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The moderating effect of strategic momentum on the relationship between big data analytics capabilities and lean supply chain practices

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The present study aimed to explore the moderating role of strategic momentum in the relationship between big data analytics capabilities and lean supply chain practices in eight textile companies in Jordan. A quantitative research methodology incorporating a cross-sectional design was adopted to gather questionnaire-based responses to investigate the hypotheses put forth. The sample for the study consisted of 116 respondents, who were selected from a diverse group of senior executives from various fields, including IT, logistics, marketing, production, and strategic planning. These individuals possessed both knowledge and skills in data and business analytics disciplines. The data were analyzed utilizing SPSS version 28 and the PROCESS v3.5 macro developed by Andrew F. Hayes. The results revealed that the strategic momentum positively moderates the relationship between big data analytics capabilities and lean supply chain practices. These findings indicate that high levels of strategic momentum allow an organization to increase resources and focus on investing in and developing its big data capabilities, thereby supporting the implementation of lean supply chain practices.

1. Introduction

In today's fast-paced and ever-changing business landscape, organizations must rapidly adapt to changes in customer demand, industry trends, and other external factors that impact their supply chain. The ability to respond to these changes quickly and efficiently is crucial for an organization's success and competitiveness (Shokoohyar et al., 2022; Shokouhyar et al., 2020). This is where the power of lean supply chain practices comes into play. These practices aim to eliminate waste and streamline operations, reduce lead times, decrease inventory levels, improve quality, and increase overall efficiency (Núñez-Merino et al., 2022). By embracing lean supply chain practices, organizations can become more flexible and better equipped to adapt to changes in the market (Yala, 2016). With customers demanding fast, reliable, and cost-effective products and services, the importance of lean supply chain practices cannot be overstated (Núñez-Merino et al., 2022). Organizations that fail to adopt these practices risk falling behind their competitors and losing market share (Rossini et al., 2022). However, adopting lean supply chain practices is often accompanied by various challenges, including an absence of collaboration, poor data quality, and a lack of understanding of the processes involved (Sonar et al., 2022). These challenges can make implementing lean supply chain practices a daunting task for organizations. Big data analytics capabilities have emerged as a solution to these challenges by providing organizations with valuable insights derived from analyzing a vast amount of data generated from various sources, including suppliers, customers, producers, distributors, transporters, and others (Awwad et al., 2018; Choi et al., 2018; Srinivasan & Swink, 2018; Tamym et al., 2020). These insights allow organizations to gain a more comprehensive

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understanding of customer demand, production processes, and supply chain logistics, and this understanding can then be utilized to optimize inventory management, forecasting, and transportation planning, leading to cost savings and an increase in customer satisfaction (Nguyen et al., 2018; Sibanda & Ramrathan, 2017; Tiwari et al., 2018). Furthermore, integrating the data from various sources can improve the accuracy of the information, and sharing data and insights among departments and suppliers promotes improved collaboration and communication (Aliahmadi et al., 2022).

Despite the increasing interest in using advanced technology tools such as big data analytics (BDACs) to support the implementation of a lean supply chain (LSC) strategy, research on the impact of these tools on LSC practices has produced conflicting results. Some studies, such as those conducted by Al-Nimer (2019) and Chiarini and Vagnoni (2017), have found no significant relationship between new information technology capabilities and lean supply chain practices. Conversely, other research studies by Rashwan (2022), Raut et al. (2021), and Wei et al. (2022) have demonstrated that BDACs have a positive impact on LSC strategy and practices. However, adopting BDACs alone is insufficient for implementing lean supply chain practices. The shift to an LSC strategy often requires a change in organization strategy, the allocation of resources, and a robust change-based strategic momentum (Daud & Zailani, 2011; Saudi et al., 2019), because the relationship between BDACs and LSC practices is not always straightforward, as it depends on various contextual factors (Sousa & Voss, 2008).
Strategic momentum (SM) is one of the key contextual factors that can serve as enablers for implementing LSC practices because it demonstrates the organization's strength, speed, and ability to adopt new approaches and technologies (Opdenakker & Cuypers, 2019). Furthermore, strategic momentum represents the dedication and effort levels that top-level decision-makers are willing to exert when the organization adopts new practices (Dutton & Duncan, 1987). Thus, to truly reap the benefits of lean supply chain management, organizations must have a robust strategic momentum that allows them to identify the level of commitment, effort, and technology required to implement the LSC strategy. However, without the right strategic momentum level, organizations may struggle to adopt LSC practices effectively and remain competitive (Abdulkareem, 2022). In this regard, we propose that organizations can more effectively translate the new insights acquired from BDACs when they own high levels of change-based strategic momentum. Further, companies with a high strategic momentum level are better equipped to adapt to changes (Opdenakker & Cuypers, 2019) in customer demand, industry trends, and other factors that impact their supply chain. On the other hand, strategic momentum enables companies to adopt new technologies smoothly (Dutton & Duncan, 1987) like big data analytics, which helps them gain a deeper understanding of their supply chain and make data-driven decisions (Opdenakker & Cuypers, 2019), leading to even more efficient and effective lean supply chain practices. This is why understanding the interaction effect of strategic momentum and BDACs on LSC practices is of critical significance for organizations looking to optimize their supply chain management practices in today's technology-driven landscape. But how exactly does strategic momentum moderate the relationship between big data analytics and lean supply chain management? That is the question at the heart of this study. However, little is known about the impact of strategic momentum on the relationship between big data analytics capabilities and lean supply chain practices. Previous studies have focused on the direct effects of BDACs on LSC practices and have overlooked the influence of contextual factors (Eckstein et al., 2015), such as strategic momentum, on this relationship. Further, the concept of strategic momentum, or consistency and persistence in a firm's strategic actions, has received little attention in the supply chain literature; and its potential moderating effect on the relationship between big data analytics and lean supply chain management is unknown. More research is needed to understand how strategic momentum can play a critical role in this relationship in various industries and contexts. This study contributes to the literature by addressing a gap in understanding the role of strategic momentum in the relationship between BDACs and LSC practices. The study aims to fill this gap by exploring the moderating effect of strategic momentum on the relationship between BDACs and LSC practices, providing a deeper understanding of this relationship. This study sheds light on a previously overlooked aspect of the relationship between BDACs and LSC practices and presents new insights for scholars and practitioners in the field.

