 0.00 | 5 | High |
| 2 | The company E-commerce Platforms are easy to use | 4.06 | 1.02 | 15.617 | 0.00 | 3 | High |
| 3 | The company E-commerce displays our products effectively | 4.03 | 1.06 | 14.681 | 0.00 | 4 | High |
| 4 | The company E-commerce provides personalized product recommendations | 4.07 | 1.00 | 16.174 | 0.00 | 2 | High |
| 5 | The company E-commerce engages customers through social media | 4.08 | 1.08 | 14.968 | 0.00 | 1 | High |
| | **E-Commerce Adoption** | **4.05** | | **18.209** | 0.00 | **High** | |

**T-tabulated=1.960**

### 4.2.2.1 E-Commerce Strategy

Table (4.6) shows that the average mean is 4.15, which indicates that the respondents are highly aware, and concerned about E-Commerce Strategy. the means E-Commerce Strategy items range from 3.99 to 4.36 with a standard deviation between 0.86 and 1.02, This indicates that respondents agree on high implementation of E-Commerce Strategy items, this is supported by a high t-value compared to T-tabulated, where the t-value is 23.008>T-tabulated = 1.960.

**Table (4.6): Mean, Standard Deviation, t-value, Ranking, and Implementation Level of E-Commerce Strategy.**

| No. | Items | M. | S.D. | t | Sig. | Rank | Impl. |
|---|---|---|---|---|---|---|---|
| 1 | The company E-commerce integrates with traditional Stores | 3.99 | 1.02 | 14.578 | 0.00 | 4 | High |
| 2 | The company E-commerce platform ability to customer comment reviews | 3.99 | 0.98 | 15.176 | 0.00 | 4 | High |
| 3 | The company E-commerce ensures security transactions | 4.24 | 0.95 | 19.508 | 0.00 | 2 | High |
| 4 | The company E-commerce ensures the safeguarding of customer's information | 4.36 | 0.86 | 23.357 | 0.00 | 1 | High |
| 5 | The company E-commerce provides (an exchange and Refund Policy) from Traditional Store | 4.19 | 1.02 | 17.516 | 0.00 | 3 | High |
| | **E-Commerce Strategy** | **4.15** | | **23.008** | 0.00 | **High** | |

**T-tabulated=1.960**

### 4.2.3 Dependent Variable (Performance)

Table (4.7) shows that the average mean is 4.13, which indicates that the respondents are highly aware and concerned about the Performance. The means of Performance sub-variables ranges from 4.04 to 4.27. This indicates that respondents agree with the high implementation of Performance sub-variables that supported rated by high t-value compared the T-tabulated, where the t-value is 24.581>T-tabulated = 1.960.

**Table (4.7): Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Performance.**

| No. | Dimensions | M. | t | Sig. | Rank | Impl. |
|---|---|---|---|---|---|---|
| 1 | Inventory Management | 4.04 | 17.496 | 0.00 | 4 | High |
| 2 | Operational Efficiency | 4.09 | 22.927 | 0.00 | 3 | High |
| 3 | Customers Satisfaction | 4.14 | 20.438 | 0.00 | 2 | High |
| 4 | Brand Equity | 4.27 | 24.598 | 0.00 | 1 | High |
| | **Performance** | **4.13** | **24.581** | **0.00** | **High** | |

**T-tabulated=1.960**

#### 4.2.3.1 Inventory Management

Table (4.8) shows that the average mean is 4.04, which indicates that the respondents are highly aware and concerned about Inventory Management. The means Inventory Management items range from 3.96 to 4.15 with a standard deviation between 0.97 and 1.04, this indicates that respondents agree on high implementation of Inventory Management items, this is supported by a high t-value compared to T-tabulated, where the t-value is 17.496>T-tabulated = 1.960.

**Table (4.8): Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Inventory Management.**

| No. | Items | M. | S.D. | t | Sig. | Rank | Impl. |
|---|---|---|---|---|---|---|---|
| 1 | The company ensures timely Stocks replenishment | 4.15 | 1.03 | 16.715 | 0.00 | 1 | High |
| 2 | The company reduces stockout | 3.96 | 1.02 | 14.042 | 0.00 | 4 | High |
| 3 | The company optimizes inventory turnover rates | 4.04 | 0.97 | 15.971 | 0.00 | 3 | High |
| 4 | The company ensures required products availability | 4.09 | 1.04 | 15.808 | 0.00 | 2 | High |
| 5 | The company ensures suitable inventory stock level | 3.96 | 1.02 | 14.042 | 0.00 | 4 | High |
| | **Inventory Management** | 4.04 | | 17.496 | 0.00 | **High** | |

**T-tabulated=1.960**

### 4.2.3.2 Operational Efficiency:

Table (4.9) shows that the average mean is 4.09, which indicates that the respondents are highly aware and concerned about Operational Efficiency. The means Operational Efficiency items range from 3.85 to 4.30 with a standard deviation between 0.82 and 1.07, this indicates that respondents agree on high implementation of Operational Efficiency items, this is supported by a high t-value compared to T-tabulated, where the t-value is 22.927>T-tabulated = 1.960.

**Table (4.9): Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Operational Efficiency.**

| No. | Items | M. | S.D. | t | Sig. | Rank | Impl. |
|---|---|---|---|---|---|---|---|
| 1 | The company ensures on-time seasonal restocking | 4.16 | 0.98 | 17.859 | 0.00 | 2 | High |
| 2 | The company forecasts demand accurately | 4.00 | 0.92 | 16.245 | 0.00 | 3 | High |
| 3 | The company adapts to market trends quickly | 4.16 | 0.92 | 18.952 | 0.00 | 2 | High |
| 4 | The company faces rarely experiences disruptions for the operations due to technical issues or system downtimes | 3.85 | 1.07 | 11.953 | 0.00 | 4 | High |
| 5 | The company ensures seamless delivery from the supplier to the stores | 4.30 | 0.82 | 23.625 | 0.00 | 1 | High |
| | **Operational Efficiency** | **4.09** | | **22.927** | 0.00 | **High** | |

**T-tabulated=1.960**

### 4.2.3.3 Customers Satisfaction:

Table (4.10) shows that the average mean is 4.14, which indicates that the respondents are highly aware and concerned about Customers Satisfaction. The means Customers Satisfaction items range from 4.08 to 4.25 with a standard deviation between 0.90 and 1.06, this indicates that respondents agree on high implementation of Customers Satisfaction items, this is supported by a high t-value compared to T-tabulated, where the t-value is 20.438>T-tabulated = 1.960.

**Table (4.10): Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Customers Satisfaction.**

| No. | Items | M. | S.D. | t | Sig. | Rank | Impl. |
|---|---|---|---|---|---|---|---|
| 1 | The company E-commerce witnesses attracting new customers | 4.25 | 0.99 | 18.879 | 0.00 | 1 | High |
| 2 | The company witnesses' customers repeatedly purchasing through various channels | 4.15 | 0.90 | 19.146 | 0.00 | 2 | High |
| 3 | The company E-commerce ensures timely delivery | 4.10 | 0.96 | 17.247 | 0.00 | 4 | High |
| 4 | The company E-Commerce fosters active customer engagement | 4.08 | 1.06 | 15.319 | 0.00 | 5 | High |
| 5 | The E-Commerce increases loyal customers | 4.12 | 0.98 | 17.223 | 0.00 | 3 | High |
| | **Customers Satisfaction** | **4.14** | | **20.438** | 0.00 | **High** | |

**T-tabulated=1.960**

### 4.2.3.4 Brand Equity:

Table (4.11) shows that the average mean is 4.27, which indicates that the respondents are highly aware and concerned about Brand Equity. The means Brand Equity items range from 4.17 to 4.34 with a standard deviation between 0.87 and 0.94, this indicates that respondents agree on high implementation of Brand Equity items, this is supported by a high t-value compared to T-tabulate, where the t-value is 24.598>T-tabulated = 1.960.

