

The Role of Business Intelligence in Enhancing the Performance of Supply Chains in Jordan

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Abstract

The study problem is represented by the question: What is the role of business intelligence in enhancing the performance of supply chains in industrial companies in Jordan?. A quantitative descriptive design was used in this study to explore the role of business intelligence in improving supply chain performance in Jordan. The study sample was selected using a stratified random sample. The expected number of participants in the study is 300 participants to ensure adequate representation of industrial companies in Jordan. The results showed that there is a positive role for business intelligence in enhancing the performance of supply chains (agility, integration, efficiency, customer responsiveness) in industrial companies in Jordan. The Jordanian companies are recommended to increase their investments in enhancing the performances of supply chains by adaption of business intelligence tools and technologies. In addition, it should focus on the development of human skills through training programs, which will definitely enhance employees' capabilities to make better use of business intelligence technologies and data.

Keywords: *Business Intelligence, Performance of Supply Chains, Agility, Integration, Efficiency, Customer Responsiveness, Industrial Companies, Jordan.*

Introduction

The development of the business environment in the modern era is more competitive than in the past. The business is characterized by a short life cycle and the rapid introduction of new products with increasing customers. The group has developed fast and more effective supply chains in order to improve the performance of the organization. Almajali et al. (2023a, 2023b) notes that in today's globalized business environment, enterprises encounter considerable difficulties in maintaining competitiveness and attaining sustainable growth. A company's capacity to manage its supply chains efficiently is a critical component in its success. According to several studies (Akkermans et al., 2013; Bowersox et al., 2000; Chen & Chang, 2012), enterprises greatly benefit from supply chain integration (SCI) since it helps them to simplify their processes, cut costs, and increase their ability to respond to customer demands. On the other hand, businesses now have more chances than ever before to improve their decision-making skills and acquire a competitive edge thanks to the widespread availability of business intelligence (BI) tools and strategies. Businesses can benefit from business intelligence (BI) because it analyzes massive volumes of data from different sources to find trends, patterns, and insights that can guide their strategic decisions.

Due to companies outsourcing many of their operations and focusing on their core competencies, supply chains have grown longer and more complex, meaning that a company's success is now dependent not only on its internal operations but also on how well it manages its entire supply chain. Improving supply chain performance benefits the focal company and all other supply chain partners, so there's a need to learn more about supply chain management practices and how they affect performance. Industrial companies in Jordan are not cut off from the rest of the world; our industries face global competition just like any other. Adapting to new conditions, learning new rules, and developing methods to exploit resources in a way that will provide enduring existence in the world markets are all necessary for industries to remain in the marketplace (Al-Madi, 2017).

According to the above, the study problem is represented by the question: What is the role of business intelligence in enhancing the performance of supply chains in industrial companies in Jordan?

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Literature Review

Business Intelligence

The term "business intelligence" refers to a collection of technologies that make it possible to process, evaluate, and visualize data with the intention of comprehending, analyzing, and making decisions based on accurate information (Tavera Romero et al., 2021). According to M Alasiri & Salameh (2020), it is essentially a collection of computerized methods that enable the analysis of data to derive novel qualitative information. This information serves as the basis for making decisions that are either tactical or strategic in nature.

Achieving the goals of organizations is the primary objective of business intelligence (BI), which will be discussed further below. According to Wee et al. (2023), the scope of this project goes beyond the creation of a collection of reports and graphs that are connected to one another and interact with one another within the same system. In the end, the purpose of these reports is to direct the decision-making process of both the company and individuals toward achieving optimal performance based on the data that is available (Yiu et al., 2021). The most important aspect is that these reports provide precise responses to specific inquiries. With business intelligence, executives and managers are given the ability to gain access to real-time data and insights that can be put into action. This eliminates the need for them to rely on information technology for reports that are static and out of date. According to Shao et al. (2022), this makes it possible for businesses to be able to acquire a comprehensive and accurate understanding of their business operations.