2. Literature review and Hypotheses development

2.1 Big data analytics capabilities

Big data encompasses a vast array of information assets characterized by their high "volume, velocity, and variety," as identified by Awwad et al. (2018). To effectively leverage these information assets to enhance decision-making, advanced and economically viable processing techniques are needed. The sheer magnitude of big data necessitates the utilization of unconventional analysis methods to uncover meaningful patterns and glean insightful information, as emphasized by Aliahmadi et al. (2022). Laney (2001) introduced the first three defining traits of big data, commonly referred to as the "3Vs". Subsequently, Shokouhyar et al. (2020) and Awwad et al. (2018) added two additional characteristics, resulting in a total of five, referred to as the "5Vs: volume, value, variety, velocity, and veracity". The volume of data refers to its sheer quantity, value refers to its utility, variety encompasses the types of data, whether structured or unstructured, velocity represents the pace at which data is collected, and veracity refers to the quality of the data obtained (Mandal, 2019; Rashwan, 2022; Zhang et al., 2022). There are three levels of big data analytics include "prescriptive, predictive, and descriptive analytics", and each one concerns different processes in the organization. For instance, "prescriptive analytics finds application data from manufacturing, logistics, transportation, and warehousing", while predictive analytics focuses on procurement, risk assessment and management, and forecasting (Awwad et al., 2018). However, descriptive analytics develop useful summary reports based on historical data (Nguyen et al., 2018).

Big Data Analytics Capabilities (BDACs) refer to an organization's capacity to effectively collect, process, and interpret vast amounts of data (Gupta & George, 2016; Wamba et al., 2017). These capabilities include using sophisticated analytical methods, such as data mining, machine learning algorithms, and statistical analysis techniques (Rezaei et al., 2019; Shokouhyar et al., 2020), to extract meaningful insights from the data (Awwad et al., 2018). The primary objective of BDAC is to translate the data into actionable information (Mikalef et al., 2019) that can inform decision-making and improve organizational performance and competitiveness (Aliahmadi et al., 2022; Kache & Seuring, 2017). For instance, "the availability of large amounts of data from various sources", such as social media, transactional data, and sensor data, provides organizations with a wealth of information about their customers and market conditions; by analyzing this data, organizations can gain insights into customer preferences, behaviors, and trends, which can inform decision-making and improve customer engagement (Ziora, 2015). However, the development of BDAC requires integrating several essential elements, including technical know-how, a robust data management system, and suitable software tools to handle large datasets. Without these elements, an organization may struggle to effectively, analyze big data and derive meaningful insights (Sabharwal & Miah., 2021).

2.2 Strategic momentum

Strategic momentum refers to the continued and determined adherence to a specific strategic approach by social entities such as individuals, groups, departments, or countries (Aken van & Opdenakker, 2005, p. 5). The theory of strategic momentum was first proposed by Aken van and Opdenakker in 2006, with subsequent reviews conducted by Opdenakker and Cuypers (2008) and Opdenakker (2012). The concept of momentum was derived from physics, representing the product of a body's mass and velocity. In management, the term was introduced in 1980 by Miller and Friesen, who used it informally to refer to the driving force and sustained change in organizational characteristics. In 1982, Miller and Friesen applied the concept of momentum to product innovation, specifically in entrepreneurial firms with a consistent drive towards innovation versus conservative firms lacking this drive. In 1992, Amburgey and Miner introduced the concept of strategic momentum, which they defined as the continuation of a strategic course of action due to the inclination to maintain or increase the direction of past strategic efforts in current strategic behavior. They identified three types of momentum: repetitive momentum, which refers to the repetition of previous strategic actions; positional momentum, which refers to strategic activities that maintain the current position; and contextual momentum, which refers to the influence of organizational structure and culture on strategic actions. Jansen (2004) concurred with this definition but proposed an additional distinction between stasis-based momentum, which pertains to the energy invested in maintaining the current trajectory of organizational action, and change-based momentum, which refers to the capacity dedicated to pursuing new courses of action. According to Dutton and Duncan (1987), "momentum for change" represents the degree of dedication and effort that top-level decision-makers are willing to exert in adopting new practices (p. 286).