**Table (4.11): Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Brand Equity.**

| No. | Items | M. | S.D. | t | Sig. | Rank | Impl. |
|---|---|---|---|---|---|---|---|
| 1 | The company increase positive reviews of the Brand | 4.17 | 0.94 | 18.644 | 0.00 | 4 | High |
| 2 | The company enhances brand recognition | 4.27 | 0.93 | 20.638 | 0.00 | 2 | High |
| 3 | The company increases brand awareness | 4.23 | 0.90 | 20.516 | 0.00 | 3 | High |
| 4 | The company enhances its accreditable brand reputation | 4.34 | 0.89 | 22.558 | 0.00 | 1 | High |
| 5 | The Company enhances the perceived value for the Brand | 4.34 | 0.87 | 23.272 | 0.00 | 1 | High |
| | **Brand Equity** | **4.27** | | **24.598** | 0.00 | **High** | |

**T-tabulated=1.960**

## 4.3 Relationship between Independent and Dependent Variables:

The researcher used the Bivariate Pearson Correlation Test to check the relationship between variables. Table (4.12) shows that the relationships among Digitalization of Supply Chain sub-variables are strong. The relationships among E-Commerce sub-variables are strong. Moreover, the relationships among Performance dimensions are also strong,

**Table (4.12): Relationship between Independent and Dependent Variables**

| No. | Dimensions | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **Digitalization of Supply Chain** | - | | | | | | | | | |
| **2** | RFID integration | 0.93** | - | | | | | | | | |
| **3** | Digital Infrastructure | 0.91** | 0.70** | - | | | | | | | |
| **4** | **E-Commerce** | 0.68** | 0.59** | 0.67** | - | | | | | | |
| **5** | E-Commerce Adoption | 0.67** | 0.56** | 0.67** | 0.95** | - | | | | | |
| **6** | E-Commerce Strategy | 0.61** | 0.55** | 0.58** | 0.93** | 0.77** | - | | | | |
| **7** | Inventory Management | 0.69** | 0.64** | 0.64** | 0.74** | 0.70** | 0.68** | - | | | |
| **8** | Operational Efficiency | 0.55** | 0.48** | 0.54** | 0.75** | 0.68** | 0.73** | 0.71** | - | | |
| **9** | Customers Satisfaction | 0.42** | 0.36** | 0.41** | 0.73** | 0.66** | 0.72** | 0.57** | 0.70** | - | |
| **10** | Brand Equity | 0.43** | 0.38** | 0.41** | 0.67** | 0.60** | 0.67** | 0.57** | 0.67** | 0.74** | - |
| **11** | **Performance** | 0.61** | 0.54** | 0.58** | 0.84** | 0.77** | 0.81** | 0.84** | 0.88** | 0.87** | 0.86** |

****. Correlation is significant at the 0.01 level (2-tailed).*. Correlation is significant at the 0.05 level (2-tailed).**

## 4.4 Testing Hypothesis:

- **H01: There is no statistically significant Impact for Digitalization of Supply Chain on the performance of the Fashion Retail Business in Jordan at (α=0.05).**

Table (4.13) shows that when regressing the two sub-variables of Digitalization of Supply Chain against the total the performance of the Fashion Retail Business in Jordan, the model shows that Digitalization of Supply Chain can explain 80.2% of the variation

of performance of the Fashion Retail Business in Jordan, where ($R^2$=0.802, F=299.186, Sig.=0.000). Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted, which states that: There is a statistically significant Impact for Digitalization of Supply Chain (RFID Integration, Digital Infrastructure) on the performance of the Fashion Retail Business in Jordan at (α=0.05).

**Table (4.13): Multiple Regressions of Digitalization of Supply Chain Sub-variables on performance of the Fashion Retail Business in Jordan.**

| Model | R | $R^2$ | Adjusted $R^2$ | F | Sig. |
|---|---|---|---|---|---|
| 1 | 0.895 | 0.802 | 0.799 | 299.186 | 0.000 |

**a. Predictors: (Constant), RFID Integration and Digital Infrastructure.**
**b. Dependent Variable: performance.**

Based on the components of Digitalization of Supply Chain, table (4.14) shows the impact of both Variables on performance of the Fashion Retail Business in Jordan. While the standardized coefficients (Beta) of the Digitalization of Supply Chain Modeling rated, 78.5% shows significant positive impacts on performance.

**Table (4.14): Multiple Regressions of Digitalization of Supply Chain sub-variables on performance of the Fashion Retail Business in Jordan (ANOVA).**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 0.395 | 0.130 | | 3.032 | 0.003 |
| | Digitalization of Supply Chain | 0.759 | 0.035 | 0.785 | 21.826 | 0.000 |

**a. Dependent Variable: performance of the Fashion Retail Business in Jordan, T-tabulated=1.960**

- **H01.1: There is no statistically significant Impact for RFID Integration on the performance of the Fashion Retail Business in Jordan at (α=0.05).**

Table (4.15) shows that there is an impact of RFID Integration on performance of the Fashion Retail Business in Jordan, where (Beta=0.540, t=9.674, sig. =0.00, p<0.05). Therefore, the null hypothesis is rejected, and the alternative hypothesis states that: There is a statistically significant Impact for RFID Integration on the performance of the Fashion

Retail Business in Jordan at (α=0.05). The model shows an ($R^2$) value of 0.295, meaning that RFID Integration explains 29.5% of the variation in performance.

**Table (4.15): Simple Linear Regressions of RFID Integration on performance.**

| Model | R | $R^2$ | Adjusted $R^2$ | F | Sig. |
|---|---|---|---|---|---|
| 1 | 0.543 | 0.295 | 0.292 | 93.595 | 0.000 |

**a. Predictors: (Constant), RFID Integration.**
**b. Dependent Variable: performance.**

Table (4.16) shows the impact of RFID Integration on performance, where the impacted was 54.0%.

**Table (4.16): Simple Linear Regressions of RFID Integration on performance (ANOVA).**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | **(Constant)** | 2.335 | 0.190 | | 12.291 | 0.00 |
| | ***RFID Integration*** | 0.440 | 0.045 | 0.540 | 9.674 | 0.00 |

**a. Dependent Variable: performance, T-tabulated=1.960**

- **H01.2: There is no statistically significant Impact for Digital Infrastructure on the performance of the Fashion Retail Business in Jordan at (α=0.05).**

Table (4.17) shows that there is an impact of Digital Infrastructure on performance of the Fashion Retail Business in Jordan, where (Beta=0.58, t=10.728, sig. =0.00, p<0.05). Therefore, the null hypothesis is rejected, and the alternative hypothesis states that: There is a statistically significant Impact for Digital Infrastructure on the performance of the Fashion Retail Business in Jordan at (α=0.05). The model shows an ($R^2$) value of 0.339, meaning that Digital Infrastructure explains 33.9% of the variation in performance.

**Table (4.17): Simple Linear Regressions of Digital Infrastructure on performance.**

| Model | R | $R^2$ | Adjusted $R^2$ | F | Sig. |
|---|---|---|---|---|---|
| 1 | 0.583 | 0.339 | 0.336 | 115.099 | 0.000 |

**a. Predictors: (Constant), Digital Infrastructure.**
**b. Dependent Variable: performance.**

Table (4.18) shows the impact of Digital Infrastructure on performance, where the impacted was 58.0%.