The Performance of Supply Chains

In its most basic form, the supply chain is a sequence of activities that facilitate the exchange of materials and information between multiple organizations, from the initial supplier to the final customer (Pettit, 2018). Consequently, supply chains enable each partner in the chain to contribute value to the final product or service being provided to the customer, and these relationships are primarily based on trust in performance, with an emphasis on quality, cost, and delivery time (Al-Abbadi, 2019). Supply chain performance is a critical subject in the supply chain literature (Fatorachian & Kazemi, 2021). It is defined as the degree to which an organization can achieve its competitive objectives, as evidenced by its capacity to provide value to customers and value to the organization through its growth and financial sustainability (Al-Bataineh & Artima, 2021). Khraisat (2020) also defines supply chain performance as the degree to which supply chains comprehend customer requirements, including product availability, on-time delivery, and sufficient inventory levels. Junior and Carpinetti (2019) define supply chain performance as the actual application of forecasting measures that support decision-making in the supply chain. The performance of various business functions along the supply chain is also referred to as supply chain performance (Mandal, 2017).

Supply chain performance is critical to the organization's operation to achieve its goals (Salvatore, 2020), so that the driving force behind many developments in supply chains is the idea of high-performance excellence that drives organizations to search for new competitive advantages (Al-Mouanis, 2020). This is because supply chains and their various activities are primarily directed to achieving satisfaction, in addition to achieving competitive advantage, all in order to achieve the organization's goals (Al-Atwi, 2019). Accordingly, short- and long-term economic benefits and competitive advantages can be achieved through supply chain performance, by making the company's activities work in an integrated, effective and flexible manner internally and externally with partners, suppliers and customers involved in the supply chain (Al-Maliji, 2021).

Based on the study of (Khraisat, 2020), the study of (Al-Bataineh, 2021), and the study of (Gawankar, Kamble & Raut, 2017), the researcher identified the dimensions of supply chain performance as (supply chain agility, supply chain integration, supply chain efficiency, and customer responsiveness).

Hypothesis Development

Utilizing appropriate technologies and tools, along with well-defined processes, is essential; however, these alone are insufficient for the efficient and effective development of business intelligence products, which require relevant knowledge and information to enhance decision-making functions within the supply chain. Furthermore, certain inter- and intra-organizational cultural factors also influence the development of business intelligence products (Aunyawong et al., 2020).

Langlois & Chauvel (2017) examined the combined benefits of business intelligence and supply chain concepts while re-evaluating the conventional BI framework. The supply chain encompasses numerous data samples gathered from the initial supplier to the final customer, which the company must analyze to enhance efficiency. The authors contend that the BI function should be regarded as an extension of supply chain management, while also demonstrating the challenges of distinguishing BI from other IT-intensive processes within the organization. While Moniruzzaman et al. (2016) asserted that supply chain agility is crucial for organizations to maintain competitiveness in the contemporary dynamic business landscape. There is growing interest in implementing Business Intelligence (BI) within the context of Supply Chain Management (SCM) to enhance Supply Chain (SC) Agility. Nonetheless, there exists a paucity of research examining the contributions of BI to supply chain agility.

Jafari et al. (2022) assert that supply chain management must implement solutions to address the evolving demands of customers. The utilization of business intelligence, coupled with integration and agility, establishes a competitive advantage in the supply chain, thereby enabling the supply chain to attain a superior position within the business landscape. The findings indicate that business intelligence, integration, and agility are crucial for enhancing supply chain performance. Currently, BI exerts the most significant influence on supply chain performance. Moreover, business intelligence exerts a beneficial and substantial influence on the integration and agility of the supply chain. Integration was found to have a direct impact on supply chain agility. Jafari et al.'s (2023) findings demonstrated the significance of BI, integration, and agility in improving supply chain performance. BI has the biggest influence on supply chain performance in the interim. Furthermore, BI significantly and favorably impacts the supply chain's integration and agility. The study also discovered a direct relationship between supply chain agility and integration.

The findings of Al-Radaideh et al. (2023) indicated that BI has a positive impact on supply chain integration and organizational performance. Additionally, supply chain integration was identified as a mediator in the relationship between business intelligence and organizational performance. The research indicated that the influence of business intelligence on organizational performance is entirely mediated by supply chain integration, implying that supply chain integration is essential for improving firm performance. In today's competitive business environment, great customer experience and engagement are crucial to organizational success, according to Gadiparthi (2024). BI systems power powerful tools and methods for deep customer data analysis and management. It discusses how BI technologies are used in customer experience strategies to decipher large amounts of customer data and turn insights into business strategies. These debates focus on research relevant to customer relationship management systems, advanced analytics platforms, and data visualization software. These tools enable hyper-personalized marketing and customer service by tracking and analyzing customer behavior and preferences. BI tools can now predict what customers might want in the future using AI and machine learning, allowing companies to anticipate customer needs and improve satisfaction and loyalty.