Opdenakker (2012) proposed a strategic momentum model with three dimensions: "insight, collective commitment, and empowerment". The insight dimension refers to individuals' ability to make decisions that contribute to preparing and formulating the strategic vision. The collective commitment dimension involves the interactions between individuals and groups toward shared organizational goals, values, and tasks. The empowerment dimension includes enhancing the power of individuals and groups to make decisions and access resources. Turner et al. (2013) expanded upon this model by considering the temporal consistency of ongoing innovation in organizations having incentives for steady-state patterns. This was later defined as "the authority, strength, and speed of organizational movement", or the organization's ability to maintain its development and power over time based on effective decision-making management that responds to the changing environment and competitive technology (Opdenakker & Cuypers, 2019). Overall, the success of organizational change, agility, and resilience may be influenced by strategic momentum (Yang, 2015), as it drives the implementation of such approaches (Kotter, 1995; Linstead & Chan, 1994) by providing the required resources, ensuring the commitment of top management, and aligning the current strategies and structures with the new ones (Miller & Friesen, 1980, 1982). Furthermore, strategic momentum has been regarded as a strategic planning tool that shapes the organization's future, mitigates neglect in the workplace (Gabr & Alabadi, 2022), produces strategic flexibility (Abdulkareem, 2022), and enhances organizational ambidexterity (Turner et al., 2013).

2.3 Lean supply chain practices

Supply chain management describes managing the flow of materials, information, and funds internally and externally between supply chain entities such as suppliers, producers, assemblers, distributors, and customers to meet stakeholder's requirements (Jørgensen & Emmitt, 2009; Chen & Paulraj, 2004). It is a method used by organizations for effective and efficient integration between the mentioned entities to minimize system cost and accomplish service needs with the right products that are suitable for distribution at the right time, at the right place (Szmelter-Jarosz et al., 2021). A lean supply chain is an approach of supply chain management aiming to optimize efficiency and minimize waste. It is based on lean manufacturing principles, which seek to eliminate waste and improve the flow of materials, information, and resources through a production process (Naim & Gosling, 2011). In lean supply chain practices, the focus is on eliminating waste in all aspects of the supply chain, including sourcing, production, transportation, and distribution (Lo & Power, 2010; Harris et al., 2010). This can involve using just-in-time production and inventory management techniques, standardizing processes, and empowering employees to identify and eliminate waste. The primary goal of a lean supply chain is to deliver value to customers while minimizing costs and maximizing efficiency (Qi et al., 2011; Qrunfleh, & Tarafdar, 2013). The concept of lean refers to a series of activities to eliminate non-value-added and non-useful operations or activities and enhance value-added operations (Wee & Wu, 2009; Singh & Pandey, 2015). Moreover, lean management or practices is the approach that helps identify waste elimination through continuous improvement based on the customer demand concerning production perfection (Buzby et al., 2002). In other words, the lean approach strives to achieve quality, efficiency, and cost reduction with fewer efforts (Sezen & Erdogan, 2009). For instance, practices of lean principles aim to enhance the performance of organizations by eliminating waste and introducing human resources to benefit from their capabilities (Antunes et al., 2013; Nimeh et al., 2018), improve quality and productivity (Hu et al., 2015), meeting customers' requirements (Prajogo et al., 2016), in addition to collaboration with suppliers (Drohomeretski et al., 2014). The lean approach, which originated from the Toyota Production System, is focused mainly on eliminating various forms of waste, including waiting, overproduction, conveyance, over-processing, excess inventory, defects, movement, and unused employee creativity (Ugochukwu, 2012; Liker, 2004). In essence, it promotes the efficient use of resources (Kimari & Muli, 2022). When applied the concept of lean to the entire supply chain, rather than just individual organizations, it is known as lean supply chain management (Agus & Hajinoor, 2012; Núñez-Merino et al., 2022). This management strategy aims to increase effectiveness, reduce costs and delivery times, and ultimately provide high value with minimal waste (Farah, 2015) within the functional level of the organization (Kimari & Muli, 2022). Several practices of lean supply chain management have been identified in the literature, as shown in table (1).