**Table (4.18): Simple Linear Regressions of Digital Infrastructure on performance (ANOVA).**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 2.236 | 0.181 | | 12.357 | 0.00 |
| | Digital Infrastructure | 0.468 | 0.044 | 0.580 | 10.728 | 0.00 |

**a. Dependent Variable: performance, T-tabulated=1.960**

- **H02: There is no statistically significant Impact for E-Commerce on the performance of the Fashion Retail Business in Jordan at (α=0.05).**

Table (4.19) shows that when regressing the two sub-variables of E-Commerce against the total the performance of the Fashion Retail Business in Jordan, the model shows that E-Commerce can explain 81.9% of the variation of performance of the Fashion Retail Business in Jordan, where ($R^2$=0.819, F=335.794, Sig.=0.000). Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted, which states that: There is a statistically significant Impact for E-Commerce (E-Commerce Adoption, E-Commerce Strategy) on the performance of the Fashion Retail Business in Jordan at (α=0.05).

**Table (4.19): Multiple Regressions of E-Commerce Sub-variables on performance of the Fashion Retail Business in Jordan.**

| Model | R | $R^2$ | Adjusted $R^2$ | F | Sig. |
|---|---|---|---|---|---|
| 1 | 0.905 | 0.819 | 0.817 | 335.794 | 0.000 |

**a. Predictors: (Constant), E-Commerce Adoption and E-Commerce Strategy.**

**b. Dependent Variable: performance.**

Table (4.20) shows the impact of both variables Ecommerce adoption and Strategy on performance of the Fashion Retail Business in Jordan, the standardized coefficients (Beta) of the e-commerce modeling rated 20.4% shows significant positive impacts on performance.

**Table (4.20): Multiple Regressions of E-Commerce sub-variables on performance of the Fashion Retail Business in Jordan (ANOVA).**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 0.279 | 0.125 | | 2.235 | 0.026 |
| | E-Commerce | 0.186 | 0.079 | 0.204 | 2.362 | 0.019 |

**a. Dependent Variable: performance of the Fashion Retail Business in Jordan, T-tabulated=1.960**

- **H02.1: There is no statistically significant Impact for E-Commerce Adoption on the Performance of the Fashion Retail Business in Jordan at (α=0.05).**

Table (4.21) shows that there is an impact of E-Commerce Adoption on performance of the Fashion Retail Business in Jordan, where (Beta=0.840, t=23.213, sig. =0.00, $p<0.05$). Therefore, the null hypothesis is rejected, and the alternative hypothesis states that: There is a statistically significant Impact for E-Commerce Adoption on the Performance of the Fashion Retail Business in Jordan at (α=0.05). The model shows an ($R^2$) value of 0.706, meaning that E-Commerce Adoption explains 70.6% of the variation in performance.

**Table (4.21): Simple Linear Regressions of E-Commerce Adoption on performance.**

| Model | R | $R^2$ | Adjusted $R^2$ | F | Sig. |
|---|---|---|---|---|---|
| 1 | 0.840 | 0.706 | 0.705 | 538.864 | 0.000 |

**a. Predictors: (Constant), E-Commerce Adoption.**

**b. Dependent Variable: performance.**

Table (4.22) shows the impact of E-Commerce Adoption on performance, where the impacted was 84%.

**Table (4.22): Simple Linear Regressions of E-Commerce Adoption on performance (ANOVA).**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 0.742 | 0.148 | | 5.006 | 0.00 |
| | E-Commerce Adoption | 0.829 | 0.036 | 0.840 | 23.213 | 0.00 |

**a. Dependent Variable: performance, T-tabulated=1.960**

- **H02.2: There is no statistically significant Impact for E-Commerce Strategy on the performance of the Fashion Retail Business in Jordan at (α=0.05).**

Table (4.23) shows that there is an impact of E-Commerce Strategy on performance of the Fashion Retail Business in Jordan, where (Beta=0.80, t=20.928, sig. =0.00, p<0.05). Therefore, the null hypothesis is rejected, and the alternative hypothesis states that: There is a statistically significant Impact for E-Commerce Strategy on the performance of the Fashion Retail Business in Jordan at (α=0.05). The Model shows an ($R^2$) value of 0.660, meaning that e-commerce strategy explains 66.2% of the variation in performance.

**Table (4.23): Simple Linear Regressions of E-Commerce Strategy on performance.**

| Model | R | $R^2$ | Adjusted $R^2$ | F | Sig. |
|---|---|---|---|---|---|
| 1 | 0.813 | 0.662 | 0.660 | 437.985 | 0.000 |

**a. Predictors: (Constant), E-Commerce Strategy.**

**b. Dependent Variable: performance.**

Table (4.24) shows the impact of E-Commerce Strategy on performance, where the impacted was 80%.

**Table (4.24): Simple Linear Regressions of E-Commerce Strategy on performance (ANOVA).**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 1.013 | 0.152 | | 6.688 | 0.00 |
| | E-Commerce Strategy | 0.752 | 0.036 | 0.800 | 20.928 | 0.00 |

**a. Dependent Variable: performance, T-tabulated=1.960**

- **H03: There is no statistically significant relationship between the Digitalization of Supply Chain and E-Commerce in the Fashion Retail Business in Jordan at (α=0.05).**

**Table (4.25): Relationship between the Digitalization of Supply Chain and E-Commerce**

| Correlations | | | |
|---|---|---|---|
| | | EC | **Digitalization of Supply Chain** |
| **E-Commerce** | Pearson Correlation | 1 | **.750**** |
| | Sig. (2-tailed) | | **.000** |
| | N | 226 | 226 |
| **Digitalization of Supply Chain** | Pearson Correlation | .750** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 226 | 226 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | |

Table (4.25) shows that the relationship between the Digitalization of Supply Chain and E-Commerce (0.75), this shows that there is a statistically significant relationship between the Digitalization of Supply Chain and E-Commerce in the Fashion Retail Business in Jordan at (α=0.05). Therefore, the null hypothesis is rejected, and the alternative hypothesis states that: There is a statistically significant relationship between the Digitalization of Supply Chain and E-Commerce in the Fashion Retail Business in Jordan at (α=0.05).

- **H03.1: There is no statistically significant impact of both the supply chain digitalization and e-commerce on the performance of the fashion retail business in Jordan at ($\alpha$=0.05)**

Table (4.26) shows that when regressing the two variables of the Digitalization of Supply Chain and E-Commerce against the total the performance of the Fashion Retail Business in Jordan, the model shows that Digitalization of Supply Chain and E-Commerce were explain 85.1% of the variation of performance of the Fashion Retail Business in Jordan, where ($R^2$=0.851, F=638.270, Sig.=0.000).

**Table (4.26): Multiple Regressions of Digitalization of Supply Chain and E-Commerce on performance of the Fashion Retail Business in Jordan.**

| Model | R | $R^2$ | Adjusted $R^2$ | F | Sig. |
|---|---|---|---|---|---|
| 1 | 0.923 | 0.851 | 0.850 | 638.270 | 0.000 |

**a. Predictors: (Constant), Digitalization of Supply Chain and E-Commerce.**

**b. Dependent Variable: performance.**

Based on the components of E Digitalization of Supply Chain and E-Commerce, table (4.27) shows the impact of the variables (Digitalization of Supply Chain and E-Commerce) on performance of the Fashion Retail Business in Jordan. The highest impact was for Digitalization of Supply Chain with 58% of the total impact, followed by E-Commerce with an impact of 40.4% on performance.