According to the above, the hypotheses of the study are as follows:

There is a positive role for business intelligence in enhancing the performance of supply chains in industrial companies in Jordan.

There is a positive role for business intelligence in enhancing supply chain agility in industrial companies in Jordan.

There is a positive role for business intelligence in enhancing supply chain integration in industrial companies in Jordan.

There is a positive role for business intelligence in enhancing supply chain efficiency in industrial companies in Jordan.

There is a positive role for business intelligence in enhancing customer responsiveness in industrial companies in Jordan.

Methodology

Methodology is a part of any research study, as it defines the general framework through which data is collected and analyzed. In this study, which addresses the role of business intelligence in enhancing supply chain performance in Jordan, a descriptive quantitative approach will be followed. This research aims to explore the relationship between business intelligence applications and supply chain performance dimensions, such as flexibility, integration, efficiency, and customer responsiveness.

Study Design

A quantitative descriptive design was used in this study to explore the role of business intelligence in improving supply chain performance in Jordan. Data were collected using a questionnaire that included a set of questions related to independent variable (business intelligence) and dependent variable (supply chain performance) and his dimensions, and quantitative analysis was used to test the hypotheses.

The study sample was selected using a stratified random sample, and targeted industrial, commercial and service companies operating in Jordan. The sample included supply chain managers, technology managers, executives, and department supervisors, as these categories directly contribute to business intelligence applications and supply chain performance. The expected number of participants in the study is 300 participants to ensure adequate representation of industrial companies in Jordan. The sample was distributed based on demographic variables such as age, years of practical experience, gender, job title, and the sector to which the company belongs.

Study Tool

The questionnaire was built based on the literature related to business intelligence and supply chain performance. There is two main parts of questionnaire:

Demographic data: which includes age, years of experience, gender, job title, and sector.

Questions related to research variables: They are based on a five-point Likert scale to measure the degree of agreement with statements related to business intelligence and supply chain performance dimensions: (agility, integration, efficiency, and customer responsiveness)

Frequencies

The research focused on analyzing the frequencies of various demographic variables of the participants in the study. These variables included age, Years of Work Experience, gender, Job Title and job title and What sector does your company operate in. Through this examination, the researchers obtained crucial information about the characteristics of the sample. The frequency analyses were instrumental in offering a thorough understanding of the study's participants, and the data is presented in Table 1.

Table 1. Demographic Frequency Statistics

Variables	sub-groups	Frequency	Percent%
Age	25 -35 years old	87	29.0
	36-46 years old	141	47.0
	More than 47	72	24.0
	Total	300	100
Years of Work Experience	Less than five years	109	36.3
	5-11 years	126	42.0
	More than 12 years	65	21.7
	Total	300	100
Gender	Male	250	83.3
	Female	50	16.7
	Total	300	100
Job Title	Executive Officer	23	7.7
	Supervisor/Department Manager	27	9.0
	Production Manager	137	45.7
	IT Officer	87	29.0
	Supply Chain Supervisor	26	8.7
	Total	300	100
What sector does your company operate in?	Industrial	133	44.3
	Commercial	108	36.0
	Service	59	19.7
	Total	300	100

The table presents demographic frequency statistics for various sub-groups in the sample, comprising a total of 300 individuals. Among the age groups, the highest percentage of participants falls within the 36-46 years old category, accounting for 47.0% of the total. This indicates that a significant portion of the sample is in their mid-thirties to mid-forties. Conversely, the lowest representation is in the More than 47 years old category, comprising only 24.0% of the respondents, suggesting a smaller number of participants from the older age group.

Regarding work experience, the highest proportion of respondents (42.0%) have 5-11 years of experience, indicating a significant presence of mid-career professionals in the dataset. On the other hand, the Less than five years category has a frequency of 36.3%, while the More than 12 years group represents 21.7%, highlighting that fewer participants have extensive experience in the field.

When considering gender distribution, males dominate the sample, accounting for 83.3% of the respondents, while females represent only 16.7%. This numerical superiority of men in these fields may reflect the industrial work environment and jobs related to supply chains, as industrial sectors usually attract more men than women, especially in societies affected by traditions and social roles such as Jordan. Industrial jobs may require physical effort or working conditions that are unattractive to many women.