Table 1
Lean supply chain practices

Author (S)	Lean supply chain practices
Awan et al. (2022)	"Process and equipment, planning and control, HR practices, product design, supplier relationships, and customer relationships."
Kimari & Muli (2022)	"Just-in-time procurement, six sigma, and total quality management as dimensions of the lean supply chain approach."
Mahmoud, Labib, & Noour (2020)	"Value stream analysis, supplier relationship management, lean shop floor, customer relationship management, just-in-time, and information technology management."
Al-Tit (2016)	"Waste elimination, manufacture-supplier relationship, cost reduction, and manufacture-customer relationship."
Yala (2016)	"Demand management, waste management, cross-enterprise collaboration, cultural practices, and standardization."
Farah (2015)	"Demand management, waste management, standardization, and behavioral practices."
Mutua (2015)	"Lean transportation, lean procurement, lean transformation, lean supplier, lean customer, and lean warehousing."
Mukunju (2014)	"Customer relationship management, customer service management, demand management strategy."

2. Hypotheses development

Making informed decisions in operations management is crucial, but it can be challenging in the era of big data. By effectively managing big data analytics and developing staff capabilities in its use, companies can utilize big data to support lean supply chain management practices (Bag et al., 2020). Big data analytics has been recognized as a critical factor in improving supply chain operations (Bag et al., 2023; Belhadi et al., 2020). Research has shown that the capabilities of big data analytics can enhance lean supply chain strategy through cost efficiency and reduction (Tseng et al., 2019) and maximizing resource employment, and eliminating waste (Gupta & George, 2016). Additionally, big data analytics can help in responding more quickly to customer demands by providing internal and external information about various facets of supply chain activities (Kamble & Gunasekaran, 2020) and enhancing coordination among various supply chain parties (Tseng et al., 2019). Several studies (Rashwan, 2022; Raut et al., 2021; Wei et al., 2022) have found a positive relationship between the analytics capabilities for big data and lean supply chain strategy and practices. Other studies, like Swafford et al. (2008) and Srinivasan and Swink (2018), have also highlighted the importance of information technology and the capabilities of big data analytics in making the supply chain more flexible and proactive. Gunasekaran et al. (2017) noted that organizations that invest in building supply chain resilience are also more likely to invest in building their big data analytics capabilities, indicating that the flexibility of the supply chain and the analytical capabilities of big data are complementary. Thus:

H_1: *Big data analytics capabilities have a positive effect on lean supply chain management practices.*

On the other hand, strategic momentum can affect lean supply chain practices and strategy in several ways. Firstly, it enables organizations to respond quickly and efficiently to changes in demand and market conditions; this allows them to make necessary adjustments to their supply chain operations promptly (Miller & Friesen, 1980, 1982), which can improve efficiency and reduce waste. Additionally, strategic momentum can help organizations identify areas for improvement in their supply chain operations and make necessary changes to match supply and demand (Abdulkareem, 2022; Turner et al., 2013), leading to improved efficiency and effectiveness. Thus:

H_2: *Strategic momentum has a positive effect on lean supply chain management practices.*

The capabilities of big data analytics, or the ability of an organization to capture and analyze large amounts of data to generate insights, can affect strategic momentum in several ways. One way is by providing organizations with a more comprehensive understanding of their operations and the market, allowing them to make more informed decisions and respond more quickly to changes in demand (Miller & Friesen, 1980). Additionally, BDAC can help organizations identify areas for improvement and make more efficient use of resources (Miller & Friesen, 1982), which leads to more effective and agile supply chain operations. Furthermore, BDAC can help organizations identify patterns and trends that can help them anticipate and respond to changes in the market more effectively (Opdenakker & Cuypers, 2019). Thus, BDAC can enable an organization to be more proactive and make quicker decisions (Turner et al., 2013). In summary, the capability of big data analytics enables organizations to identify opportunities for improvement, anticipate market changes, and respond more effectively, which all can lead to improved strategic momentum (Opdenakker & Cuypers, 2019; Turner et al., 2013). Thus:

H$_3$: *Big data analytics capabilities have a positive effect on strategic momentum.*

Strategic momentum presence can enhance the relationship between BDAC and LSC practices. This is because strategic momentum allows organizations to efficiently implement the insights generated through BDAC (Miller & Friesen, 1980, 1982) to improve their LSC practices, thereby leveraging BDAC to enhance LSC. Research has also demonstrated that organizations that react swiftly to market changes are more likely to implement LSC practices successfully (Mrugalska & Ahmed, 2021). Strategic momentum enables organizations to make necessary changes to align supply and demand (Cox & Chicksand, 2005), resulting in improved efficiency in supply chain operations and an enhanced relationship between BDAC and LSC. In conclusion, strategic momentum allows organizations to respond quickly to market changes (Vonderembse et al., 2006) and efficiently implement insights (Agarwal et al., 2007; Carvalho & Cruz-Machado, 2011) generated through BDAC to improve LSC practices. Thus:

H$_4$: Strategic momentum positively moderates the relationship between big data analytics capabilities and lean supply chain management practices.

3. Research model

Fig. 1. represents the research model.