**Table (4.27): Multiple Regressions of Digitalization of Supply Chain and E-Commerce on performance of the Fashion Retail Business in Jordan (ANOVA).**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 0.328 | 0.108 | | 3.032 | 0.003 |
| | Digitalization of Supply Chain | 0.561 | 0.038 | 0.580 | 14.859 | 0.000 |
| | E-Commerce | 0.368 | 0.036 | 0.404 | 10.349 | 0.000 |

**a. Dependent Variable: performance of the Fashion Retail Business in Jordan, T-tabulated=1.960**

Table (4.28) shows that there is an impact for both the Digitalization of Supply Chain and E-Commerce (independent variable) on performance of the Fashion Retail Business in Jordan, where (Beta=0.78, t=18.875, sig. =0.00, $p<0.05$). Therefore, the null hypothesis is rejected, and the alternative hypothesis states that: There is a statistically significant Impact of the relationship for both the Digitalization of Supply Chain and E-Commerce (independent variable) on the performance of the Fashion Retail Business in Jordan at ($\alpha=0.05$).

**Table (4.28): Simple Linear Regressions for both the Digitalization of Supply Chain and E-Commerce on performance.**

| Model | R | $R^2$ | Adjusted $R^2$ | F | Sig. |
|---|---|---|---|---|---|
| 1 | 0.784 | 0.614 | 0.612 | 356.279 | 0.000 |

**a. Predictors: (Constant), both the Digitalization of Supply Chain and E-Commerce.**

**b. Dependent Variable: performance.**

Table (4.29) shows the impact for both the Digitalization of Supply Chain and E-Commerce on performance, where the impacted was 78%.

**Table (4.29): Simple Linear Regressions for both the Digitalization of Supply Chain and E-Commerce on performance (ANOVA).**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 1.125 | 0.162 | | 6.943 | 0.000 |
| | Both the Digitalization of Supply Chain and E-Commerce. | 0.739 | 0.039 | 0.780 | 18.875 | 0.000 |

a. Dependent Variable: performance, T-tabulated=1.960

# Chapter Five:
# Results Discussion, Conclusion, and Recommendations

5.1 Introduction

5.2 Interpretation of results

5.3 Implications and Recommendations

5.4 Future research

# Chapter Five:

## Results Discussion, Conclusion, and Recommendations

## 5.1 Introduction

The objective of this chapter is to combine the results of the study with the wider theoretical and practical framework of digital transformation in the fashion retail industry of Jordan. The research investigated the effects of modern digital solutions, such as RFID technology complete digital infrastructure, and adoption of e-commerce strategies, on the inventory management, operational efficiency, customer satisfaction, brand equity and overall performance of fashion businesses. This debate aims to analyze empirical data using theoretical frameworks from the literature. The goal is interpret the study results, compare them to other research works in the literature, and evaluate their implication for industry stakeholders.

The chapter is structured to first interpret the results considering the study's hypotheses and the existing both of knowledge. It will then compare these outcomes with findings from prior studies. This discussion also evaluates the importance of this research in contributing to the strategic digitalization of Jordan's fashion retail industry, acknowledges the limitations of the current study, and suggests avenues for future research. Additionally, it revisits the study's objectives and methods to discuss how they have contributed to addressing the research questions and achieving the aims of the investigation.

## 5.2 Interpretation of results

The study employed a mixed-methods approach, incorporating qualitative interviews and a structured quantitative questionnaire, to examine the effect of digitalization in the supply chain and e-commerce on the fashion retail in Jordan. The research collected detailed insights and strong quantitative data by conducting semi-structured interviews with experts from fashion brands and distributing surveys to managers. This approach allowed for a thorough analysis of the installation of RFID technology, the improvement of digital infrastructure, and the strategic use of e-commerce in the industry. In addition, the qualitative interviews went into more detail about the strategy in implementation and operational challenges of digital technologies. The quantitative survey, in the other hand, used numbers to show how these technologies affected things like customer satisfaction and inventory management. This method not only made sure that subjective reeling and objective data were seen fairly, but it also improved the validity and reliability of the results by using three different types of data.

The next part analyze the qualitative data show how digital strategies are seen and implemented in the Jordanian fashion retail and the next part will detail the statistical effect of these technologies of company performance based on the quantitative results.

### 5.2.1 Qualitative analysis Results discussion

The thematic analysis of interviews with Jordanian fashion retail professionals offers detailed insights into the implementation of RFID technology and the strategic use of e-commerce. These technologies are reshaping inventory management and market reach, presenting a complex blend of advantages, challenges, and strategic decisions. This not only reduces the labor and time involved but also significantly boosts the accuracy of inventory data. Such precision is critical in minimizing out-of-stock situations, thereby enhancing sales potential.

However, moving from the operational benefits to the challenges, the adoption of RFID technology involves substantial initial costs, demands extensive training for staff, and requires integration into existing systems. Despite these hurdles, the long-term benefits such improved customer service through loss prevention and expedited checkout processes-suggest substantial enhancements in retail operations are possible.

Further exploring the transformation driven by digital technologies, e-commerce adoption varies among brands with me fully integrating online platforms and others adopting a hybrid approach with catalogues and social media sales. This variation underscores the strategic choices made based on market position and resource availability. E-commerce's primary appeal lies in its ability to extend customer reach beyond the confines of physical stores, opening up new market opportunities and customer segments. Yet, this shift towards online platforms is not without concerns. Strategies to reserve the identity and value of the brand and to keep its reputation and loyalty intact in the digital sphere also emerge as important concerns.

Efforts must be made to establish store customer service, regulate online content effectively, and guarantee product quality, countrified products is an additional complication in this landscape, calling for preventative measures to protect brand reputation and inform buyers. In order to back up these technologies, a strong digital foundation is needed. In addition to supporting RFID and e-commerce, this infrastructure improves operational efficiency and response to market dynamics by automating processes and providing real-time data. For online retailers to meet their customers' expectations, RFID technology must be integrated with their operations. This will have a revolutionary effect on inventory management. The importance of RFID in providing e-commerce systems with real-time data which allows for accurate stock management and boosts consumer happiness by decreasing order fulfillment mistakes and stock outs.

Moreover, the adoption of e-commerce significantly extends brand's reach and solidifies its identity, crucial in a fiercely competitive fashion industry. Having a strong brand identity, along with efficient e-commerce and RFID systems, has a direct impact on customer satisfaction by guaranteeing that products are readily available and of high quality. Understanding the relationship between technology integration and customer experience is crucial for building customer loyalty and improving brand perception. The foundational role of digital infrastructure in supporting RFID and e-commerce implementations cannot be overstated.

Furthermore, the easy integration of e-commerce and supply chain operations greatly improves the ability to respond to market demands. With a keen focus on market research and analysis, this dynamic approach to supply chain management emphasizes the vital connection between up-to-the-minute e-commerce activities and efficient inventory management. It highlights the advantages of a flexible and interconnected digital strategy. With the ongoing digitalization and rise of e-commerce, the Jordanian fashion retail industry is undergoing significant changes.

Industry experts provide valuable insights to various practices and their expected future paths. These insights from experts provide a comprehensive understanding of the intricate relationship between technological advancements and strategic decisions in the Jordanian fashion retail industry. They shed light on the significant changes brought about by digital transformation, as well as the obstacles encountered in adapting to this new landscape. Expert interviews have focused on the intricate landscape of opportunities and challenges in the Jordanian fashion retail industry, where RFID technology and e-commerce strategies are intertwined. Examining the perspectives of industry leaders reveals a detailed understanding of digital transformation, emphasizing the crucial role of

RFID in improving inventory management and the strategic utilization of e-commerce to broaden brand reach and establish a strong identity.

