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THE ROLE OF ARTIFICIAL INTELLIGENCE AND ADAPTIVE CAPABILITIES IN ENHANCING SUPPLY CHAIN RESILIENCE, PERFORMANCE, AND FINANCIAL OUTCOMES IN PAKISTAN'S TEXTILE SECTOR

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Abstract

The textile sector in Pakistan is a vital component of the country's economy, making a substantial contribution to both GDP and export revenue. Not just its economic significance, the industry continues faces persistent difficulties in efficiently managing supply chains. These difficulties are caused by operational inefficiencies, exposure to volatile international market circumstances, and a slow-moving adoption of contemporary procedures. This research investigates how the sector can preserve a competitive edge by strengthening ***Supply Chain Performance (SCP)*** *and* ***Supply Chain Resilience (SCR)****. Understanding how businesses* ***Artificial Intelligence (AI)' Adaptive Capabilities (AC)****, or their capacity to adapt and change in response to change, play a significant role in influencing these linkages is given special attention. Businesses with greater resilience are more likely to have better performance outcomes and financial stability, according to the findings, which are based on research done in the textile industry. Resilience has a considerably stronger effect on performance in organizations whose flexibility is ingrained in the organizational mindset, as seen by their willingness to change tactics, learn new things, and adapt to disruption. This implies that a company's supply chain's ability to function effectively under pressure is greatly influenced by how it handles uncertainty. By applying the* ***Resource-Based View (RBV)*** *and* ***Dynamic Capabilities View (DCV)*** *to a growing market scenario, the study adds to the body of knowledge by providing fresh perspectives on how internal strengths might influence long-term performance. Practically speaking, the study offers insightful recommendations for business executives and legislators looking to future-proof the textile supply chain by making investments in resilience and flexibility. These characteristics are turning into crucial cornerstones of long-term growth and competitive advantage in a time of perpetual change*

INTRODUCTION

The textile industry in Pakistan plays a vital role in the country's economy, having a significant impact on both GDP and export revenues. However, despite its economic value, the sector faces numerous challenges, especially in supply chain management. Inefficiencies in supply chain operations, coupled with external disruptions like fluctuating global demand and technological constraints, have weakened the industry's ability to compete effectively in international markets. Therefore, improving supply chain resilience and performance is crucial for Pakistan's textile industry to maintain its growth trajectory and strengthen its position in the global marketplace (Elahi et al., 2024). Artificial intelligence (AI)-driven automation presents an innovative approach to streamline operations, enhance decision-making capabilities, and provide the agility needed to address market uncertainties (Srinivasan & Swink, 2023; Malik, 2024). Through the incorporation of AI technologies like machine learning and predictive analytics, companies can streamline repetitive tasks, base decisions on data, and quickly adapt to fluctuating market dynamics (Khan et al., 2025). Moreover, adaptive abilities act as an essential moderating element, enhancing the connection between AI and supply chain resilience, along with the relationship between resilience and performance (Mubeen & Vafaei-Zadeh, 2024)

This study explores how AI-powered automation influences supply chain resilience (SCR), supply chain performance (SCP), and financial results in the textile industry of Pakistan. AI denotes the capability of machines to mimic human cognitive abilities like learning, reasoning, and making decisions. In supply chain management, AI enhances operational efficiency by automating essential activities such as inventory control, demand prediction, and logistics optimization (Khan et al., 2025). The theoretical foundation for this research is based on the Resource-Based View (RBV), proposed by Barney (1991), which indicates that companies can achieve competitive advantage by utilizing internal resources that are valuable, rare, difficult to replicate, and non-substitutable (VRIN). In this context, AI acts as a crucial strategic asset for Pakistan's textile sector, offering prospects to improve supply chain robustness and efficiency (Malik, 2024). Furthermore, the study examines how adaptive capabilities serve as a moderating element in the connection between AI-driven automation, supply chain resilience, and performance. According to the Dynamic Capabilities View (DCV), adaptive capabilities enable organizations to adjust their resources and processes in reaction to external shifts, thereby aiding them in managing disruptions more efficiently (Teece, 2007; Naz et al., 2024)

This study holds significant value as it tackles the persistent issues within Pakistan's textile sector, especially regarding supply chain management. Enhancing the efficiency and resilience of the textile sector's supply chains is crucial for sustaining its global competitiveness, especially when confronted with external challenges such as varying demand, technological obstacles, and geopolitical instabilities, as it plays a significant role in GDP and export income (Khan et al., 2025). Although artificial intelligence (AI) has been thoroughly investigated in developed nations, its contribution to enhancing supply chain resilience in emerging markets like Pakistan is still largely unexamined (Mukherjee et al., 2024). This research aims to address this issue by exploring AI-powered automation as a possible means to strengthen resilience in Pakistan's textile industry, emphasizing AI technologies like machine learning and predictive analytics that can optimize operations, enhance decision-making, and facilitate quicker adjustments to changing market environments (Leman et al., 2024). Moreover, the study emphasizes the significance of adaptive abilities in influencing the relationship between AI-driven task automation and supply chain robustness. These abilities are essential for Pakistani companies to modify their resources and operations in reaction to disturbances (Teece, 2007; Khan et al., 2025). The research seeks to provide important insights into how AI can enhance resilience, address inefficiencies, and guarantee the long-term sustainability of Pakistan's textile supply chains in the face of global challenges (Wu et al., 2024)

Although there is growing interest in AI for supply chain management, a notable gap exists in the literature concerning its impact on enhancing supply chain resilience, especially in developing countries such as Pakistan. Although many studies have

investigated AI's direct influence on supply chain performance, several neglect its impact on resilience or the moderating effect of adaptive capabilities (Khan et al., 2025). Furthermore, most AI-related research has taken place in developed countries, resulting in a significant lack of empirical studies regarding its use in Pakistan's textile industry. The connection among AI, supply chain resilience, and financial performance is mostly uncharted, particularly regarding emerging markets (Mukherjee et al., 2024). This research seeks to address these deficiencies by investigating how AI-based automation can improve supply chain resilience and performance in Pakistan's textile sector, while also analyzing the moderating influence of adaptive capabilities and their effect on financial performance (Belhadi et al., 2024; Wu et al., 2024)

This research seeks to examine the strategic function of Artificial Intelligence (AI) and adaptive abilities in improving supply chain results in Pakistan's textile industry. It specifically aims to assess the influence of AI on supply chain resilience (SCR), explore the connection between SCR and supply chain performance (SCP), and examine how SCR enhances financial performance. Additionally, the research explores how adaptive capabilities serve as a moderating element—both in the relationship between AI and SCR, and between SCR and SCP—emphasizing the significance of organizational agility and learning in enhancing the advantages of technology implementation and developing stronger, high-performing supply chains.

The research will seek to answer the following questions:

1. How does Artificial Intelligence impact supply chain resilience in Pakistan's textile sector?
2. What is the effect of supply chain resilience on supply chain performance in the textile sector?
3. How does supply chain resilience affect financial performance in Pakistan's textile sector?
4. How do adaptive capabilities moderate the relationship between Artificial Intelligence and supply chain resilience?
5. How do adaptive capabilities moderate the relationship between supply chain resilience and supply chain performance in Pakistan's textile sector?