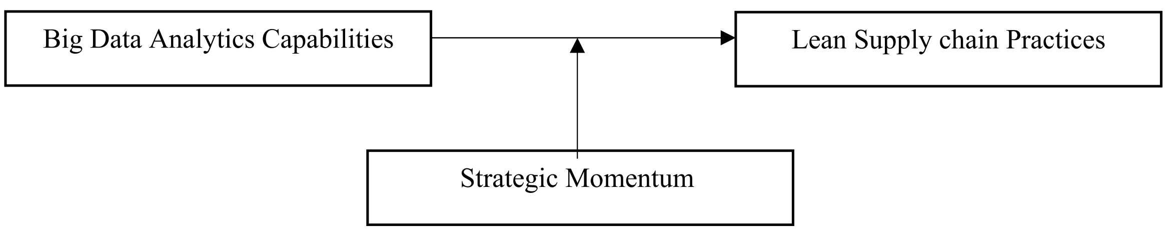

Fig. 1. The research model (Source: prepared by the authors)

4. Research Methodology

This study employed a descriptive and quantitative approach. The theoretical framework was developed by reviewing previous literature about strategic momentum, big data analytics capabilities, and lean supply chain practices subjects. In a quantitative research methodology, a cross-sectional design was adopted to gather questionnaire-based responses to investigate the hypotheses put forth. The questionnaire was distributed to a random sample of 116 respondents, comprising senior executives from various fields, including IT, logistics, marketing, production, and strategic planning, who possessed both knowledge and skills in data and business analytics disciplines at eight textile manufacturing companies in Jordan, through an online platform. The collected data was analyzed using descriptive and inferential statistics. “Descriptive statistics were used to summarize the data and provide an overview of the variables,” while “inferential statistics were used to test the hypotheses.” To test the study hypotheses, simple linear regression analysis and moderation analysis was conducted to examine the moderating effect of strategic momentum on the relationship between big data analytics capabilities and lean supply chain practices. The statistical software SPSS v. 28 and PROCESS v3.5 macro by Andrew F. Hayes were used for the data analysis.

4.1 Sample characteristics

Of the study sample, 66 (57%) were male, 52 (45%) had a bachelor’s degree, and the majority of respondents (53%) had between 10 and less than 15 years of experience in their current jobs.

4.2 Instrument

A questionnaire based on a five-point Likert scale was developed to measure the variables of the research. The capabilities of big data analytics were assessed using a five-item scale adopted from the studies of Srinivasan and Swink (2018) and Akter et al. (2016). Strategic momentum was measured using a six-item scale based on the work of Jansen (2004). Lean supply chain practices were evaluated using a nineteen-item scale developed based on the work of Yala (2016) and Farah (2015).

4.3 Reliability and validity

To ensure the reliability and validity of the study instrument, we performed a series of tests. We used Cronbach's alpha to assess internal consistency, average extracted variance to verify convergent validity, and the Fornell-Larcker criterion to check discriminant validity. As shown in tables (2 & 3), the results of these tests indicate that the study instrument has satisfactory reliability, as Cronbach's alpha values are above 0.70. In addition, the study instrument demonstrates convergent validity, as the average extracted variance values are above 0.50, and discriminant validity, as the "square root of the average variance extracted by a construct is greater than the correlation between the construct and any other construct." (Hair et al., 2021).

Table 2
Instrument reliability and convergent validity

Construct	No. of items	Cronbach's alpha	Average Extracted Variance (AVE)
Big data analytics capabilities	5	0.827	0.63
Strategic momentum	6	0.851	0.68
Lean supply chain	19	0.833	0.71

Table 3
Instrument discriminant validity

Construct	Big data analytics capabilities	Strategic momentum	Lean supply chain
Big data analytics capabilities	**0.793**		
Strategic momentum	0.776	**0.824**	
Lean supply chain	0.603	0.730	**0.842**

5. Data analysis and hypothesis testing

5.1 Descriptive statistics

Table 4 presents the descriptive statistics for the data collected from the respondents on their companies' BDAC, LSC practices, and SM. The mean score for capabilities of big data analytics is 3.58, with a standard deviation of 0.855, indicating that the utilization of BDAC in companies is generally medium. The mean score for lean supply chain practices is 3.78, with a standard deviation of 0.74, indicating that the companies typically apply LSC practices highly. The mean score for strategic momentum is 3.82, with a standard deviation of 0.69, which means that the companies commonly employ the strategic momentum approach widely.

Table 4
Descriptive Statistics for Lean Supply Chain Practices, Big Data Analytics Capabilities, and Strategic Momentum

Measure	Mean	Standard Deviation
Big Data Analytics Capabilities	3.58	0.855
Lean Supply Chain Practices	3.78	0.74
Strategic Momentum	3.82	0.69

5.2 Hypothesis testing

Before testing the hypotheses of our study, we thoroughly examined the data to confirm that it was normally distributed. We used the values of Skewness and Kurtosis to assess the normal distribution. As shown in table (5), our analysis revealed that the "Skewness and Kurtosis values were within the range of -2 and + 2, indicating a normal distribution" (Sekaran & Bougie, 2016).