At the same time, the emergence of e-commerce has brought about a range of strategic possibilities and obstacles. Different brands have different levels of adoption when it comes to online platforms. Some fully embrace comprehensive online platforms, while others take a more cautious approach by integrating social media and e-commerce to varying extents. The strategic variability observed in this context is a result of the varying market positions and resource availabilities among different brands. Furthermore, the insights provided by industry experts indicate that the incorporation of RFID and e-commerce technologies can improve operational efficiencies and broaden market reach. However, it is crucial to integrate these technologies with existing processes in a meticulous manner to maintain brand identity and ensure a consistent customer experience.

Experts emphasizes the importance of maintaining a strong presence both online and offline. This underscores the continued significance of physical stores in delivering a holistic customer experience. Based on the insights gathered from industry experts, it is evident that the integration of RFID and e-commerce within the Jordanian fashion retail hold the promise. It is clear that there is great potential for increased operational efficiency reaching a wider customer base, and strengthening brand identity.

To successfully do the transition, it is necessary to have a clear vision, make significant investments in digital infrastructure, and take a comprehensive approach to incorporating now technologies into current business models. This will allow you to fully influence the advantage of digital transformations while minimizing any potential risks.

### 5.2.2 Quantitative Analysis Results

The descriptive statistical analysis presented in this section offers a comprehensive overview of the variables under consideration, their means, standard deviations, t-values, rankings, and implementation levels. The data, analyzed using SPSS, provides valuable insights into respondents' perceptions and the degree of implementation across various dimensions and items related to the supply chain digitalization, e-commerce, and performance in the fashion retail business in Jordan.

Beginning with the independent variables, the supply chain digitalization is divided into sub-variables such as RFID integration and digital infrastructure. The mean scores for these sub-variables indicate a high level of implementation, supported by significant t-values. Similarly, the analysis of the e-commerce dimension reveals high mean scores and significant t-values, indicating a strong level of implementation in this area as well. This suggests that both the supply chain digitalization and e-commerce are perceived as crucial and are highly implemented in the fashion retail business in Jordan.

Moving on to the dependent variable, which is performance, sub-variables like inventory management, operational efficiency, customer satisfaction, and brand equity are considered. The mean scores for these sub-variables also indicate a high level of performance, supported by significant t-values. This suggests that the fashion retail businesses in Jordan are performing well across these dimensions, which are critical for success in the industry.

The analysis also explores the relationships between the independent and dependent variables using bivariate Pearson correlation tests. Strong correlations are observed among the sub-variables within each dimension, indicating a significant relationship between the supply chain digitalization, e-commerce, and performance. This further

underscores the importance of these factors and their interconnectedness in driving success in the fashion retail business.

The hypotheses testing section delves deeper into assessing the impact of the independent variables on performance. Through multiple regression and simple linear regression analyses, it is found that both the supply chain digitalization and e-commerce have a statistically significant impact on performance. Specifically, RFID integration and digital infrastructure within the supply chain digitalization, as well as e-commerce adoption and e-commerce strategy, are identified as significant predictors of performance.

Furthermore, the analysis reveals a significant relationship between the supply chain digitalization and e-commerce, highlighting their interdependence in influencing performance. This finding emphasizes the importance of considering both aspects in tandem to enhance overall business performance in the fashion retail.

In conclusion, the descriptive statistical analysis and hypothesis testing provide valuable insights into the implementation levels, relationships, and impacts of the supply chain digitalization, e-commerce, and performance in the fashion retail business in Jordan. These findings can inform strategic decision-making and guide future research and interventions aimed at improving business outcomes in the industry.

### 5.2.3 Hypothesis discussion

Various hypotheses were tested in the study to evaluate the impact of digital technologies on the performance of the fashion retail in Jordan. Understanding how digitalization, particularly through RFID integration and enhancements in digital infrastructure, contributes to operational performance can be achieved.

**H01: There is no statistically significant impact of the supply chain digitalization on the performance of the fashion retail business in Jordon ($\alpha$=0.05).**

The Hypothesis testing revealed that the supply chain digitalization significantly impacts performance of fashion retail businesses in Jordan. The comprehensive digitalization of supply chains is evidently beneficial, with Digital Infrastructure having a slightly higher impact compared to RFID Integration as indicated by strong that investments in digital infrastructure can substantially improve operational efficiencies, inventory management and customer satisfaction.

Moving to the implications of this finding, it is clear that the positive effects of digitalization are broad, affecting various aspects on the retail operation. For example, enhancements in digital infrastructure that provide real-time visibility into inventory and supply chain stages not only reduce operation bottleneck but also improve the accuracy of demand forecasting and replenishment cycles. This level of integration is crucial for maintaining a competitive edge in a fast market environment.

That agree with the interviews analysis that indicate that the Digitalization of supply chain greatly improves the ability to respond to market demands. With a keen focus on market research and analysis, this dynamic approach to supply chain management emphasizes the vital connection between up-to-the-minute e-commerce activities and efficient inventory management. It highlights the advantages of a flexible and interconnected digital strategy, with the ongoing digitalization; the Jordanian fashion retail is undergoing significant changes.

These finding is aligned also with (Szozda, 2023) who investigates the interrelationships among technologies in retail and how the supply chain digitalization have influences in the fashion industry.

**H01.1: There is no statistically significant impact of RFID integration on the performance of the fashion retail business in Jordan at ($\alpha$=0.05).**

The results from testing this hypothesis that RFID's impact on reducing product shrinkage, inventory tracking, order fulfillment and forecasting was significant on the performance using the regression analysis, this finding enhance that RFID technology has clear benefits in supply chain, inventory management and operational efficiency areas indicating a significant impact of RFID integration on fashion retail business performance. In addition, real time tracking is mandatory to response to the customer's needs and enhance their satisfaction. As well, integration with suppliers increase the responsiveness for the supply chain and minimize the lead-time to ensure products availability.

These finding aligned with the Interviews outputs that ensure the implementation of RFID technology has had a significant impact on the transformation of inventory management within the Jordanian fashion retail. This technology has been found to improve the efficiency of tasks like stocktaking and shipment handling, while also increasing the accuracy of inventory levels. This improvement is essential for ensuring real-time updates on stock availability, which will greatly minimize the occurrence of out-of-stock scenarios and ultimately boost sales.

That's ensure the finding of (Gao, 2022) that Integrating RFID had significantly improved operational efficiencies by enabling better tracking and management of inventory, which is crucial for the dynamic demands of fashion retail. In addition agreed with (Sagar, 2024) that these technologies provide a granular understanding of the entire supply chain, enabling swift responses to disruptions, reducing lead times, and ensuring a seamless flow of products from manufacturers to consumers.

**H01.2: There is no statistically significant impact of digital infrastructure on the performance of the fashion retail business in Jordan at ($\alpha = 0.05$).**

The statistical evidence strongly supports the digital infrastructure have a significant impact on the performance of the fashion retail business in Jordan. Testing this hypothesis uncovered noteworthy positive impacts aspects of digital infrastructure, the overall improvements in digital infrastructure play significant role in enhancing performance outcomes.

The study findings supports that the adoption and enhancement of digital technologies in the supply chain of the Jordanian fashion retail from the positive analysis and rejection of the null hypotheses emphasize the immense power of digitalization, not just as a means of improving operations but also as a valuate assets that can greatly enhance customer satisfaction and brand equity.

These finding is aligned with the Interviews findings that the backbone of successful RFID implementation and e-commerce operations is a strong digital infrastructure. This infrastructure supports the seamless integration of technology that enhances operational efficiencies and customer engagement.

These finding is agreed with (Špiler et al., 2023) where they found that The enhancement of digital infrastructure plays a critical role in supporting digital transformations within fashion retail. Which supports efficient operations and profitability.

**H02: There is no statistically significant impact of e-commerce on the performance of the fashion retail business in Jordan at ($\alpha$=0.05)**.