Regarding job titles, the highest percentage of participants are Production Managers, comprising 45.7% of the total. This suggests that a large portion of the sample holds operational leadership roles. IT Officers follow with 29%, highlighting the significance of technology roles. In contrast, Executive Officers and

Supervisors/Department Managers have lower representation at 7.7% and 9.0%, respectively, while Supply Chain Supervisors make up 8.7% of the total.

Concerning the sectors in which participants' companies operate, the Industrial sector has the highest frequency at 44.3%, indicating a strong representation from manufacturing or related industries. The Commercial sector follows with 36.0%, while the Service sector has the lowest representation at 19.7%, suggesting fewer respondents from service-based industries.

Description of Study Variables

Table 2 shows the mean, standard deviation (SD) and importance ranking of the study variables. The mean of the supply chain flexibility index has a mean score of 3.35 with a standard deviation of 1.31, indicating a medium level of importance. The supply chain integration has a slightly higher mean of 3.40 and a standard deviation of 1.20, which is also rated as medium importance. Meanwhile, the supply chain efficiency has a mean score of 3.21 with a standard deviation of 1.24, which also indicates a medium level of importance, and the customer responsiveness index has a mean score of 3.71 and a standard deviation of 0.67, which is rated as high importance. This highlights that organizations place great emphasis on their ability to respond quickly and effectively to customer demands, which is crucial to maintaining competitiveness in the market. Therefore, the overall mean score for all dependent variables is 3.42 with a standard deviation of 0.91, which falls within the average category. This indicates that organizations, collectively, view aspects of supply chain performance as moderately important. In contrast, the independent variable, has a mean score of 2.90 with a standard deviation of 1.06, which reflects a moderate level of importance.

Table (2). The Mean, SD And Rank Study Variables

Variables	Mean	Std. Deviation	Importance
Supply Chain Agility	3.35	1.31	medium
Supply Chain Integration	3.40	1.20	medium
Supply Chain Efficiency	3.21	1.24	medium
Customer Responsiveness	3.71	0.67	high
Dependent variable (all)	3.42	0.91	medium
Independent variable (Business intelligence)	2.90	1.06	medium

Normality Testing

The normality of the study variables was evaluated using skewness and kurtosis, which are essential in determining the suitability of parametric statistical analyses. According to Kim (2013), skewness values within the range of ± 2.00 and kurtosis values within ± 7.00 suggest no significant concerns regarding normality. The results in Table (3) confirm that all variables in the study business Intelligence and the four dimensions of supply chain performance (agility, integration, efficiency, and customer responsiveness) exhibited skewness and kurtosis values well within the acceptable range.

Specifically, the skewness values ranged from -0.158 to 0.171, and the kurtosis values ranged from -1.271 to -0.751, indicating a normal distribution of the data. The skewness and kurtosis statistics fall within the recommended thresholds (± 2.00 for skewness and ± 7.00 for kurtosis), suggesting that the distribution of these variables does not deviate significantly from normality.

As such, the assumption of normality is met, validating the use of parametric statistical tests in this study. This ensures the reliability and appropriateness of the regression analyses and hypothesis testing that will be conducted on the relationship between business intelligence and supply chain performance.

Table (3). Normality Test

Variables	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Dependent (all)	0.027	0.176	-1.145	0.351
Supply Chain Agility	0.026	0.176	-1.27	0.351
Supply Chain Integration	-0.158	0.176	-0.978	0.351
Supply Chain Efficiency	0.171	0.176	-1.271	0.351
Customer Responsiveness	0.095	0.176	-0.751	0.351
Independent Business intelligence	0.099	0.176	-1.05	0.351

Validity Test

This process involves evaluating whether the questionnaire effectively measures what it is intended to, based on the assessments of experts and potential respondents. Ensuring validity is a vital part of the research methodology, as it confirms that the data collected accurately represent the variables under investigation. Such methodological precision is key to preserving the integrity of the study's results and the conclusions drawn from the analysis (Sekaran & Bougie, 2016). By establishing the validity of the questionnaire, the study aims to generate reliable and actionable insights into the influence of business intelligence on supply chain performance, particularly in the context of Jordan's industrial sector.