Table 5
Results of normal distribution

Construct	Skewness	Kurtosis
Big data analytics capabilities	- 0.81	0.23
Strategic momentum	- 0.74	0.21
Lean supply chain	- 1.31	2.20

After confirming the normal distribution of the data, simple linear regression using SPSS v. 28 software was carried out to test hypotheses H1, H2, and H3. The results of a statistical analysis that examines the relationship between the independent variable, big data analytics capabilities (BDAC), and the dependent variable, lean supply chain practices (LSC), are presented in Table 6. The R and R-squared values indicate a moderate positive correlation (0.603) between the two variables, with BDAC explaining 36.4% of the variation in LSC practices. The F-value (65.30) and significance level (p = 0.00) indicate that the model is statistically significant. The beta coefficient (0.603), t-value (8.081), and significance level (p = 0.00) suggest that BDAC has a statistically significant positive relationship with LSC practices, indicating that an increase in BDAC is associated with an increase in lean supply chain practices. Therefore, these results support the hypothesis that "Big data analytics capabilities have a positive effect on lean supply chain management practices."

Table 6
Results of first hypothesis testing

Outcome variable: lean supply chain practices			
Model Summary			
R	R-sq	F	Sig.
0.603	0.364	65.30	0.00
Model			
	Beta	t	Sig.
Constant		15.128	0.00
Big data analytics capabilities	0.603	8.081	0.00

Table 7 presents the results of a statistical analysis that examines the relationship between the independent variable, strategic momentum (SM), and the dependent variable, lean supply chain practices (LSC). The R and R-squared values indicate a strong positive correlation (0.730) between the two variables, with strategic momentum explaining 53.3% of the variation in LSC practices. The F-value (129.98) and significance level ($p = 0.00$) indicate that the model is statistically significant. The beta coefficient (0.730), t-value (11.401), and significance level ($p = 0.00$) suggest that strategic momentum has a statistically significant positive relationship with LSC practices, indicating that an increase in strategic momentum approach is associated with an increase in lean supply chain practices. Therefore, these results support the hypothesis that "Strategic momentum has a positive effect on lean supply chain management practices."

Table 7
Results of second hypothesis testing

Outcome variable: lean supply chain practices			
Model Summary			
R	R-sq	F	Sig.
0.730	0.533	129.98	0.00
Model			
	Beta	t	Sig.
Constant		4.681	0.00
Strategic momentum	0.730	11.401	0.00

Table 8 presents the results of a statistical analysis that examines the relationship between the independent variable, big data analytics capabilities (BDAC), and the dependent variable, strategic momentum (SM). The R and R-squared values indicate a strong positive correlation (0.776) between the two variables, with BDAC explaining 60.2% of the variation in strategic momentum. The F-value (172.38) and significance level ($p = 0.00$) indicate that the model is statistically significant. The beta coefficient (0.776), t-value (13.130), and significance level ($p = 0.00$) suggest that BDAC has a statistically significant positive relationship with strategic momentum, indicating that an increase in BDAC is associated with an increase in strategic momentum. Therefore, these results support the hypothesis that "Big data analytics capabilities have a positive effect on strategic momentum."

Table 8
Results of third hypothesis testing

Outcome variable: strategic momentum			
Model Summary			
R	R-sq	F	Sig.
0.776	0.602	172.38	0.00
Model			
	Beta	t	Sig.
Constant		15.361	0.00
Big data analytics capabilities	0.776	13.130	0.00

A moderation analysis was conducted using the PROCESS v3.5 macro by Andrew F. Hayes, specifically utilizing model number 1, in order to test the fourth hypothesis. Table 9 presents the results of a statistical analysis that examines the moderating effect of strategic momentum (SM) on the relationship between big data analytics capabilities (BDAC) and lean supply chain practices (LSC). The analysis reveals that there is an interaction effect between BDAC and SM on LSC practices, with the effect of BDAC increasing as SM increases. The table also presents the conditional effects of BDAC on LSC practices at various levels of SM, indicating that as the level of SM increases, the effect of BDAC on LSC practices also increases. In summary, the results demonstrate that the relationship between BDAC and LSC practices is moderated by SM, thus supporting the hypothesis that "Strategic momentum positively moderates the relationship between big data analytics capabilities and lean supply chain management practices."

Table 9
Moderation analysis

Outcome variable: lean supply chain						
Model Summary						
R	R-sq	MSE	F	df1	df2	P
0.63	0.40	0.043	24.91	3.00	112.00	0.00
Model						
	Coeff	Se	t	P	LLCI	ULCI
Constant	0.15	1.02	0.29	0.91	-1.95	1.33
Big data analytics capabilities	1.02	0.23	3.41	0.00	0.32	1.05
Strategic momentum	1.07	0.26	3.74	0.00	0.41	1.07
Big data analytics capabilities X strategic momentum	0.61	0.24	2.56	0.01	0.13	1.09
"Conditional effects of the focal predictor at values of the moderator (s)":						
Strategic momentum	Effect	Se	t	P	LLCI	ULCI
3.49	0.18	0.11	3.70	0.003	0.20	0.67
3.69	0.25	0.03	4.89	0.001	0.15	0.38
4.20	0.44	0.05	5.720	0.000	0.19	0.33