The hypothesis testing revealed that both E-Commerce Adoption and E-Commerce Strategy significantly enhance the performance of fashion retail businesses in Jordan. The comprehensive adoption of E-Commerce practices is evidently beneficial, with E-Commerce Adoption having a slightly higher impact compared to E-Commerce Strategy. Indicating that

improvements in e-commerce are strongly associated with enhanced performance metrics in the retail. This reflects the integral role that e-commerce plays in driving various performance dimensions including customer reach, operational efficiency, and brand equity.

These findings is aligned with the interviews findings that the E-commerce plays a big part in building brand equity because it helps brands reach and serve more people, which improves the customer experience and satisfaction.

Finally, these findings is aligned with (Kilay et al., 2022) where they analyze the operational efficiencies brought about by digital payment solutions and e-commerce integration within MSMEs (Medium, Small and Medium Enterprises).

**H02.1: There is no statistically significant impact of e-commerce adoption on the performance of the fashion retail business in Jordan at ($\alpha$=0.05)**

The regression analysis reveals a significant impact of e-commerce adoption on performance. Factors such as integrating e-commerce which Suppliers, effectively displaying products, the ease of use of e-commerce platforms, providing personalized product recommendation and engaging customers through social media examples of enhancement to performance metrics. Reinforcing the effectiveness of e-commerce, indicating a significant impact of e-commerce adoption on fashion retail business performance.

These findings is harmonized with the Interviews finding that The E-commerce adoption significantly contributes to expanding a brand's reach and enhancing its identity. This digital extension allows brands to penetrate new markets and solidify their presence in the competitive fashion industry.

In addition, these finding is aligned with (Špiler et al., 2023) that the adoption of e-commerce technologies can lead to improved business performance and customer satisfaction.

**H02.2: There is no statistically significant impact of e-commerce strategy on the performance the fashion retail business in Jordan at ($\alpha$>0.05)**

Based on the regression analysis e-commerce strategy has a significant impact on performance. e-commerce strategy component including the integration with traditional stores, the platform's ability to enable customer comments, ensuring security transactions, safeguarding customer information, and providing flexible exchange and refund policies. These strategies not only improve operational performance but also enhance customer satisfaction and brand loyalty, thereby contributing to the overall performance and success of retail businesses.

The results strongly support the idea that e-commerce has a significant impact on improving the operational and strategic performance of the fashion retail in Jordan. The findings that are statistically significant across various aspects of e-commerce highlight the need to adopt comprehensive digital strategies in order to remain competitive and meet the changing demands of consumers in the digital era.

Effective e-commerce strategies leverage digital tools to enhance customer experience, streamline sales processes, and foster brand loyalty. Research has shown that comprehensive e-commerce strategies that include customer-centric approaches, such as personalized marketing and responsive service systems, significantly contribute to business performance.

These finding aligned with the findings of the interviews that understanding customer behavior in the digital marketplace is pivotal for creating effective e-commerce strategies.

The digital shopping environment demands a keen understanding of consumer preferences, from the browsing phase to the final transaction.

Finally, these findings harmonized with (Gaudenzi et al., 2021) which ensure that fashion companies can successfully implement e-commerce strategies by configuring their e-supply chains. In addition to (Casciani et al., 2022) that these strategies are instrumental in building customer trust and enhancing the overall purchasing experience, which are critical factors in the competitive performance of fashion retail businesses. As well, the incorporation of e-commerce complements the in-store experience, offering customers flexibility in how they engage with the brand (Sagar, 2024).

**H03: There is no statistically significant relationship between the supply chain digitalization and e-commerce in the fashion retail business Jordan at ($\alpha$ =005).**

Based on the correlation analysis there is a significant positive correlation between the supply chain digitalization and e-commerce. Revealing a strong positive correlation underscores the interdependency between the supply chain digitalization and e-commerce enhancements, suggesting that as supply chain processes are digitized, e-commerce practices also improve, leading to a synergistic boost in overall business performance. The statistical robustness of this relationship demonstrating that the linkage between these digital aspects is integral to driving business performance.

The analysis around the relationship between the supply chain digitalization and e-commerce in the Jordanian fashion retail offers profound into how interconnected digital strategies enhance business performance.

These findings is aligned with the Interviews outcomes that the seamless integration of e-commerce platforms with existing logistical and supply chain systems is essential for the efficient processing and fulfillment of online orders. The complexity of managing

digital transactions, inventory, and delivery requires a robust infrastructure that can handle real-time data exchanges and support streamlined logistics operations.

Finally, these findings agreed with (Gao, 2022) that The integration of digital technologies in SCM is pivotal for enhancing e-commerce capabilities within the fashion retail. Digital transformation, through technologies not only improves the robustness and sustainability of supply chains but also significantly enhances e-commerce operations by streamlining logistics and facilitating better customer interactions.

**H03.1: There is no statistically significant impact of both the supply chain digitalization and e-commerce on the performance of the fashion retail business in Jordan at ($\alpha$=0.05)**

Based on the regression analysis that both the digitalization of supply chain and e-commerce has a significant impact on the performance of fashion retail business in Jordan, enhancing that improvements in these areas are not only interrelated but also cumulatively the performance of the retail sector. Highlighting the importance of digitalization of supply chain and e-commerce as drivers of performance improvements.

The rejected hypotheses support the idea that the supply chain digitalization and e-commerce are not separate strategies, but rather interconnected approaches that together improve the performance of the fashion retail in Jordan. In today's competitive retail landscape, the importance of integrated digital transformation strategies cannot be overstated. The interconnectedness of operations not only enhances optional efficiency but also drives broader strategic gains.

These findings are aligned with (Szozda, 2023) that the digitalization of supply chains directly contributes to enhancing e-commerce efficiency, thereby improving the overall performance and competitive stance of fashion retail businesses. The study findings is

also aligned with (Kilay et al., 2022) that the synergistic impact of supply chain digitalization and e-commerce on retail performance is underscored by their collective contribution to operational efficiency and customer satisfaction. Studies have shown that the supply chain digitalization facilitates real-time inventory management and logistics optimization, which are essential for successful e-commerce strategies.

Lastly, our findings align with (Gaudenzi et al. 2021) and our research highlights the importance of strategically supporting resources and capabilities with e-commerce strategies. The successful digital transformation the Jordanian fashion retail depends on integrating digital infrastructure with strategic business goals to maximize performance improvements.

On the other Hand, our study offers a different perspective on consumer behavior in Jordan's fashion retail, in contrast to (Heuer et al., 2015). They found surprisingly low levels of cross-brand competition in fashion e-commerce, indicating that increased market transparency online does not necessarily lead to frequent brand switching. Brand loyalty is quite high among Jordanian consumers, even if it is easy to compare prices and items online. Several aspects of the fashion retail contribute to the tenacity of brand loyalty. Firstly, the importance of brand identity in fashion retail cannot be overstressed. Brands in this sector are not just selling products; they are lifestyles and identities. Consumers develop strong attachments to certain brands that reasonable with their personal or aspirational self-images, which isn't easily swayed by price comparisons alone. This emotional connection makes them less likely to switch brands cased only on availability or minor cost differences, a behavior starkly highlighted in our study.

## 5.3 Implications and Recommendations

The findings from this study provide substantial evidence of the positive impact of digitalization on the performance of fashion retail businesses in Jordan. Key technologies such as RFID and e-commerce not only enhance operational efficiencies but also improve customer satisfaction and brand equity. These technologies address critical aspects like inventory management, market reach, and overall operational performance.

**Operational Efficiency and Inventory Management:** The integration of RFID and digital infrastructure significantly reduces labor and time, while improving the accuracy of inventory data. This minimizes out-of-stock situations, enhancing sales potential and customer satisfaction.