Table (4). The Pearson Correlation Coefficient

Dependent variable: Supply Chain in Jordan							
Supply Chain Agility		Supply Chain Integration		Supply Chain Efficiency		Customer Responsiveness	
NO. paragraph	Pearson correlation	NO. paragraph	Pearson correlation	NO. paragraph	Pearson correlation	NO. paragraph	Pearson correlation
1	**0.865	1	**0.865	1	**0.682	1	**0.607
2	**0.906	2	**0.935	2	**0.851	2	**0.827
3	**0.909	3	**0.850	3	**0.938	3	**0.831
4	**0.881	4	**0.809	4	**0.944	4	**0.802
5	**0.893	5	**0.635	5	**0.886	5	**0.774
Independent variable: Business intelligence							
1		**0.642		6		**0.877	
2		**0.780		7		**0.930	
3		**0.560		8		**0.888	
4		**0.848		9		**0.872	
5		**0.629		10		**0.799	

From the table the Correlation coefficient values range for Supply Chain Agility is from 0.865 to 0.909, indicating a very strong positive relationship between different aspects of business intelligence and supply chain agility, correlation coefficient values Supply Chain Integration range from 0.635 to 0.935, indicating a strong positive relationship as well.

For Supply Chain Efficiency values range from 0.682 to 0.944. still positive relationship. And the value correlation of Customer Responsiveness from 0.607 to 0.831, indicating a positive relationship between business intelligence and the company's responsiveness to customer needs.

For the independent variable, all items related to business intelligence achieve positive correlation coefficients ranging from 0.560 to 0.930, indicating that there is a significant positive relationship between the use of business intelligence tools and improving the performance of different aspects of the supply chain. These results reinforce the importance of artificial intelligence in supporting strategic decisions and enhancing efficiency in various operations.

Reliability Test

Reliability refers to the consistency and stability of the results generated by a questionnaire when administered to the same group of individuals multiple times. It is essential for ensuring that the measurement tool produces dependable outcomes under similar conditions. In this study, reliability was assessed using Cronbach's alpha coefficient, a common statistical measure for evaluating the internal consistency of a questionnaire.

A Cronbach's alpha value above 0.60 is considered statistically acceptable, indicating that the questionnaire is reliable (Sekaran & Bougie, 2016). The closer the alpha value is to 1.0, the greater the internal consistency of the instrument, suggesting that the items in the questionnaire are measuring the same underlying construct.

Table (5). Cronbach's Alpha Values for Study Variables

Variable	SupplyChain Agility	Supply Chain Integration	Supply Chain Efficiency	Customer Responsiveness	SupplyChain (all) dependent	Business intelligence independent
Cronbach's alpha	0.935	0.870	0.912	0.768	0.943	0.931

The Cronbach alpha values shown in the table show that the questionnaire used in the study has very good reliability, which enhances the credibility of the results that will be obtained through the research. An alpha level that exceeds 0.7 is considered an indicator of good reliability, and therefore the data extracted from this study can be relied upon in the analysis and conclusions.

Hypotheses Testing

Testing hypotheses is crucial for examining the relationships between variables in research. Using SPSS to analysis this study. The researcher utilized simple linear regression as a preliminary method for testing the study's hypotheses, allowing for insights before developing a comprehensive structural model. This approach was applied to all hypotheses in the study, providing a solid foundation for understanding the dynamics among the variables.

The result of the main hypothesis: There is a positive role for business intelligence in enhancing the performance of supply chains in industrial companies in Jordan at a significance level $\alpha \leq 0.05$.

Table (6). Simple Regression Analysis to Determine the Impact of The Effectiveness of Business Intelligence on Supply Chains.

Model summary		ANOVA			
R	R square	F	Sig ^{F*}		
0.704	0.496	293.273	0.00		
Coefficient					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std.Error	Beta		
constant	1.668	0.109		15.296	0.00
BI	0.604	0.035	0.704	17.125	0.00

Table (6) presents the results of the simple regression analysis used to determine the impact of business intelligence on the performance of supply chains in industrial companies in Jordan.

The results indicate that the correlation coefficient R is 0.704, demonstrating a strong positive relationship between business intelligence and supply chain performance. The R-squared value of 0.496 shows that business intelligence explains 49.6% of the variance in supply chain performance, highlighting the model's ability to explain the data.

Furthermore, the F value of 293.273 with a significance level of 0.00 indicates that the relationship between the two variables is statistically significant at a significance level of $\alpha \leq 0.05$.

Regarding the unstandardized regression coefficient (B), it was 1.668 for the constant and 0.604 for business intelligence, meaning that an increase of one unit in business intelligence is associated with an increase of 0.604 in supply chain performance.

The standardized coefficient (Beta) was 0.704, further confirming the relative importance of business intelligence in improving supply chain performance.