6. Results discussion

The present study investigated the moderating effect of strategic momentum on the relationship between big data analytics capabilities and lean supply chain practices. The study reached a set of results. ***First***, the findings revealed that the utilization of big data analytics capabilities has a positive impact on lean supply chain practices. This result is consistent with the literature (Rashwan, 2022; Raut et al., 2021; Wei et al., 2022). Companies can employ predictive modeling techniques to forecast demand, discern patterns, and make more accurate decisions regarding inventory levels, production schedules, and transportation routes by analyzing large quantities of historical data, which leads to a reduction in costs associated with overproduction and inventory carrying costs, as well as an optimization of logistics and transportation routes (Kamble & Gunasekaran, 2020). In addition, the collection and analysis of sensor data from various sources allow organizations to gain real-time visibility into their supply chain operations; as a result, this facilitates the identification of bottlenecks, tracking of inventory levels, and monitoring of performance metrics, ultimately leading to improved efficiency and reduced waste (Awwad et al., 2018; Choi et al., 2018; Srinivasan & Swink, 2018; Tamym et al., 2020).

Companies also can identify opportunities to optimize their supply chain operations by analyzing data from multiple sources (Bag et al., 2020). For instance, companies can identify suppliers that are not meeting their service level agreements and take corrective action to improve performance or seek new suppliers through the analysis of data about supplier performance (Belhadi et al., 2020). As well companies can pinpoint the root causes of supply chain issues and take action to eliminate waste by analyzing data from multiple sources (Mandal, 2019). Furthermore, companies can collaborate to optimize their supply chains, resulting in reduced costs, improved efficiency, and elimination of waste through the reduction of duplicated efforts, enhanced communication and coordination, and identification of opportunities for shared savings by sharing data with suppliers and partners (Aliahmadi et al., 2022; Tseng et al., 2019).

Second, the findings revealed that strategic momentum positively affects lean supply chain practices. Utilizing the strategic momentum approach helps decrease costs, increase efficiency, and reduce waste in the supply chain operations in several ways. It mitigates resistance toward change by instilling a sense of urgency and commitment toward implementing lean principles (Dutton & Duncan, 1987; Opdenakker, 2012). Additionally, strategic momentum fosters a culture of learning and innovation, thereby enhancing the organization's ability to learn from experiences and adapt to changes in the external environment (Turner et al., 2013).
Moreover, strategic momentum facilitates the implementation of lean supply chain practices by streamlining processes and aligning resources and capabilities (Opdenakker & Cuypers, 2019). In addition, it promotes a culture of continuous improvement (Turner et al., 2013), identifying opportunities for cost reduction, increased efficiency, and waste elimination. Lastly, strategic momentum enables the creation of a more adaptable supply chain capable of quickly responding to changes in demand (Miller & Friesen, 1980, 1982).

Third, the findings revealed that the utilization of big data analytics capabilities has a positive impact on strategic momentum. Studies have shown that organizations that employ big data analytics are better equipped to make data-driven decisions and drive strategic momentum (Kamble & Gunasekaran, 2020). Big data analytics enhance organizations' ability to optimize their operations (Rashwan, 2022); by analyzing large amounts of data on their operations, organizations can identify areas where improvements can be made (Miller & Friesen, 1980, 1982), leading to activating strategic momentum. In addition, big data analytics assists organizations in gaining a better understanding of their competitive environment; by analyzing large amounts of data on competitors, industry trends, and customer behavior, organizations can gain a complete understanding of their market and improve their position (Miller & Friesen, 1980, 1982), which in turn increasing strategic momentum.

Lastly, big data analytics can help organizations adapt to changes in the external environment. By analyzing large amounts of data on market conditions, customer preferences, and other factors that may affect the organization, organizations can better anticipate and respond to changes, becoming more agile by increasing strategic momentum levels (Opdenakker & Cuypers, 2019).

Finally, the results of this study have demonstrated the pivotal role that strategic momentum plays in enhancing the relationship between big data analytics capabilities and lean supply chain practices. Big data analytics capabilities, when integrated into supply chain activities such as supplier performance evaluation, demand pattern analysis, and logistics management, provide organizations with valuable insights that can help identify bottlenecks, inefficiencies, and areas of waste (Bag et al., 2020; Kache & Seuring, 2017; Mandal, 2019). To leverage these insights and realize meaningful improvements, organizations must transform them into actionable steps (Nguyen et al., 2018; Núñez-Merino et al., 2022). This is where high levels of strategic momentum become indispensable. Strategic momentum serves as a driving force, providing organizations with the necessary resources, effort, commitment, power, speed, and flexibility to bring about change (Aken van & Opdenakker, 2006; Amburgey & Miner, 1992; Jansen, 2004; Opdenakker, 2012; Opdenakker & Cuypers, 2008). In contrast, organizations with weak or stagnant strategic momentum may struggle to invest in big data capabilities, lacking the necessary focus and resources (Turner et al., 2013). In such cases, the organization may be unable to effectively utilize big data analytics to optimize its supply chain, putting it at a disadvantage compared to organizations with stronger strategic momentum.