LITERATURE REVIEW:

1: Artificial Intelligence has a positive relationship with supply chain resilience:

AI has transformed supply chain management by enhancing flexibility, scalability, and effectiveness. Logistics employs various AI technologies to address the intricate issues that modern supply chain resilience encounters within the textile sector (Iwuanyanw et al., 2024). The incorporation of artificial intelligence (AI) has transformed supply chains' resilience by enhancing adaptability, operational efficiency, and risk detection. AI enhances productivity, reduces expenses, and streamlines logistics, all contributing to greater operational effectiveness. The effective movement of goods is facilitated by technologies such as smart inventory control and AI-based route optimization, which improve overall supply chain efficiency and boost its resilience against disruptions. AI can assist logistics firms by enhancing routes in real-time, avoiding delays caused by weather, traffic, or collisions. This guarantees faster delivery and reduces the overall effect of disruptions. The ability of artificial intelligence to enhance supply chain resilience is groundbreaking (Akerele et al., 2024). AI applications in automation and robots enhance warehouse operations, boosting productivity and reducing the reliance on manual labor (Garba et al., 2024). The growing complexity of supply chains allows for the integration of AI, which can boost resilience by improving the responsiveness, agility, and reliability of logistics management (Uzoka et al., 2024) Worldwide commerce relies on supply chains, and economic stability hinges on their resilience. AI enhances supply chain resilience by providing tools for optimizing logistics, managing inventory, and forecasting demand (Gupta et al., 2023). The Textile Sector often requires collecting substantial data from suppliers and consumers to derive meaningful insights when unforeseen crises lead to changes in supply and demand. Artificial intelligence is a technology for data processing that helps analyze complex information. Moreover, AI-driven innovative decision-making improves supply chain resilience (Belhadi et al., 2021). When Artificial Intelligence is integrated into textile industry supply chains, it enhances operational efficiency, risk management, and flexibility, leading to greater

resilience (Bassey, 2022). AI enhances supply chain resilience by improving adaptability, allowing the supply chain to quickly respond to changes in demand, supply conditions, or disruptions. For instance, AI-powered demand forecasting systems can autonomously modify predictions using real-time information, allowing companies to rapidly respond to unforeseen situations such as a sudden surge in customer demand or an unanticipated supply chain disruption (Ojukwu et al., 2024). Based on the preceding discussion, we can infer that Artificial Intelligence positively correlates with supply chain resilience.

H1: Artificial Intelligence has a positive relationship with supply chain resilience.

2: Supply Chain Resilience has a positive relationship with Supply Chain Performance:

A supply chain network that integrates resilience into its structure can enhance a textile industry's ability to manage unforeseen situations. Moreover, a functional supply chain network allows the textile industry to quickly address delays and resume standard operations, ultimately enhancing business performance (Adobor, 2020; Scholten et al., 2019). The concept of supply chain resilience is considered vital for enhancing supply chain performance in several prior research studies (Gölgeci & Kuivalainen, 2020; Alrazehi et al., 2021; Muzammil, 2022). Emerging innovations powered by artificial intelligence offer greater benefits by potentially simplifying the decision-making process in the textile sector regarding identifying, experimenting, and creating solutions to issues (Paschen et al., 2020). Analysts describe this kind of innovative decision-making approach as a design. Historically regarded as a complex element in enhancing supply chain resilience and performance, the role of innovation generated by artificial intelligence (AI) predominantly bolsters the supply chain (SC) via information sharing, processing, and integration present within a textile company's framework (Fosso Wamba & Akter, 2019; Rasheed, 2022). The supply chain's performance and resilience are enhanced by the preparedness to implement artificial intelligence technologiesThe use of artificial intelligence technology improves supply chain resilience in the textile industry, aligning with results from previous studies (Belhadi et al., 2021). The literature indicates that supply chain resilience enables companies to respond efficiently to shifts in an uncertain environment, reducing the adverse impacts of disruptions to supply chains and improving overall supply chain performance. The resilience of supply chains enhances end-user satisfaction and value by guaranteeing a steady flow of materials and providing prompt and reliable delivery of products (Gu et al., 2021). Although limited research has explored the moderating impact of supply chain resilience, most studies have concentrated on the influence of supply chain resilience on supply chain performance (Qader et al., 2022). In spite of growing anticipation regarding the application of digital AI technology for supply chain aims. The research on how AI technologies and big data analytics can improve organizational agility and enhance supply chain resilience strategies to increase the efficiency of supply chain performance in the textile industry is still nascent. Organizations are gradually recognizing the significance of this technology in improving their decision-making capabilities (Behl et al., 2021). Based on the previous discussion, we recognize that Supply Chain Resilience positively correlates with Supply Chain Performance in the textile industry.

H2: Supply Chain Resilience has a positive relationship with Supply Chain Performance.

3: Supply Chain Performance has a positive relationship with Financial Performance:

The availability of raw materials, governmental regulations, economic stability, and technological developments in production are the main determinants of investment in the textile sector. Every operation in the supply chain has a direct impact on a Textile industry's top and bottom lines, underscoring the significance of assessing supply chain performance using financial performance. Monitoring financial performance is a top priority for organizations in today's demanding business climate in order to guarantee long-term stability. The comprehensive management of all activities related to the manufacture and distribution of goods or services is known as supply chain management, or SCM. This includes acquiring raw supplies, producing, distributing, and finally getting to the final customer. The textile industry's competitiveness

is a reflection of its capacity to manufacture innovative, high-quality, and reasonably priced goods for both home and foreign markets (S. Gautam et al, 2020). By encouraging such cooperation, long-term investment in the textile industry will rise and become more sustainable. The term "Measurement of a firm's performance related to its operations against a standard benchmark or approved indicators of cost-effectiveness, product efficiency, and environmental responsibility such as productivity, waste reduction, cycle time, and regulatory compliance" (Operative Performance) (Kaydos, 2020). Success in today's business environment is only possible for companies that can effectively identify and anticipate current market trends and promptly adapt to the quickly changing needs and expectations of their customers (Rasheed et al., 2020). Product planning, implementation procedures, and all other reviews can incorporate customer needs. Customer satisfaction is a measure of a company's necessary service level, which is directly tied to the overall effectiveness of its supply chain. Customers in various businesses evaluate different factors, such as delivery service, where time is undoubtedly their top priority; in contrast, for components manufacture, the precision of the specification can be the most crucial factor. Because of this, the Financial of each performance metric may vary depending on the industry. In general, supply chain performance (SCP) refers to the advantages that come from supply chain operations being resilient and efficient in a changing environment (Chowdhury et al. 2019; Jain et al. 2017). The effectiveness and efficiency of the business's daily activities in creating and distributing its goods are referred to as operational performance in Textile Sector. This covers elements like logistics, inventory control, supply chain management, and production procedures. The overall competitiveness, profitability, and customer happiness of a business can all be impacted by its financial performance. Thus, SCP significantly and positive affect financial performance in Textile Firms in Pakistan.

H3: Supply Chain Performance has a positive relationship with Financial Performance.

4: Artificial Intelligence has a positive relationship with Financial Performance:

Artificial Intelligence has emerged as a vital instrument for revolutionizing financial decision-making by facilitating more precise, effective, and data-driven approaches (Ionescu & Diaconita, 2023; Owolabi et al., 2024) In the current global environment, the textile business is a fiercely competitive and ever-evolving field where staying ahead requires ongoing innovation and adaptation. Studies show that industries that have been able to sustain high levels of competitiveness have witnessed a rise in profitability and market share (Attaran, 2023; Auboin et al., 2021). According to research, being competitive in this industry requires not only cost-effectiveness but also the ability to meet the changing needs of quality, innovation, and sustainability. Sustaining and improving competitiveness is essential for nations like Pakistan, which are major participants in the global textile market, to continue growing and integrating into the global economy (Attaran, 2023; Dwivedi et al., 2021; Vahdat, 2022). In recent years, operational performance has received more attention, and a growing corpus of research has been conducted to pinpoint best practices and improvement tactics. For instance, implementing Industry 4.0 technologies like artificial intelligence (A.I.) and the Internet of Things (IoT) is becoming more and more common as a means of improving financial performance. Businesses can use these technologies to obtain real-time operational visibility and make data-driven decisions to save waste and increase efficiency (Pachar et al., 2022). In the context of emerging nations like Pakistan, where the textile sector contributes significantly to the national economy, this is especially pertinent. Employment rates, foreign exchange earnings, and industrial growth are all directly impacted by this sector's competitive position. AI-based methods give businesses the ideal means to distribute resources, oversee the reporting system, and enhance their brand, which ultimately boosts stock market credibility and profitability according to Padilla-Lozano & Collazzo (2022). On the above discussion, AI has a positive relationship with Financial Performance.

H4: Artificial Intelligence has a positive relationship with Financial Performance.