Overall, these results support the main hypothesis of the study, which posits a positive role for business intelligence in enhancing the performance of supply chains in industrial companies in Jordan.

The result of the first sub-hypothesis: There is a positive role for business intelligence in enhancing supply chain agility in industrial companies in Jordan at a significance level $\alpha \leq 0.05$.

Table (7). Simple Regression Analysis to Determine the Impact of The Effectiveness of Business Intelligence on Supply Chains Agility.

Model summary		ANOVA			
R	R square	F	Sig ^{F*}		
0.634	0.402	200.207	0.00		
Coefficient					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std.Error	Beta		
constant	1.091	0.170		6.410	0.00
BI	0.779	0.055	0.634	14.149	0.00

Table (7) presents the results of the simple regression analysis conducted to assess the impact of business intelligence on supply chain agility in industrial companies in Jordan.

The results indicate that the correlation coefficient R is 0.634, suggesting a moderate to strong positive relationship between business intelligence and supply chain agility. The R-squared value of 0.402 indicates that business intelligence accounts for 40.2% of the variance in supply chain agility, demonstrating a substantial explanatory power of the model.

Additionally, the F value of 200.207 with a significance level of 0.00 confirms that the relationship between the variables is statistically significant at a significance level of $\alpha \leq 0.05$.

Regarding the coefficients, the unstandardized regression coefficient (B) is 1.091 for the constant and 0.779 for business intelligence. This implies that an increase of one unit in business intelligence is associated with an increase of 0.779 in supply chain agility.

The standardized coefficient (Beta) is 0.634, indicating the strength of the relationship and the relative importance of business intelligence in enhancing supply chain agility.

Overall, these findings support the first sub-hypothesis, which posits a positive role for business intelligence in enhancing supply chain agility in industrial companies in Jordan.

The result of the second sub-hypothesis: There is a positive role for business intelligence in enhancing supply chain integration in industrial companies in Jordan at a significance level $\alpha \leq 0.05$.

Table (8). Simple Regression Analysis to Determine the Impact of The Effectiveness of Business Intelligence on Supply Chains Integration.

Model summary		ANOVA			
R	R square	F	Sig ^{F*}		
0.724	0.523	327.338	0.00		
Coefficient					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std.Error	Beta		
constant	1.037	0.139		7.443	0.00
BI	0.815	0.045	0.724	18.092	0.00

Table (8) presents the results of the simple regression analysis conducted to evaluate the impact of business intelligence on supply chain integration in industrial companies in Jordan.

The analysis reveals a correlation coefficient (R) of 0.724, indicating a strong positive relationship between business intelligence and supply chain integration. The R-squared value of 0.523 signifies that business intelligence explains 52.3% of the variance in supply chain integration, highlighting the model's robust explanatory power.

The F statistic of 327.338 with a significance level of 0.00 indicates that the relationship between the two variables is statistically significant at a significance level of $\alpha \leq 0.05$.

In terms of coefficients, the unstandardized regression coefficient (B) is 1.037 for the constant and 0.815 for business intelligence. This suggests that for every unit increase in business intelligence, supply chain integration is expected to increase by 0.815 units.

The standardized coefficient (Beta) is 0.724, which illustrates the strength of the relationship and indicates the significant role of business intelligence in enhancing supply chain integration.

Overall, these findings support the second sub-hypothesis, which posits that there is a positive role for business intelligence in enhancing supply chain integration in industrial companies in Jordan.

The result of the third sub-hypothesis: There is a positive role for business intelligence in enhancing supply chain efficiency in industrial companies in Jordan at a significance level $\alpha \leq 0.05$.

Table (9). Simple Regression Analysis to Determine the Impact of The Effectiveness of Business Intelligence on Supply Chains Efficiency.

Model summary		ANOVA			
R		R square	F	Sig ^{F*}	
0.607		0.369	170.651	0.00	
Coefficient					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std.Error	Beta		
constant	1.159	0.166		6.982	0.00
BI	0.708	0.054	0.607	13.199	0.00

Table (9) presents the results of the simple regression analysis performed to evaluate the effect of business intelligence on supply chain efficiency in industrial companies in Jordan.

The model summary indicates a correlation coefficient (R) of 0.607, suggesting a moderate positive relationship between business intelligence and supply chain efficiency. The R-squared value of 0.369 shows that business intelligence explains 36.9% of the variance in supply chain efficiency, indicating a substantial contribution of the independent variable to the dependent variable.