7. Conclusion

The results of this study provide valuable insights into the relationship between big data analytics capabilities, strategic momentum, and lean supply chain practices. The statistical analyses conducted in this study revealed that there is a positive correlation between big data analytics capabilities and lean supply chain practices, strategic momentum and lean supply chain practices, and big data analytics capabilities and strategic momentum. Additionally, the results of the moderation analysis indicate that the relationship between big data analytics capabilities and lean supply chain practices is moderated by strategic momentum, with the effect of big data analytics capabilities on lean supply chain practices increasing as strategic momentum increases. This research adds to the existing literature by highlighting the importance of considering the interplay between big data analytics capabilities, strategic momentum, and lean supply chain practices to achieve optimal operational performance.

8. Implications and future research

The current study presents a novel examination of the relationships between big data analytics capabilities (BDAC), strategic momentum (SM), and lean supply chain practices (LSC). The study findings have important implications for organizations seeking to improve their LSC practices.

Firstly, the findings suggest that investing in BDAC can enhance LSC practices. The moderate positive correlation between BDAC and LSC practices indicates that organizations with strong BDAC will have superior LSC practices; this highlights the importance of investing in technologies such as data warehousing, data mining, and machine learning, as well as hiring and training employees with the necessary skills to utilize these technologies.

Secondly, the study emphasizes the crucial role of SM in enhancing LSC practices. The strong positive correlation between SM and LSC practices suggests that organizations with clear and consistent direction and the ability to adapt quickly to changes will have superior LSC practices; this implies the importance of organizations creating and implementing strategic plans aligned with their goals and objectives, as well as fostering a culture of continuous improvement and adaptability.
In conclusion, this study provides novel insights into the relationships between BDAC, SM, and LSC practices, and the findings have important implications for organizations seeking to enhance their LSC practices. By investing in BDAC and fostering SM, organizations can improve their LSC practices, which leads to more efficient and effective supply chain management.

On the other hand, future research can build on the findings of this study in several ways. Firstly, future research can examine the moderating effect of other variables, such as organizational culture or leadership, on the relationship between BDAC, SM, and LSC practices. Secondly, future research can investigate the underlying mechanisms that link BDAC, SM, and LSC practices. This can help organizations understand how and why these variables are related and how they can be leveraged to improve lean supply chain practices. Thirdly, future research can investigate the impact of BDAC and SM on other performance outcomes, such as operational efficiency or customer satisfaction. This can provide a more comprehensive understanding of the potential benefits of investing in BDAC and SM.

9. Study limitations

The current study has several limitations that should be considered when interpreting the findings. One limitation is the limited sample size and geographical scope of the study. The study was conducted on only eight textile manufacturing companies in Jordan, which may limit the generalizability of the findings to other industries or regions. Another limitation is the use of self-reported data from survey respondents. Self-reported data can be subject to biases, which may affect the validity of the findings. Additionally, the sample was restricted to specific functions and levels of management within the target companies, which may not represent the views and experiences of all employees in the organization. Finally, the study relied on a single source of measurement, the questionnaire, which may not capture all aspects of the studied variables and may limit the validity of the findings.

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Appendix (A) Study instrument

Big Data Analytics capabilities

1. The firm use advanced tools (like optimization/regression/simulation) for data analysis.
2. The firm use data gathered from multiple sources (like company reports, tweets, Instagram, YouTube) for data analysis.
3. The firm use data visualization techniques to assist decision makers in understanding complex information extracted from large data.
4. The firm dashboards display information, which is useful for carrying out necessary diagnosis.
5. The firm have connected dashboard applications or information with the manager's communication devices.

Strategic momentum

1. The change in firm seems to have quite a bit of momentum
2. There does not seem to be any energy associated with this change
3. There is no energy propelling this change along
4. I sense quite a bit of enthusiasm associated with this change
5. This change seems to have very little momentum
6. There is very strong energy propelling this change along

Lean Supply Chain

1. The firm manages product supply and customer orders to ensure there is a match.
2. The firm always communicates its demand forecasts to all partners in the supply chain.
3. The firm make investment in collaborative demand planning
4. The firm always conduct annual or periodic demand forecasting
5. The firm continuously seeks to maintain continuous product flow
6. The firm encourages quality control activities in all its production stages
7. Materials are standardized across the supply chain to reduce complexity
8. Processes are standardized across the supply chain to reduce complexity
9. Assembly line standardized so that no unique components needed
10. Raw materials supplies and production following just in time (JIT) method
11. Value stream mapping is done to eliminate the waste in the chain
12. Expenditures keenly monitored to ensure no unnecessary costs incurred
13. The firm consistently seeks to eliminate waste while sustaining value for the customer
14. The firm groups similar parts in families to eliminate movement and queue
15. The firm has always broadened the experience of work to enhance employee needs satisfaction
16. The firm always encourages high employee participation
17. Adequate information system linkage exists with customers
18. Customer relationships are evaluated on the basis of their profitability
19. Common set of policies are shared by partners in the supply chain.