5: Supply chain resilience and supply chain performance sequentially mediates the relationship with Artificial Intelligence and financial performance:

Pakistan's textile industry was chosen for this study because it is one of the biggest domestic sectors and is connected to global supply chains that involve imports and exports. The Textile industry is essential to every country's economic development and progress, and it makes a substantial contribution to the accomplishment of the Sustainable Development Goals (SDGs). Improving the performance of the Textile industry is crucial to achieving this significant objective (Vishnu and Krishnan 2024). AI technology significantly reduced the amount of time required to complete jobs. Automation systems with set rules take slower to complete tasks when unexpected events or workflow modifications occurred. When AI algorithms were added, the systems' flexibility allowed them to react quickly to these changes, which greatly improved their efficiency. The operational risks are associated with typical supply chain (SC) activity disruptions, such as lead-time and order fluctuations, whereas the disruption risks are mostly associated with infrequent but serious incidents (Kinra et al 2020). In order to keep supply chains robust over time, long-duration emergencies such as protracted pandemics, ongoing conflicts, or prolonged natural disasters need prompt responses as well as ongoing monitoring and adaptation. According to (El Baz and Ruel (2021)), the ability of the enterprises to withstand challenges from both internal and external environments is essential to the SC's performance. SC resilience and robustness are the ability of SC to recover its ability to function efficiently following a disruptive incident. The operations and performance of the company are positively impacted by being SC resilient and robust, particularly when businesses encounter unforeseen risks and occurrences (Hendijani and Norouzi (2023)). In the previous context, Supply chain resilience and supply chain performance sequentially mediates the relationship with AI and financial performance in the Textile industry.

H5: Supply chain resilience and supply chain performance sequentially mediates the relationship with Artificial Intelligence and financial performance.

6: Adaptive capabilities moderate the relationship between Artificial Intelligence and supply chain resilience by enhancing the impact of Artificial Intelligence:

The integration of new AI technologies within sector industries can have many beneficial effects, such as enhancing employee's resilience and alleviating stress and Supply Chain Resilience factors crucial for sustaining high levels of adaptive capability and supply chain performance (Andrade & Neves, 2022). Artificial Intelligence greatly influences how employees perform their duties. To improve supply chain performance and reach organizational objectives, strengthened organizational funding is which is essential for textile sector (Musenze et al., 2022). Artificial Intelligence implementation into supply chain logistics has transformed the textile sector, enhancing efficiencies, optimizing supply chains resilience, and facilitating decisions based on data. Nevertheless, with the ongoing evolution of AI technology, the future of Artificial Intelligence in logistics holds even more enchanting business forecasts (Manuel et al., 2024). Ensuring by Artificial Intelligence, predictive analytics is essential for enhancing decision-making through the use of historical data and machine learning models to project future trends and possible risks. In the textile sector of supply chain management, precise demand forecasting is crucial for guaranteeing that products are accessible at the right time and place. AI-based predictive models can process extensive datasets such as historical sales data, market trends, and external influences like weather conditions or geopolitical occurrences to produce accurate predictions of future demand (Umana et al., 2024). With the advancement of Artificial Intelligence technologies, it is crucial for textile industry leaders to collaborate in developing international regulations and standards that foster innovation in cross-border supply chain logistics. Through these worldwide partnerships, we can ensure that Artificial Intelligence technologies are able to be adopted and integrated internationally, facilitating smoother operations in global trade and supply chains (Esan et al., 2024). Artificial

Intelligence future in supply Chain logistics looks bright, as cutting-edge technologies like quantum-based computing, advanced robotics, and autonomous systems are set to transform the textile industry. Although, to successfully integrate these technologies, cooperation among textile industry, which enhance supply chain resilience (Adepoju et al., 2022). From small innovative companies to large multinational textile corporations, supply chain logistics companies will encourage the practical use of emerging AI technologies. These firms frequently lead the way in embracing AI advancements and testing novel technologies, yielding important information regarding their scalability and effectiveness in practical application. To incorporate quantum programming, robotics, and autonomous systems into current logistics infrastructure, partnerships between industry and technology providers will be crucial (Akinsulire et al., 2024). With the ongoing progress of the supply chain logistics landscape, Artificial Intelligence will become ever more essential for boosting efficiency, cutting costs, and strengthening supply chain resilience transforming how goods are transported and delivered globally. Thus, the positive and significant impact of Adaptive capabilities moderate the relationship between Artificial Intelligence and supply chain resilience by enhancing the impact of Artificial Intelligence in textile industry it buffers the impact of Artificial Intelligence and improves supply chain performance.

H6: Adaptive abilities influence the connection between Artificial Intelligence and supply chain resilience by amplifying the effects of Artificial Intelligence.

7: Adaptive abilities influence the connection between supply chain resilience and supply chain performance by amplifying the effect of supply chain resilience.

Resilience, Supply Chain Effectiveness, and Financial Results of Companies. Moreover, it has been shown that resilience in supply chains can greatly improve performance, and previous research has indicated that the main goal of every textile industry is firm performance, which can be enhanced through adaptive capability (Alkhatib and Momani 2023). Every textile company requires guidance to recognize the adaptive capabilities and visibility levels that influence supply chain resilience, enhancing the value of supply chain operations and performance (Baah et al. 2022). However, the relationship among the interconnected factors of supply chain performance and resilience has not been deeply investigated. To maintain a competitive edge during tumultuous periods, businesses must focus on improving their adaptability and integrating AI-powered technologies (Agrawal et al. 2022). Various perspectives have defined the concept of adaptive capabilities. The adaptive ability of supply chain operations is characterized as particular competencies that allow for the efficient and effective performance of all supply chain activities, thus enhancing supply chain resilience (Asamoah et al. 2021). Resilience within the supply chain involves adaptable planning and proactive forecasting through flexible abilities to efficiently address risks in the textile industry (Phan et al. 2023a). Supply Chain Resilience encompasses different elements within the supply chain landscape, yet it is a crucial adaptive capability for the textile industry (Sturm et al. 2023). Having adaptive capacity in firms involves numerous organizations working together to combine resources and achieve common objectives to enhance their results and increase performance (Naghshineh and Carvalho 2022). Supply chain resilience denotes a supply chain's ability to efficiently ready itself for unexpected disruptions, address challenges, recover, and manage its structure and supply chain performance, utilizing insights from various areas within textile industries (Agarwal et al. 2022). The capacity for adaptation in supply chain management involves an organization's skill in effectively recognizing, utilizing, and integrating both internal and external resources and data to ensure the optimal functioning of the supply chain (Asamoah et al. 2021)

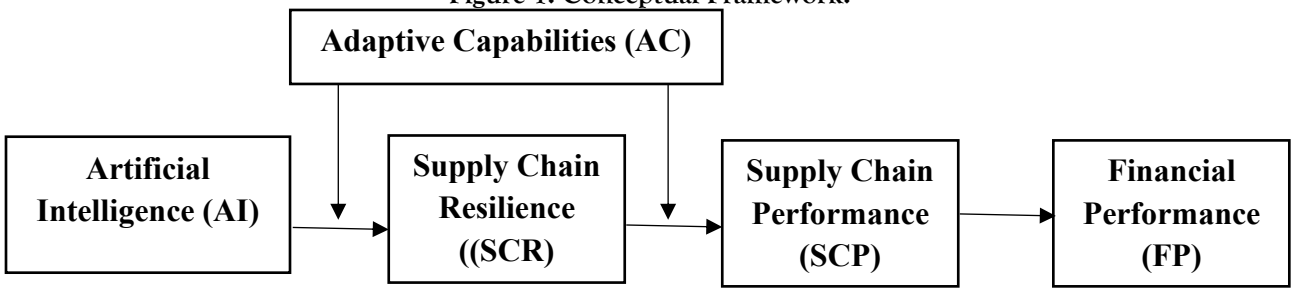
H7: Adaptive capabilities moderate the relationship between supply chain resilience and supply chain performance by enhancing the impact of supply chain resilience.

8: Artificial Intelligence positively influences the financial performance through supply chain resilience and supply chain performance:

It has been widely acknowledged that a crucial factor in SCRes development and SCP improvement is how AI advancements influence the establishment of dependable supply chains via information processing, sharing, and system integration (Wamba and Akter 2019). The Textile chain involves many stakeholders and operates with different systems and data types; the effectiveness of AI systems relies on consistent, high-quality data from these varied sources, yet these challenges continue to be substantial. Innovative AI approaches are essential for accelerating sustainability efforts. AI enhances sustainability in operations by streamlining waste management and optimizing energy consumption in intelligent grids (Tabbakh et al., 2024). The proven capability of artificial intelligence (AI) to enhance financial performance decision-making by exploring how AI can improve the supply chain's sustained performance and competitive edge, or innovation (Akter et al. 2020). AI technologies, for example, are employed in finance to analyze consumer actions and market patterns, facilitating faster and more informed decision-making (Bahoo et al., 2024).Minimizing the manual input required for data processing enables a more strategic allocation of human resources, enhancing overall productivity. Hence, it is essential to understand the relationships among AI, FP, SCRes, and SCP. These relationships ought to provide useful perspectives on how AI functions ought to be developed and applied within agile supply chains. AI has embedded itself across numerous sectors to enhance efficiency. AI reduces resource usage, optimizes workflows, and enhances the strategic allocation of human resources through its data processing capabilities, learning algorithms, and customer service tools. To ensure AI's complete potential, these risks need to be tracked and controlled. AI technologies are transforming the industry landscape and facilitating continuously improving efficiency benefits. Nonetheless, employing AI to boost resilience necessitates a thorough assessment of system vulnerabilities and interdependencies, indicating that a Textile sector must confirm its AI systems can endure disruptions such as power failures and cyber threats (Katsaliaki et al., 2022). Based on the previous discussion, AI positively impacts financial performance by enhancing supply chain resilience and supply chain efficiency in the Textile sector of Pakistan.