**Customer Satisfaction and Brand Equity:** E-commerce adoption broadens market reach and strengthens brand identity. However, it requires a robust strategy to maintain brand integrity and customer loyalty in the digital space.

**Strategic Digitalization:** The synergy between supply chain digitalization and e-commerce highlights the necessity for a holistic digital transformation strategy. The positive correlation between these aspects underscores their collective importance in driving business performance.

## Recommendations

**Invest in Digital Infrastructure:** Jordanian fashion retailers should prioritize investments in digital infrastructure to support RFID and e-commerce integration. This includes real-time data capabilities to enhance inventory management and customer experience.

**Comprehensive E-Commerce Strategy:** Develop a detailed e-commerce strategy that integrates seamlessly with physical stores. Focus on enhancing the online customer journey through personalized recommendations, easy navigation, and robust customer service.

**Training and Integration:** Address the operational challenges of RFID and other digital technologies by investing in employee training and ensuring seamless integration with existing systems. This will facilitate smoother transitions and better utilization of new technologies.

**Continuous Improvement and Innovation:** Regularly update and innovate digital strategies to adapt to evolving market dynamics. This includes leveraging data analytics for better decision-making and continuously enhancing the e-commerce platform to meet changing customer expectations.

**Focus on Customer Experience:** Maintain a balanced approach that combines online and offline customer experiences. Ensure that digital advancements complement in-store services to deliver a unified and engaging brand experience.

**Future Research and Development:** Encourage further research to explore emerging digital technologies and their potential impact on the fashion retail sector. This will help in staying ahead of trends and maintaining a competitive edge.

By implementing these recommendations, Jordanian fashion retailers can enhance their operational efficiencies, expand their market reach, and strengthen their competitive position in the industry.

## 5.4 Future research

The study presents a comprehensive understanding of the impact of digitalization on Jordan's fashion retail, but further research is necessary to deepen this understanding and verify the robustness of the findings.

Future studies could explore the long-term effects of digital technologies on brand loyalty and customer retention, particularly assessing the direct impact on sales and profitability by using financial indicators.

It would be also beneficial to investigate the specific challenges and opportunities faced by smaller, local brands in integrating these technologies, which could highlight differences in digital adoption rates and effectiveness.

Additionally, examining the role of emerging technologies as artificial intelligence and Big Data in enhancing the retail operations and performance could provide insights into next-generation strategies for the industry.

Finally, examining the customer’s intention and behavior towards e-commerce in the fashion retail in Jordan and what is the obstacles they may have insight about the factors influencing customer’s decision and attitude toward adoption the online shopping in Jordan.

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# Appendix

## Appendix (1): Names of Academic Experts.

Academic Experts:

| الرقم | الإسم | الدرجة العلمية | الجامعة |
|---|---|---|---|
| 1 | أ.د. أحمد علي صالح | أستاذ دكتور | جامعة الشرق الأوسط |
| 2 | أ.د. عبد العزيز الشرباتي | أستاذ دكتور | جامعة الشرق الأوسط |
| 3 | أ.د. عزام أبو مغلي | أستاذ دكتور | جامعة الشرق الأوسط |
| 4 | أ.د. علي العضايلة | أستاذ دكتور | جامعة الشرق الأوسط |
| 5 | أ.د. عمر الهمشري | أستاذ دكتور | الجامعة الأردنية |
| 6 | أ.د. غازي أبو قاعود | أستاذ دكتور | جامعة مؤته |
| 7 | أ.د. فاطمة الربابعة | أستاذ دكتور | جامعة مؤته |
| 8 | د. محمد المعايطة | أستاذ مشارك | جامعة البلقاء التطبيقية |
| 9 | د. مها الشيخ | أستاذ مساعد | جامعة الشرق الأوسط |

## Appendix (2): Interview Questions

| Key Area | Questions Summary |
|---|---|
| **RFID Integration** | • How does RFID Integration influence the efficiency and effectiveness of inventory management within the Jordanian fashion retail industry?<br>• Can you describe the current inventory management processes within your fashion retail business?<br>• Have you implemented RFID technology in your supply chain, and if so, what specific improvements have you observed in inventory management efficiency? If not what alternatives are you using?<br>• What challenges did you face during the integration of RFID technology into your supply chain, and how did you overcome them? If not are you planning to use it? Do you recognize any threats in the RFID use?<br>• What opportunities do you foresee in further leveraging RFID technology to optimize inventory management processes? What are the strength of the RFID |
| **Digital Infrastructure** | • What is the role of digital infrastructure in supporting the operational efficiency and responsiveness of the supply chain for Jordanian fashion retailers?<br>• What Digital Infrastructure are you currently using in supporting the inventory management?<br>• How does the digital infrastructure support day-to-day operations in managing supply chain dynamics within your fashion retail business?<br>• Can you provide examples of how digital tools or systems have enhanced the responsiveness of your supply chain to changing demands or trends?<br>• How do you ensure the seamless integration of digital infrastructure components across different stages of the supply chain?<br>• What are some best practices you follow in utilizing digital tools to enhance supply chain efficiency and responsiveness? |
| **E-commerce** | • What strategies do fashion retailers employ in adopting e-commerce, and how does this affect their customer reach and Satisfaction?<br>• Are you currently using E-Commerce? If not are you planning to use it?<br>• What factors influenced your decision to adopt e-commerce strategies within your fashion retail business.<br>• How have these e-commerce strategies influenced your customer reach and satisfaction levels compared to traditional retail channels?<br>• Can you discuss the strategic planning process involved in transitioning your business towards e-commerce platforms?<br>• How do you tailor your e-commerce strategies to align with the preferences and behaviors of your target customers?<br>• How do you leverage e-commerce platforms to enhance customer engagement and satisfaction?<br>• What feedback mechanisms do you have in place to gather insights into customer experiences and preferences in the online environment? |

| Key Area | Questions Summary |
|---|---|
| **Brand identity in e-commerce** | • How does e-commerce adoption affect the brand identity and perceived value of fashion brands, and how are these perceptions influenced by the presence of counterfeit products<br>• How do you maintain and communicate your brand identity in the online marketplace amidst competition and counterfeit products?<br>• Have you observed any shifts in customer perceptions of your brand's value due to the adoption of e-commerce platforms, especially concerning counterfeit products?<br>• What measures do you take to safeguard your brand's integrity and authenticity in the digital marketplace?<br>• How do you address concerns related to counterfeit products and ensure a consistent brand experience for online shoppers?<br>• What do you see regarding the straightness, weaknesses, threats, and opportunities of e-commerce? |
| **Performance Metrics** | • What KPI's you are using to evaluate the Business Performance?<br>• How do you evaluate the Supply Chain Performance?<br>• How do you evaluate the Inventory Performance? |

## Appendix (3): Study Tool (Questionnaire)

### Demographic Questions

1. **Gender: الجنس**

- Male ذكر
- Female أنثى

2. **Age: الفئة العمرية**

| Under 25 | 25-30 | 31-35 | 36-40 | 40 and above |
|---|---|---|---|---|
| | | | | |

3. **Experience in the Fashion Industry: الخبرة في مجال الأزياء**

| Less Than 5 Year | 6-10 | 11-15 | 16-20 | More than 20Year |
|---|---|---|---|---|
| | | | | |

4. **Current Role:الوظيفة الحالية**

| Assistant Store Manager مساعد مدير محل | Store Manager مدير محل | Branch Manger مدير فرع | Operation Manager مدير عمليات | Stock Control Manager مدير رقابة المخزون |
|---|---|---|---|---|
| | | | | |