The F statistic of 170.651 with a significance level of 0.00 confirms that the model is statistically significant at a significance level of $\alpha \leq 0.05$.

In terms of coefficients, the unstandardized regression coefficient (B) is 1.159 for the constant and 0.708 for business intelligence, indicating that for every unit increase in business intelligence, supply chain efficiency is expected to rise by 0.708 units.

The standardized coefficient (Beta) of 0.607 further emphasizes the strong positive effect of business intelligence on supply chain efficiency.

These results support the third sub-hypothesis, demonstrating that business intelligence plays a positive role in enhancing supply chain efficiency in industrial companies in Jordan.

The result of the fourth sub-hypothesis: There is a positive role for business intelligence in enhancing customer responsiveness in industrial companies in Jordan at a significance level $\alpha \leq 0.05$.

Table (10). Simple Regression Analysis to Determine the Impact of The Effectiveness of Business Intelligence on Supply Chains Customer Responsiveness.

Model summary		ANOVA			
R		R square	F	Sig ^{F*}	
0.180		0.033	10.026	0.02	
Coefficient					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std.Error	Beta		
constant	3.387	0.111		30.505	0.00
BI	0.114	0.036	0.180	3.166	0.02

Table (10) presents the simple regression analysis results examining the impact of business intelligence on customer responsiveness within industrial companies in Jordan.

The model summary shows a correlation coefficient (R) of 0.180, indicating a weak positive relationship between business intelligence and customer responsiveness. The R-squared value is 0.033, meaning that business intelligence explains only 3.3% of the variance in customer responsiveness, suggesting that other factors contribute more significantly to this outcome.

The F-statistic of 10.026 and the associated p-value of 0.02 confirm the model's statistical significance at the $\alpha \leq 0.05$ level.

Regarding the coefficients, the unstandardized coefficient (B) for business intelligence is 0.114, meaning that for every unit increase in business intelligence, customer responsiveness is expected to rise by 0.114 units. The standardized coefficient (Beta) of 0.180 supports this weak yet positive relationship. Additionally, the constant value is 3.387, representing the baseline level of customer responsiveness when business intelligence is zero.

The results confirm the fourth sub-hypothesis, indicating a positive role for business intelligence in enhancing customer responsiveness in industrial companies in Jordan, though the effect size is relatively small, as shown by the low R-squared value.

In conclusion, the analysis of the main hypothesis and its four sub-hypotheses highlights the significant positive role that business intelligence plays in enhancing various aspects of supply chain performance in industrial companies in Jordan. While the results demonstrate strong positive relationships between business intelligence and supply chain performance, agility, integration, and efficiency, the impact on customer responsiveness, although positive, is relatively weaker. These findings underscore the importance of implementing effective business intelligence systems to drive improvements in key supply chain functions. However, it also suggests that further investigation into additional factors influencing customer responsiveness is warranted to achieve a more comprehensive enhancement in this area. Overall, the study supports the hypothesis that business intelligence is a critical enabler of supply chain performance in Jordan's industrial sector.

Conclusion

This research explores, through four dimensions-agility, integration, efficiency, and responsiveness to customers-the role business intelligence can play in enhancing Jordanian supply chain performance. The results showed that the utilization of business intelligence technologies highly enhances the dimension of agility, thus enabling companies to swiftly respond to changes occurring within the market. It also showed that a better integration amongst the various parties down the value chain makes things more efficient and economical. Business intelligence also makes the companies more responsive to the needs of their customers, hence increasing their satisfaction and loyalty towards the brand. The Jordanian companies are recommended to increase their investments in enhancing the performances of supply chains by adaption

of business intelligence tools and technologies. In addition, it should focus on the development of human skills through training programs, which will definitely enhance employees' capabilities to make better use of business intelligence technologies and data. It is also required to develop various data analysis strategies that will help extract insights useful in enhancing supply chains, making them flexible and responsive. Companies should reinforce cooperation with understandable criteria set for regular assessment of supply chains' performance, focusing on how business intelligence contributes to results improvement. This contributes to the literatures by providing an integrated model showing how business intelligence influences the supply chain performance in Jordan, as well as providing practical insights for companies seeking to improve operations to match rapid market changes and increased customer value. The main focuses through which the findings can guide companies' strategies in their quest for improved performance are major focuses on agility, integration, efficiency, and customer responsiveness.

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