H8: Artificial Intelligence positively influences the financial performance through supply chain resilience and supply chain performance.

Figure 1: Conceptual Framework:



METHEDOLOGY:

This study employs a Likert scale method to gather feedback from various demographic groups to ensure a comprehensive understanding of the roles that Artificial Intelligence and Adaptive Capability have. The response pool consists of individuals from various age groups, but most participants are aged 25 to 34, with those under 25 following closely. Younger professionals, likely more engaged with Artificial Intelligence in their jobs, are notable in this distribution. A valuable perspective on seniority and experience in adapting to Artificial Intelligence workflows is provided by the involvement of older age groups.

Organizational roles included are Employees (55) and Mid-Level Managers (68). The impact of Artificial Intelligence on employee adaptability, operational productivity, and decision-making is

reflected in this balanced portrayal throughout organizational levels. The largest segment consists of mid-level managers, reflecting their essential position in incorporating AI technologies and promoting Supply Chain Resilience (SCR) and Supply Chain Performance (SCP). The Likert scale approach was employed due to its efficacy in capturing intricate perspectives on subjects such as Financial Performance (FP) and AI-Adaptation Capability. It varies from complete agreement to disagreement. This approach aligns well with other research that underscores how younger and mid-career professionals can adopt technological advancements and encourage innovation in their work environments.

A commonly accepted guideline for sample size in factor analysis and scale validation is to have between 5 to 10 respondents per questionnaire item or variable to ensure stable and reliable factor solutions (Fabrigar et al., 1999; Guadagnoli & Velicer, 1988)

Table1: Descriptive Analysis:

Name	Mean	Standard deviation
AI1	3.729	1.085
AI2	3.971	0.981
AI3	3.816	1.099
AI4	3.766	0.817
AI5	3.411	0.874
SCR1	3.397	1.106
SCR2	3.518	0.978
SCR3	3.343	0.938
SCR4	3.43	1.048
SCR5	3.596	1.165
AC1	3.705	1.068
AC2	3.833	1.128
AC3	3.56	0.75
SCP1	3.597	0.975
SCP2	3.51	0.804
SCP3	3.768	0.869
SCP4	3.466	1.108
FP1	3.345	0.957
FP2	3.65	0.773
FP3	3.355	1.07

Descriptive analysis indicates that higher average ratings and lower variability compared to Artificial Intelligence (AI) show that respondents generally view AI-driven supply chain resilience (SCR) and supply chain performance (SCP) through adaptive capabilities (AC) more positively. This consistency highlights the significance of these factors in enhancing Financial Performance (FP).

Table2: Correlation Matrix:

	AC	AI	FP	SCP	SCR
AC	1.000				
AI	0.571	1.000			

FP	0.522	0.471	1.000		
SCP	0.722	0.505	0.677	1.000	
SCR	0.688	0.546	0.544	0.651	1.000

The correlation matrix from Structural Equation Modeling offers an in-depth insight into the connections between the study's latent variables. The correlation of 0.571 between Artificial Intelligence (AI) and Adaptive Capability (AC) indicates a connection that is both relevant and separate. Likewise, there is a notable connection between Adaptive Capability (AC) and Supply Chain Performance (SCP), demonstrated by a robust correlation of 0.722. The significant impact of Financial Performance (FP) on connecting Artificial Intelligence (AI) processes and adaptability is shown through its moderate correlation with SCP (0.677) and SCR (0.544). All correlation values stay below the 0.85 limit, indicating no multicollinearity problems are present. This guarantees the uniqueness of the constructs and adheres to the top standards in structural equation modeling. This phase enhances the model's validity by forming links without suggesting causation.
The model indicates that Artificial Intelligence (AI) and Adaptive Capability (AC) significantly impact Supply Chain Resilience (SCR) and Supply Chain Performance (SCP), enhancing Financial Performance (FP), which in turn fosters Adaptive Capability (AC). AC significantly impacts SCP (0.722) and has a moderate effect on SCR (0.688), while it also moderately influences AI (0.677) but has a weaker direct connection with it (0.471).

Table 3: Path Coefficients:
Path Coefficient:

	AC	AI	FP	SCP	SCR	AC x AI	AC x SCR
AC		0.571		0.545	0.587		
AI					0.282		
FP							
SCP			0.677				
SCR				0.272			
AC x AI					0.131		
AC x SCR				0.067			

Figure 2: Structural Equation Model of the phenomenon:

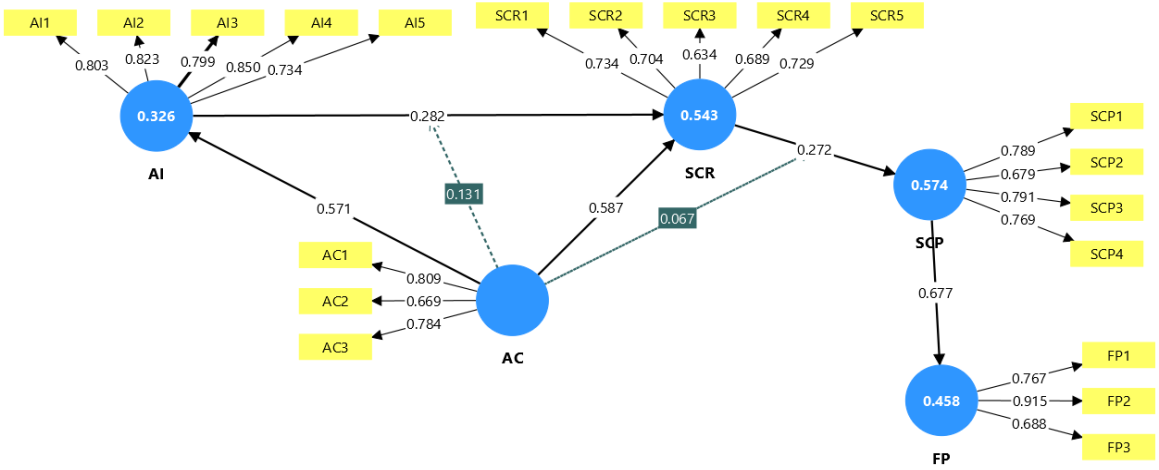


Table 4: Path Coefficients:

PATH	Path Co efficient
AC -> AI	0.571
AC -> SCP	0.545
AC -> SCR	0.587
AC x AI -> SCR	0.131
AC x SCR -> SCP	0.067
AI -> SCR	0.282
SCP -> FP	0.677
SCR -> SCP	0.272

This table presents path coefficients, which shows how strong the relationships are between variables in above research model. The Value of Path co-efficient between AC and AI is **0.571** which shows strong relation between AC and AI. The Value of Path co-efficient between AC and SCP is **0.545** which shows strong positive effect between AC and SCP. The Value of Path co-efficient between AC and SCR is **0.587** which also strongly improves positive effect between AC and SCR. The Value of Path co-efficient between AC, AI and SCR is **0.131** which shows weak effect between AC, AI and SCR. The Value of Path co-efficient between AC, SCR and SCP is **0.067** which shows very weak relationship between AC, AI and SCR. The Value of Path co-efficient between AI and SCR is **0.282** which shows moderate positive effect on AI and SCR. The Value of Path co-efficient between SCP and FP is **0.677** which shows strongly boosts effect on SCP and FP. The Value of Path co-efficient between SCR and SCP is **0.272** which shows moderate positive impact on SCR and SCP.