**The Questionnaire Below will be Use a Likert scale from One (Strongly Disagree) to Five (Strongly Agree).**

| لا أوافق بشدة Strongly Disagree | لا أوافق Disagree | محايد Neutral | أوافق Agree | أوافق بشدة Strongly Agree | السؤال Question | # الرقم |
|---|---|---|---|---|---|---|
| | | | | | The company uses RFID to enhance inventory tracking<br>تستخدم الشركة (تحديد الهوية بإستخدام الترددات الراديوية) لتعزيز تتبع المخزون | .1 |
| | | | | | The company uses RFID to streamline the shipments receiving Process<br>تستخدم الشركة (تحديد الهوية بإستخدام الترددات الراديوية) لتسهيل عملية إستلام الشحنات | .2 |
| | | | | | The company uses RFID to prevent products shrinkage<br>تستخدم الشركة (تحديد الهوية بإستخدام الترددات الراديوية) لتسهيل منع النقص بالبضائع | .3 |
| | | | | | The company uses RFID to streamline the order fulfillment process<br>تستخدم الشركة (تحديد الهوية بإستخدام الترددات الراديوية) لتسهيل عملية إعادة التعبئة | .4 |
| | | | | | The company Uses RFID to enhance data analytics<br>تستخدم الشركة (تحديد الهوية بإستخدام الترددات الراديوية) لتعزيز تحليل البيانات | .5 |
| | | | | | The company digital infrastructure provides stock visibility into supply chain stages<br>توفرالشركة البنية التحتية الرقمية التي تتيح إمكانية رؤية البضائع في مراحل سلسلة التوريد. | .6 |
| | | | | | The company digital infrastructure integrates Data with our suppliers system<br>توفرالشركة البنية التحتية الرقمية المدمجة مع أنظمة الموردين | .7 |
| | | | | | The company digital infrastructure provides on-time inventory stock visibility<br>توفرالشركة البنية التحتية الرقمية التي تمكن من رؤية فورية لتوافر البضائع في المخزون | .8 |
| | | | | | The company digital infrastructure supports e-commerce operations | .9 |

| # الرقم | السؤوال Question | أوافق بشدة Strongly Agree | أوافق Agree | محايد Neutral | لا أوافق Disagree | لا أوافق بشدة Strongly Disagree |
|---|---|---|---|---|---|---|
| | توفر الشركة البنية التحتية الرقمية التي تدعم عمليات التجارة الإلكترونية | | | | | |
| .10 | The company digital infrastructure provides data access through the internet from anywhere<br>توفر الشركة البنية التحتية الرقمية التي تتيح إمكانية الوصول إلى البيانات عبر الإنترنت من أي مكان | | | | | |
| .11 | The company integrates E-commerce with suppliers<br>تقوم الشركة بدمج التجارة الإلكترونية مع الموردين | | | | | |
| .12 | The company E-commerce Platforms are easy to use<br>تقدم الشركة منصات التجارة الإلكترونية سهلة الإستخدام | | | | | |
| .13 | The company E-commerce displays our products effectively<br>تعرض الشركة منتجاتها بفعالية عبر التجارة الإلكترونية | | | | | |
| .14 | The company E-commerce provides personalized product recommendations<br>تقدم الشركة توصيات شخصية للبضائع عبر التجارة الإلكترونية | | | | | |
| .15 | The company E-commerce engages customers through social media<br>تُشرك الشركة زبائن التجارة الإلكترونية عبر منصات التواصل الإجتماعي | | | | | |
| .16 | The company E-commerce integrates with traditional Stores<br>تكامل الشركة التجارة الإلكترونية مع المعارض التقليدية | | | | | |
| .17 | The company E-commerce platform ability to customer comment reviews<br>تمكن الشركة الزبائن مع التعبير عن أرائهم بترك تعليق بمنصة التجارة الإلكترونية | | | | | |
| .18 | The company E-commerce ensures security transactions<br>تضمن الشركة المعاملات المالية الأمنة **في** التجارة الإلكترونية | | | | | |
| .19 | The company E-commerce ensures the safeguarding of customer's information<br>تضمن الشركة حماية معلومات الزبائن في التجارة الإلكترونية | | | | | |

| لا أوافق بشدة Strongly Disagree | لا أوافق Disagree | محايد Neutral | أوافق Agree | أوافق بشدة Strongly Agree | السؤوال Question | # الرقم |
|---|---|---|---|---|---|---|
| | | | | | The company E-commerce provides (an exchange & Refund Policy) from Traditional Store<br>توفر الشركة سياسة التبديل والإرجاع من المعارض التقليدية في التجارة الإلكترونية | .20 |
| | | | | | The company ensures timely Stocks replenishment<br>تضمن الشركة عملية إعادة التعبئة للبضائع في الوقت المناسب | .21 |
| | | | | | The company reduces stock out<br>تقلص الشركة حالات نفاذ المخزون | .22 |
| | | | | | The company optimizes inventory turnover rates<br>تحسن الشركة معدلات دوران المخزون | .23 |
| | | | | | The company ensures required products availability<br>تضمن الشركة توافر البضائع المطلوبة | .24 |
| | | | | | The company ensures suitable inventory stock level<br>تضمن الشركة مستوى مناسب من المخزون | .25 |
| | | | | | The company ensures on-time seasonal restocking<br>تضمن الشركة إعادة التخزين للبضائع الموسمية في الوقت المناسب | .26 |
| | | | | | The company forecasts demand accurately<br>تتوقع الشركة معدلات الطلب بدقة | .27 |
| | | | | | The company adapts to market trends quickly<br>تتكيف الشركة مع إتجاهات السوق بسرعة | .28 |
| | | | | | The company faces rarely experiences disruptions for the operations due to technical issues or system downtimes<br>تواجه الشركة حالات نادرة من العطل في العمليات نتيجة لمشاكل تقنية أو تعطل النظام | .29 |
| | | | | | The company ensures seamless delivery from the supplier to the stores<br>تضمن الشركة التوصيل السلس من المورد للمعارض | .30 |

| لا أوافق بشدة Strongly Disagree | لا أوافق Disagree | محايد Neutral | أوافق Agree | أوافق بشدة Strongly Agree | السؤوال Question | # الرقم |
|---|---|---|---|---|---|---|
| | | | | | The company E-commerce witnesses attracting new customers<br>تشهد الشركة جذب زبائن جدد من خلال التجارة الإلكترونية | .31 |
| | | | | | The company witnesses customers repeatedly purchasing through various channels<br>تشهد الشركة قيام الزبائن بتكرار عمليات الشراء عبرقنوات الشركة المتنوعة | .32 |
| | | | | | The company E-commerce ensures timely delivery<br>تكفل الشركة إيصال البضائع بالوقت المناسب عبر التجارة الإلكترونية | .33 |
| | | | | | The company E-Commerce fosters active customer engagement<br>تعزز الشركة المشاركة النشطة للزبائن من خلال التجارة الإلكترونية | .34 |
| | | | | | The E-Commerce increases loyal customers<br>تزيد الشركة عدد الزبائن الأوفياء من خلال التجارة الإلكترونية | .35 |
| | | | | | The company increase positive reviews of the Brand<br>تزيد الشركة من التعليقات الإيجابية للعلامة التجارية | .36 |
| | | | | | The company enhances brand recognition<br>تعزز الشركة التعرف على العلامة التجارية | .37 |
| | | | | | The company increases brand awareness<br>تزيد الشركة من مستوى الوعي بالعلامة التجارية | .38 |
| | | | | | The company enhances its accreditable brand reputation<br>تعزز الشركة سمعة العلامة التجارية | .39 |
| | | | | | The Company enhances the perceived value for the Brand<br>تعزز الشركة القيمة المتصورة للعلامة التجارية | .40 |