Table 5: Indirect Path:

	AC	AI	FP	SCP	SCR	AC x AI	AC x SCR
AC			0.507	0.203	0.161		
AI			0.052	0.077			
FP							
SCP							
SCR			0.184				
AC x AI			0.024	0.036			
AC x SCR			0.045				

The Indirect Path analysis underscores the mediating role of Adaptive Capability (AC) and Financial Performance (FP) which has an indirect effect of **0.507**, which means Adaptive Capability (AC) indirectly improves Financial Performance (FP) significantly. Adaptive Capability (AC) and Supply Chain Performance (SCP) has an indirect effect of **0.203.** Adaptive Capability (AC) and Supply Chain Resilience (SCR) has an indirect effect of **0.161.** Artificial Intelligence (AI) and Financial Performance (FP) has a small indirect effect of **0.052.** AC, AI and FP is **0.024** and AC, AI and SCP is **0.036** which shows combined effect of AC and AI on FP and SCP is small but present. AC, SCR on FP is **0.045** which influence AC and SCR on FP has a small indirect effect.

Table 6: Indirect Path:

	Specific Indirect Effects
AC -> AI -> SCR	0.161
SCR -> SCP -> FP	0.184
AC x AI -> SCR -> SCP	0.036
AC -> AI -> SCR -> SCP -> FP	0.030
AC x SCR -> SCP -> FP	0.045
AC -> SCR -> SCP -> FP	0.108
AI -> SCR -> SCP -> FP	0.052
AC -> SCP -> FP	0.369
AC -> SCR -> SCP	0.160
AC -> AI -> SCR -> SCP	0.044
AI -> SCR -> SCP	0.077
AC x AI -> SCR -> SCP -> FP	0.024

This table displays the particular indirect effect, illustrating the strength of the indirect effects among variables in the research model above. The indirect influence of AC, AI, and SCR is 0.161, indicating a moderate level of strength. The influence of SCR, SCP, and FP is 0.184, indicating a comparatively stronger indirect effect. The impact of AC, AI, SCR, and SCP is 0.036, indicating a fairly moderate indirect effect. The impact of AC, AI, SCR, SCP, and FP is 0.030, indicating a weak indirect effect. The impact of AC, SCR, SCP, and FP is 0.045, indicating a weak indirect effect. The impact of AC, SCR, SCP, and FP is 0.108, indicating a weak indirect influence. The influence of AI, SCR, SCP, and FP is 0.052, indicating a weak indirect impact. The influence of AC, SCP, and FP is 0.369, indicating the most substantial indirect effect. The influence of AC, SCR, and SCP is 0.160, indicating a fairly moderate indirect impact. The influence of AC, AI, SCR, and SCP is 0.044, indicating a weak indirect effect. The impact of AI, SCR, and SCP is 0.077, indicating a moderate indirect influence. The influence of AC, AI, SCR, SCP, and FP is 0.024, indicating a slight indirect effect

Table 7: Reliability and Validity Analysis:

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
AC	0.720	0.724	0.904	0.572
AI	0.861	0.864	0.900	0.644
FP	0.710	0.731	0.836	0.632
SCP	0.752	0.756	0.843	0.575
SCR	0.740	0.745	0.827	0.560

Key metrics evaluating the convergent validity and internal consistency of the constructs AC, AI, FP, SCP, and SCR are displayed in the reliability and validity analysis table. Cronbach's alpha scores, which fall between 0.710 and 0.861 and all beyond the generally recognized cutoff point of 0.7, show that the measurement items within each construct have strong internal consistency. This consistency is further supported by composite reliability measures, rho_a and rho_c. By taking indicator loadings into account, the rho_c values are noticeably high (all over 0.82), indicating great reliability above Cronbach's alpha. Each construct explains more than half of the variation in its indicators, as shown by the Average variation Extracted (AVE) values, which range from 0.560 to 0.644 and above the suggested minimum of 0.50. This confirms good convergent validity. All of these findings point to the validity and reliability of the constructs'

measurements, which offers a strong basis for further structural model testing.

Table 8: Correlation Matrix HTMT:

	AC	AI	FP	SCP	SCR	AC x AI	AC x SCR
AC							
AI	0.748						
FP	0.767	0.595					
SCP	0.625	0.626	0.619				
SCR	0.621	0.696	0.691	0.634			
AC x AI	0.366	0.381	0.057	0.169	0.134		
AC x SCR	0.156	0.094	0.116	0.075	0.075	0.799	

With all values falling below the cautious threshold of 0.85 often advised in the literature, the HTMT correlation matrix shows adequate discriminant validity among the components AC, AI, FP, SCP, SCR, and their interaction terms (AC × AI and AC × SCR). This validates the construct reparability of the measurement model by showing that each construct and interaction term represents separate variation and is empirically different from the others. More evidence that these interaction effects are unique constructs rather than merely extensions of the original variables comes from the interaction terms' notably low HTMT values with their constituent constructs. These findings, taken together, lend credence to the measurement framework's resilience and boost trust in further structural investigations.

Table 9: Fornell Larcker Criterion FLC:

	AC	AI	FP	SCP	SCR
AC	0.756				
AI	0.571	0.803			
FP	0.522	0.471	0.795		
SCP	0.722	0.505	0.677	0.758	
SCR	0.688	0.546	0.544	0.651	0.748

The Fornell-Larcker Criterion also supports discriminant validity, as the square roots of the Average Variance Extracted (AVE) values (Diagonal Elements) exceed the correlations among constructs. For instance, AC has a square root AVE of (0.756), which exceeds its correlations with AI (0.571), FP (0.522), SCP (0.722), and SCR (0.688)

Table 10: Model Fit:

	Saturated model	Estimated model
Chi-square	798.077	812.149

The model fit indices suggest a satisfactory match between the structural equation model and the actual data. The chi-square statistics, 798.077 for the saturated model and 812.149 for the estimated model, indicate small discrepancies, commonly observed in large sample sizes. In general, the model shows an adequate alignment for examining the connections among Artificial Intelligence, Adaptive Capability, Supply Chain Resilience, Supply Chain Performance, and Financial Performance (Hu&Bentler, 1999).

Table 11: Structural Equation Model (R Square):

	R-square	R-square adjusted
AI	0.326	0.323
FP	0.458	0.456
SCP	0.574	0.568
SCR	0.543	0.536

The R-square and adjusted R-square values reflect the extent of variance accounted for by the independent variables for each dependent variable. For Artificial Intelligence (AI), the R square value stands at 0.326, indicating that 32.1% of its variance is clarified by the predictors, with a modified value of 0.323 that considers model complexity. The R-square value for Financial Performance (FP) is 0.458, indicating that 45.1% of its variance is accounted for, while the adjusted value stands at 0.456. The R-square value for Supply Chain Performance is 0.574, indicating that 57.1% of its variance is accounted for, with a modified value of 0.568. For Supply Chain Resilience (SCR), the R-square value stands at 0.543, indicating that 54.1% of its variance is accounted for, with an adjusted value of 0.536. These figures demonstrate a moderate level of explanatory strength for the model, reinforcing its credibility

Table 12: Structural Equation Model of Phenomenon:

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
AC -> AI	0.571	0.572	0.057	10.059	0.000
AC -> SCP	0.545	0.533	0.099	5.502	0.000
AC -> SCR	0.587	0.587	0.078	7.549	0.000
AC x AI -> SCR	0.131	0.142	0.050	2.605	0.009
AC x SCR -> SCP	0.067	0.083	0.007	2.286	0.022
AI -> SCR	0.282	0.281	0.077	3.664	0.000
SCP -> FP	0.677	0.680	0.050	13.446	0.000
SCR -> SCP	0.272	0.279	0.101	2.704	0.007

The table presents the path coefficients and their significance in the model. Adaptive Capability (AC) has a weak positive impact on Artificial Intelligence (AI) (0.571, p = 0.000) and, AC significant weak influence on Supply Chain Performance (SCP) (0.545, p=0.000) AC also significant weak influence on Supply Chain Resilience (SCR) (0.587, p=0.000). Finally, AC and AI strongly enhances SCR **(0.131, p=0.009)**. Also, AC and SCR strongly enhances SCP **(0.067, p=0.022)**. AI has significant weak influence on Supply Chain Resilience (SCR) **(0.282, p=0.000)**. SCP has significant weak influence on Financial Performance (FP) **(0.677, p=0.000)**. SCR has moderate influence on Supply Chain Performance (SCP) **(0.272, p=0.007)**.The high t-statistics and low p-values for most paths confirm that these relationships are statistically significant, highlighting the critical role of AI technologies in fostering resilience and performance.

Table 13: Cross Loadings:

	AC	AI	FP	SCP	SCR	AC x AI	AC x SCR
AC1	0.809	0.553	0.378	0.520	0.577	-0.225	-0.151
AC2	0.669	0.185	0.375	0.563	0.468	-0.097	0.019
AC3	0.784	0.510	0.435	0.569	0.513	-0.333	-0.109
AI1	0.500	0.803	0.448	0.416	0.464	-0.316	-0.100

AI2	0.485	0.823	0.450	0.485	0.458	-0.248	-0.063
AI3	0.423	0.799	0.381	0.371	0.425	-0.321	-0.077
AI4	0.456	0.850	0.225	0.379	0.444	-0.298	-0.086
AI5	0.419	0.734	0.382	0.365	0.397	-0.234	-0.023
FP1	0.448	0.425	0.767	0.602	0.604	-0.060	0.072
FP2	0.493	0.476	0.915	0.574	0.469	-0.032	0.135
FP3	0.268	0.165	0.688	0.407	0.137	0.022	0.025
SCP1	0.570	0.426	0.583	0.789	0.581	-0.189	-0.041
SCP2	0.622	0.455	0.444	0.679	0.374	-0.163	0.014
SCP3	0.431	0.430	0.504	0.791	0.548	-0.074	0.045
SCP4	0.562	0.221	0.511	0.769	0.458	-0.019	0.097
SCR1	0.458	0.313	0.330	0.458	0.734	-0.064	0.044
SCR2	0.421	0.415	0.351	0.375	0.704	-0.098	0.008
SCR3	0.397	0.509	0.201	0.291	0.634	-0.162	-0.052
SCR4	0.547	0.463	0.524	0.496	0.689	-0.032	0.069
SCR5	0.547	0.249	0.434	0.594	0.729	0.046	0.053
AC x AI	-0.299	-0.354	-0.036	-0.149	-0.076	1.000	0.799
AC x SCR	-0.117	-0.088	0.103	0.035	0.042	0.799	1.000

The Cross-Loadings analysis supports indicator reliability, as each item loads more strongly on its associated construct than on others. For instance AC1 exhibit high loadings on (AC)(**0.809**) compared to other constructs like AI,FP,SCP and SCR. Similarly, AI4 loads highly on AI (**0.850**). FP2 exhibit high loadings on (FP)(**0.915**) compared to other Construct. SCP3 loads highly on SCP (**0.791**). SCR1 exhibit high loadings on (SCR)(**0.734**) compared to other Construct. And maintains lower loadings on non-associated constructs, such as SCP, SCR and FP. This robust indicator alignment reinforces the validity of the measurement model, ensuring its precision in capturing the targeted variables (Fornell&Larcker,1981)

DISCUSSION:

This study sheds light on how Pakistan's textile industry can better navigate today's unpredictable business environment. The findings reveal that when companies take steps to strengthen their supply chains by improving coordination, communication, and response times they become more capable of bouncing back from disruptions. This kind of resilience is not only essential in managing crises like delayed shipments or raw material shortages but also in ensuring that day-to-day operations run smoothly. When a company's supply chain is resilient, its overall performance tends to improve. Deliveries become more consistent, customer satisfaction grows, and internal processes are less likely to be thrown off course.

But resilience alone isn't enough. This study also found that adaptive capabilities a company's ability to change, learn, and adjust quickly play a key role in turning resilience into real performance gains. In businesses where teams are open to change, able to shift strategies on the fly, and willing to rethink traditional ways of working, the supply chain becomes not just more reliable, but more competitive. These adaptive companies can take resilience and use it as a stepping stone toward faster deliveries, fewer delays, and ultimately, better financial outcomes.

What stands out most is that change-readiness whether it's in leadership style, team culture, or decision-making is just as important as any new system or process. Companies that focus on building this adaptability see better results across the board, from operations to revenue. This makes a strong case for businesses to prioritize not only better planning and infrastructure but also flexibility and a willingness to evolve.

THEORATICAL & PRACTICAL IMPLICATIONS:

This study makes a significant theoretical contribution by grounding its analysis in the Resource-Based View (RBV), which posits that firms gain a sustainable competitive advantage through internal resources that are valuable, rare, inimitable, and non-substitutable. In the context of Pakistan's textile industry, the findings reinforce the RBV framework by showing that Supply Chain Resilience (SCR) can function as a strategic internal capability that provides long-term value to firms. When firms strengthen their supply chains through better coordination, planning, and responsiveness, they develop a core resource that enhances Supply Chain Performance (SCP) and ultimately improves Financial Performance (FP). In this regard, SCR is not just a reaction to external pressures but an embedded, high-value capability that supports competitive advantage in volatile markets.

Further theoretical grounding is provided by the Dynamic Capabilities View (DCV), which emphasizes an organization's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. This study extends the DCV by highlighting the role of Adaptive Capabilities (AC) as a moderating variable that strengthens the relationship between SCR and SCP. Firms that exhibit high levels of AC those that are flexible, learning-oriented, and responsive to change are better positioned to convert resilience into actual performance improvements. Thus, AC is not only a support mechanism but a dynamic capability that enables the transformation of static supply chain processes into adaptive, future-proof systems.

The findings support both RBV and DCV by showing that long-term performance and competitive advantage are not simply the result of tangible investments or market positioning, but stem from

LIMITATIONS & FUTURE DIRECTIONS:

While this research offers valuable insights, it's important to acknowledge its limitations. The study focused specifically on Pakistan's textile industry, which means the findings may not apply in the same way to other sectors or countries. Different industries may face different types of supply chain challenges, and the solutions that work in one context might not work in another.

Another limitation is the timeframe. This was a cross-sectional study, capturing data at a single moment. As supply chains continue to evolve and businesses learn from past disruptions, it would be helpful to conduct longer-term studies that track changes over time. This would offer a better understanding of how resilience and adaptability grow or fade depending on a company's strategy and environment.

Looking ahead, future research could explore how other industries approach resilience, or take a more personal, qualitative look into how managers and employees experience and respond to supply chain disruptions. This could include interviews or case studies that give voice to the human side of change. It would also be worth studying how cultural attitudes, leadership styles, and organizational values impact a company's ability to adapt and grow stronger through uncertainty.

CONCLUSION:

In today's fast-changing world, the ability to adapt and stay strong in the face of challenges is more important than ever. This study highlights just how crucial **resilience** and **adaptability** are for the textile industry in Pakistan. Businesses that build stronger, more flexible supply chains are more likely to perform better not only in operations but financially as well. But it's not just about having better systems. It's about the people behind those systems teams that are ready to change direction, take smart risks, and find new ways of working when old methods no longer serve them. **Adaptive capabilities** bring supply chain improvements to life, helping businesses make the most of their strengths and weather any storm. Ultimately, this research makes a simple but powerful point: the companies that will lead in the future are the ones that prepare for change, learn from challenges, and never stop improving. In a world that's constantly shifting, resilience isn't just a strategy it's a mindset.

REFERENCES:

Akerele, J.I., Uzoka, A., Ojukwu, P.U., & Olamijuwon, O.J. (2024). Optimizing traffic management for public services during high-demand periods using cloud load balancers. Computer Science & IT Research Journal, 5, 2594-2608, November 2024. DOI: 10.51594/csitrj.v5i11.1710: http://www.fepbl.com/index.php/csitrj

Akinsulire, A.A., Idemudia, C., Okwandu, A.C., & Iwuanyanwu, O. (2024). Public-Private partnership frameworks for financing affordable housing: Lessons and models. International Journal of Management & Entrepreneurship Research, 6(7), 2314 2331.

Alkhatib, Saleh Fahed, and Rahma Asem Momani. 2023. Supply Chain Resilience and Operational Performance: The Role of Digital Technologies in Jordanian Manufacturing Firms. Administrative Sciences 13: 40. [CrossRef]

Agrawal, Tarun Kumar, Ravi Kalaiarasan, Jan Olhager, and Magnus Wiktorsson. 2022. Supply chain visibility: A Delphi study on managerial perspectives and priorities. International Journal of Production Research 1–16. [CrossRef]

Asamoah, David, Benjamin Agyei-Owusu, Francis Kofi Andoh-Baidoo, and Emmanuel Ayabur. 2021. Inter-organizational systems use and supply chain performance: Mediating role of supply chain management capabilities. International Journal of Information Management 58: 102195. [CrossRef]

Agarwal, Nishtha, Nitin Seth, and Ashish Agarwal. 2022. Selecting Capabilities to Mitigate Supply Chain Resilience Barriers for an Industry 4.0 Manufacturing Company: An AHP-Fuzzy Topsis Approach. Journal of Advanced Manufacturing Systems 21: 55–83. [CrossRef]

Asamoah, David, Benjamin Agyei-Owusu, Francis Kofi Andoh-Baidoo, and Emmanuel Ayabur. 2021. Inter-organizational systems use and supply chain performance: Mediating role of supply chain management capabilities. International Journal of Information Management 58: 102195. [CrossRef]

Adobor, H. (2020). Supply chain resilience: an adaptive cycle approach. The International Journal of Logistics Management, 31(3), 443-463. https://doi.org/10.1108/IJLM-01-2020-0019

Attaran, M. (2023). The impact of 5G on the evolution of intelligent automation and industry digitization. Journal of ambient intelligence and humanized computing, 14(5), 5977-5993.

Auboin, M., Koopman, R., & Xu, A. (2021). Trade and innovation policies: Coexistence and spillovers. Journal of Policy Modeling, 43(4), 844-872.

Abbas, J., & Khan, S. M. (2022). Green knowledge management and organizational green culture: An interaction for organizational green innovation and green performance. Journal of Knowledge Management. https://doi.org/10.1108/JKM-03-2022-0156

Ajmal, M. M., Khan, M., Shad, M. K., AlKatheeri, H., & Jabeen, F. (2021). Socio-economic and technological new normal in supply chain management: Lessons from COVID-19 pandemic. The International Journal of Logistics Management, 33, 1499. https://doi.org/10.1108/IJLM-04- 2021-0231

Akter, S., Michael, K., Uddin, M. R., McCarthy, G., & Rahman, M. (2020). Transforming business using digital innovations: The application of AI, blockchain, cloud and data analytics. Annals of Operations Research. https://doi.org/10.1007/s10479-020-03620-w

Abdallah, A. B., & Al-Ghwayeen, W. S. (2020). Green supply chain management and business performance. Business Process Management Journal, 26(2), 489–512. https://doi.org/10.1108/BPMJ-03-2018-0091

Adepoju, O., Esan, O., & Akinyomi, O. (2022). Food security in Nigeria: enhancing workers' productivity in precision agriculture. Journal of Digital Food, Energy & Water Systems, 3(2).

Andrade, C., & Neves, P. C. (2022). Perceived Organizational Support, Coworkers' Conflict and Organizational Citizenship Behavior: The Mediation Role of Work-Family Conflict.

Administrative Sciences, 12(1). https://doi.org/10.3390/admsci12010020.

Bahoo, S., Cucculelli, M., Goga, X., & Mondolo, J. (2024). Artificial intelligence in Finance: a comprehensive review through bibliometric and content analysis. SN Business & Economics, 4(2), 23

Barney, J. B. (1991). Firm Resources and Sustained Competitive Advantage. Journal of Management, 17(1), 99-120.

Belhadi, A.; Mani, V.; Kamble, S.S.; Khan, S.A.R.; Verma, S. Artificial Intelligence-Driven Innovation for Enhancing Supply Chain Resilience and Performance under the Effect of Supply Chain Dynamism: An Empirical Investigation. Ann. Oper. Res. 2021, 1–26. [CrossRef] [PubMed]

Baah, Charles, Douglas Opoku Agyeman, Innocent Senyo Kwasi Acquah, Yaw Agyabeng-Mensah, Ebenezer Afum, Kassimu Issau, Daniel Ofori, and Daniel Faibil. 2022. Effect of information sharing in supply chains: Understanding the roles of supply chain visibility, agility, collaboration on supply chain performance. Benchmarking 29: 434–55. [CrossRef]

Bassey, K.E. (2022). Enhanced design and development simulation and testing. Engineering Science & Technology Journal, 3(2), 18-31.

Belhadi, A.; Mani, V.; Kamble, S.S.; Khan, S.A.R.; Verma, S. Artificial Intelligence-Driven Innovation for Enhancing Supply Chain Resilience and Performance under the Effect of Supply Chain Dynamism: An Empirical Investigation. Ann. Oper. Res. 2021, 1–26. [CrossRef] [PubMed]

Belhadi, A., Mani, V., Kamble, S. S., Khan, S. A. R., & Verma, S. (2024). Artificial intelligence-driven innovation for enhancing supply chain resilience and performance under the effect of supply chain dynamism: an empirical investigation. Annals of Operations Research, 333(2), 627-652.

Behl, A., Chavan, M., Jain, K., Sharma, I., Pereira, V.E., Zhang, J.Z., 2021. The role of organizational culture and voluntariness in the adoption of artificial intelligence for disaster relief operations. Int. J. Manpow. https://doi.org/10.1108/IJM-03-2021- 0178.

Chowdhury, M., Quaddus, M., & Agarwal, R. (2019). Supply chain resilience for performance: Role of relational practices and network complexities. Supply Chain Management: An International Journal, 24(5), 659–676

Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., . . . Eirug, A. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. International journal of information management, 57, 101994.

El Baz J, Ruel S (2021) Can supply chain risk management practices mitigate the disruption impacts on supply chains resilience and robustness? evidence from an empirical survey in a covid-19 outbreak era. International Journal of Production Economics 233:107,972

Esan, O., Nwulu, N.I., David, L.O., & Adepoju, O. (2024). An evaluation of 2013 privatization on Benin Electricity Distribution technical and workforce performance. International Journal of Energy Sector Management.

Farrukh, A., & Sajjad, A. (2024). Investigating Supply Chain Disruptions and Resilience in the Textile Industry: A Systemic Risk Theory and Dynamic Capability-Based View. Global Journal of Flexible Systems Management, 1-27.

Fosso Wamba, S., & Akter, S. (2019). Understanding supply chain analytics capabilities and agility for data-rich environments. International Journal of Operations & Production Management, 39(6/7/8), 887-912. https://doi.org/10.1108/IJOPM-01-2019-0025

Gu, M., Yang, L., Huo, B., 2021. The impact of information technology usage on supply chain resilience and performance: an ambidexterous view. Int. J. Prod. Econ. 232, 107956.

Garba, B.M.P., Umar, M.O., Umana, A.U., Olu, J.S., & Ologun, A. (2024). Energy efficiency in public buildings: Evaluating strategies for tropical and temperate climates. World Journal of Advanced Research and Reviews, 23(03), 409-421. doi: 10.30574/wjarr.2024.23.3.2702.

Gölgeci, I., & Kuivalainen, O. (2020). Does social capital matter for supply chain resilience? The role of absorptive capacity and marketing-supply chain management alignment. Industrial Marketing Management, 84, 63-74. https://doi.org/10.1016/j.indmarman.2019.05.006

Gupta, S., Modgil, S., Choi, T. M., Kumar, A., & Antony, J. (2023). Influences of artificial intelligence and blockchain technology on financial resilience of supply chains. International Journal of Production Economics, 261, 108868.

Hussain, M., Ajmal, M., Subramanian, G., Khan, M., & Anas, S. (2024). Challenges of big data analytics for sustainable supply chains in healthcare–a resource-based view. Benchmarking: An International Journal, 31(9), 2897-2918

Hendijani R, Norouzi M (2023) Supply chain integration and firm performance in the covid19 era: the mediating role of resilience and robustness. Journal of Global Operations and Strategic Sourcing 16(2):337–367

Ionescu, S. A., & Diaconita, V. (2023). Transforming financial decision-making: the interplay of AI, cloud computing and advanced data management technologies. International Journal of Computers Communications & Control, 18(6).

Iwuanyanwu, O., Gil-Ozoudeh, I., Okwandu, A.C., & Ike, C.S. (2024). The role of green building materials in sustainable architecture: Innovations, challenges, and future trends International Journal of Applied Research in Social Sciences, 6(8), 1935-1950

Joshi, S., & Sharma, M. (2022). Impact of sustainable supply chain management on performance of SMEs amidst COVID-19 pandemic: An Indian perspective. International Journal of Logistics Economics and Globalisation, 9(3), 248–276. https://doi.org/10.1504/IJLEG.2022.120811

Jain, V., Kumar, S., Soni, U., & Chandra, C. (2017). Supply chain resilience: model development and empirical analysis. International Journal of Production Research, 55(22), 6779–6800

Katsaliaki, K., Galetsi, P., & Kumar, S. (2022). Supply chain disruptions and resilience: A major review and future research agenda. Annals of Operations Research, 1-38.

Khan, S. A. R., Sheikh, A. A., Shamsi, I. R. A., & Yu, Z. (2025). The Implications of Artificial Intelligence for Small and Medium-Sized Enterprises' Sustainable Development in the Areas of Blockchain Technology, Supply Chain Resilience, and Closed-Loop Supply Chains. Sustainability, 17(1), 334.

Kinra A, Ivanov D, Das A, Dolgui A (2020) Ripple effect quantification by supplier risk exposure assessment. International Journal of Production Research 58(18):5559–5578

Kaydos, W. (2020). Operational performance measurement: Increasing total productivity. CRC Press.

Kiran, S., Rehman, F. U., Javed, S., Abrar, S., Mukhtar, N., Moied, A. & Nawaz, R. (2024). Ecological effects of biopolymers and their advantages for textile industry. In Biopolymers in the textile industry: Opportunities and limitations (pp. 241-272). Singapore: Springer Nature Singapore.

Lerman, L. V., Benitez, G. B., Müller, J. M., de Sousa, P. R., & Frank, A. G. (2024). When digital transformation meets supply chain needs in emerging markets: contributions for social and economic performance. Supply Chain Management: An International Journal, 29(6), 929-942.

Malik, T. A. (2024). Navigating Sustainable Supply Chains in Pakistan's Textile Industry: Addressing Regulatory, Infrastructural, and Social Challenges for Enhanced Sustainability.

Manuel, H.N.N., Kehinde, H.M., Agupugo, C.P., & Manuel, A.C.N. (2024). The impact of AI on boosting renewable energy utilization and visual power plant efficiency in contemporary construction. World Journal of Advanced Research and Reviews, 23(2), 1333-1348.

Mubeen, S. K., Vafaei-Zadeh, A., & Amran, A. B. (2024). From threads to trends: IoT's role in enhancing supply chain & firm performance in Pakistani textiles. Global Business and Management Research, 16(3), 278-299.

Mukherjee, S., Baral, M. M., Nagariya, R., Chittipaka, V., & Pal, S. K. (2024). Artificial intelligence-based supply chain resilience for improving firm performance in emerging markets. Journal of Global Operations and Strategic Sourcing, 17(3), 516-540.

Musenze, I. A., Mayende, T. S., Kalenzi, A., & Namono, R. (2022). Perceived Organizational Support, Self-Efficacy and Work Engagement: Testing for the Interaction Effects. Journal of Economic and Administrative Sciences, 38(2), 201–228. https://doi.org/10.1108/jeas-08-2020-0141

Mathivathanan, D., Mathiyazhagan, K., Rana, N. P., Khorana, S., & Dwivedi, Y. K. (2021). Barriers to the adoption of blockchain technology in business supply chains: A total interpretive structural modelling (TISM) approach. International Journal of Production Research, 59(11), 1–22. https://doi.org/10.1080/00207543.2020.1868597

Novak, David C., Zhaohui Wu, and Kevin J. Dooley. 2021. Whose resilience matters? Addressing issues of scale in supply chain resilience. Journal of Business Logistics 42: 323–35. [CrossRef]

Naghshineh, Bardia, and Helena Carvalho. 2022. The implications of additive manufacturing technology adoption for supply chain resilience: A systematic search and review. International Journal of Production Economics 247: 108387. [CrossRef]

Naz, F., Kumar, A., Majumdar, A., & Agrawal, R. (2022). Is artificial intelligence an enabler of supply chain resiliency post COVID-19? An exploratory state-of-the-art review for future research. Operations Management Research, 15(1), 378-398.

Ojukwu, P. U., Cadet, E., Osundare, O. S., Fakeyede, O. G., Ige, A. B., & Uzoka, A. (2024). The crucial role of education in fostering sustainability awareness and promoting cybersecurity measures. International Journal of Frontline Research in Science and Technology, 2024, 04(01), 018–034. https://doi.org/10.56355/ijfrst.2024.4.1.0050

Owolabi, O. S., Uche, P. C., Adeniken, N. T., Ihejirika, C., Islam, R. B., & Chhetri, B. J. T. (2024). Ethical implication of artificial intelligence (AI) adoption in financial decision making. Computer and Information Science, 17(1), 1-49.

Padilla- Lozano CP, Collazzo P (2022) Corporate social responsibility, green innovation and competitiveness–causality in manufacturing. Compet Rev: An Int Business J 32(7):21–39

Pachar, N., Darbari, J. D., Govindan, K., & Jha, P. C. (2022). Sustainable performance measurement of Indian retail chain using two-stage network DEA. Annals of Operations Research, 315(2), 1477–1515. https://doi.org/10.1007/s10479-021-04088-y

Paschen, U., Pitt, C., & Kietzmann, J. (2020). Artificial intelligence: Building blocks and an innovation typology. Business Horizons, 63(2), 147-155. https://doi.org/10.1016/j.bushor.2019.10.004

Phan, Vu-Dung-Van, Yung-Fu Huang, and Manh-Hoang Do. 2023a. Exploring the effect of cognitive factors and e-social interactions on the green purchase intention: Evidence from a transitional economy. Young Consumers 1–19. [CrossRef]

Qader, G.; Junaid, M.; Abbas, Q.; Mubarik, M.S. Industry 4.0 enables supply chain resilience and supply chain performance. Technol. Forecast. Soc. Change 2022, 185, 122026. [CrossRef]

Rasheed et al , COVID-19 pandemic: A case study. The International Journal of Logistics Management, 34, 389. https://doi.org/10.1108/IJLM-04-2021- 0232

S. Gautam and M. Lal, "Analysing competitiveness and trade performance: evidence from Indian textile industry and its select competitors," Transnational Corporations Review, vol. 12, no. 4, pp. 406–424, Dec. 2020, doi: 10.1080/19186444.2020.1768794.

Sturm, Sebastian, Nils Ole Hohenstein, and Evi Hartmann. 2023. Linking entrepreneurial orientation and supply chain resilience to strengthen business performance: An empirical analysis. International Journal of Operations and Production Management 43: 1357–86. [CrossRef]

Tabbakh, A., Al Amin, L., Islam, M., Mahmud, G. I., Chowdhury, I. K., & Mukta, M. S. H. (2024). Towards sustainable AI: a comprehensive framework for Green AI. Discover Sustainability, 5(1), 408.

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and micro foundations of (sustainable) enterprise performance. Strategic management journal, 28(13), 1319-1350.

Uzoka, A., Cadet, E., & Ojukwu, P. U. (2024). Applying artificial intelligence in Cybersecurity to enhance threat detection, response, and risk management. Computer Science & IT Research Journal, 5, 2511-2538, October 2024. DOI: 10.51594/csitrj.v5i10.1677: www.fepbl.com/index.php/csitrj

Umana, A.U., Garba, B.M.P., & Audu, A.J. (2024). Sustainable business development in resource-intensive industries: Balancing profitability and environmental compliance. International Journal of Multidisciplinary Research Updates, 8(2), 64-78. doi: 10.53430/ijmru.2024.8.2.0054.

Vahdat, S. (2022). The role of IT-based technologies on the management of human resources in the COVID-19 era. Kybernetes, 51(6), 2065-2088.

Vishnu, C.R.& Krishnan, L.R.K. (2024). Importance and Implications of India's National Logistics Policy. Georgetown journal of international affairs, 2(3), 1-13

Wu, H., Liu, J., & Liang, B. (2024). AI-driven supply chain transformation in Industry 5.0: Enhancing resilience and sustainability. Journal of the Knowledge Economy, 1-43.

Wamba, S. F., & Akter, S. (2019). Understanding supply chain analytics capabilities and agility for data-rich environments. International Journal of Operations & Production Management, 39(6/7/8), 887–912