

Blockchain Technology and Its Impact in Advancing Supply Chain Analytics

Dr.A.Anny leema^{1*}, Sarah C. Alvarez²

¹ VIT, India

² Nueva Ecija University of Science and Technology, Philippines

*Corresponding Author Email: annyleema.a@vit.ac.in

Abstract

Blockchain technology has made global supply chains more perfect and efficient by delivering products and services directly to customers without third parties. The main purpose of this research paper is to examine the perspective of blockchain technologies for supply chain analytics. Blockchain technology (BT) is supporting logistics and financial services more flexibly and easily. It also helps companies understand their supply chain and attracts consumers with immutable, verifiable, and real data. The security system of any specific supply chain company also has become high with the collaboration of blockchain technology. Accompanied by the adoption of modern and advanced blockchain technology, instant traceability, and greater transparency have become possible to implement in the supply chain management (SCM) process. In maintaining the relationship between stakeholders and customers, blockchain technology is a useful medium. In order to collect the relevant data and resources regarding this research topic, "primary quantitative data" has been identified as beneficial. Along with this, SPSS software has been used to interpret the data in a perfect and systematic way. Moreover, this study will help the readers to understand the real effectiveness of blockchain technology and its role in influencing and advancing supply chain analytics.

Keywords

Accountability, Blockchain Technology, Growth, Product Delivery, Profit, Supply Chain Analytics, Transparency.

INTRODUCTION

Background of the study

The emergence of Industry 4.0 has introduced several types of advanced technologies and innovative tools, including blockchain technology. This technology is regarded to be highly efficient and has the potential to transform the supply chain activities and associated factors, such as transparency, security and "cost savings". A positive correlation between supply chain inventory and blockchain technology has been identified which impacts the performance and innovation of the supply chain [1]. Integrating blockchain technology into business management, especially in the supply chain provides various advantages and opportunities to the business. Additionally, efficient performance of the supply chain enables an organisation to achieve a competitive advantage to sustain in the business environment.

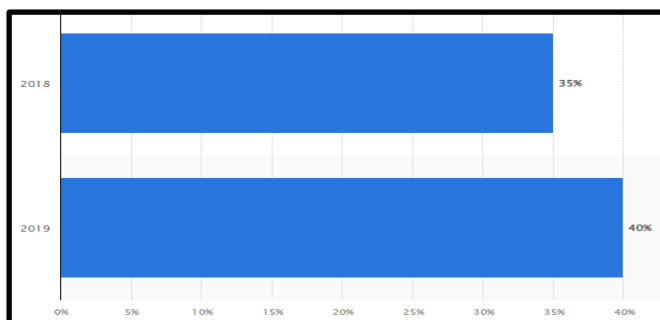


Figure 1: Business organisations planning to incorporate blockchain technology[2]

Incorporating blockchain technology in the supply chain provides an opportunity to enhance innovation and improve inventory which eventually leads to improved business performance. Considering these advantages and opportunities, business organisations are integrating blockchain technology into their supply chain activities. In 2018, 35% of global business organisations planned for integrating blockchain technology into their supply chain procedures, which increased to 40% in 2019 [2]. Furthermore, increasing competition and business complexities are also key driving factors which have increased the significance of blockchain technology in supply chain analytics and business performance. This technology upgrades accountability and security and ensures better performance of the supply chain by enabling organisations to utilise advanced and innovative technologies.

Aim and objectives

The main purpose of conducting this study is to elaborate on the effectiveness of blockchain technology and explore its impact on advanced supply chain analytics.

Objectives

- To assess the features and effectiveness of the blockchain technology
- To address the impact of blockchain technology on improving the supply chain
- To evaluate the importance of blockchain technology on supply chain analytics

Significance of the study

The present study has emphasised the role and impact of “blockchain technology” or BT in upgrading supply chain analytics. In addition, several areas associated with the implementation of BT into the supply chain have been discussed in this study, including the key features, its advantages, its impact on supply chain management or SCM and its effectiveness in improving sustainability. A primary quantitative data collection method has been followed and reliable and accurate data has been collected from the surrounding population, which has provided effective and in-depth insights associated with the research phenomenon. Hence, it can be stated that this study has provided significant insights into the impact of BT on advanced supply chain analytics and has opened a new dimension for future research.

METHODS

Research philosophy

The researcher has found “*positivism research philosophy*” as a valuable methodological tool as it is able to use metaphysical speculations to make the process of observation perfect. It is helpful in formulating different laws on the positive dynamics of the social universe and also helps in improving the significance of the study [3]. In this paper, “positivism philosophy” has assisted the researcher to recognise prominently the role of blockchain technology in advancing supply chain analytics.

Research approach

In this area, the “*inductive research approach*” has been considered beneficial for the conducting process of this research paper. It has also been chosen here to improve the flexibility of the research and also support the new theory generation about the topic [4]. Particularly in this research process, this approach has assisted to govern different innovative methodological tools to implement blockchain technology in the field of supply chain management procedure.

Research design

Leading this research paper, the “*descriptive research design*” has been chosen to describe the winter data in a systematic way. Observing the phenomenon and current situation, this research design is capable of using a variety of research variables [5]. In this research, “descriptive design” has been proved perfect as it follows the systematic way to establish the connection between blockchain technology and supply chain analytics.

Inclusion and exclusion criteria

The data and resources relevant to the research topic have been included from Google Scholar, authentic websites, books, and newspapers. It has been noticed that all the articles must be chosen between 2018 and 2022 to serve the latest updates. In addition to that, all the doctoral dissertations

have been excluded as those could not provide authentic information. Thus, the resources which contained limited data and information also were excluded to make the research paper valuable and sustainable for a long-term issue.

Data collection technique

In order to collect valuable data regarding blockchain technology and its impact in advancing supply chain analytics, “*primary quantitative*” data has been seen as the perfect method. It has made it possible for the researcher to collect first-hand and fresh data [6]. Under this process, a survey has been completed on 51 individual participants and set a questionnaire of “*10 close-ended questions*”. All the participants who had been chosen had experience and knowledge regarding the supply chain management process and blockchain technology in order to get reliable answers. All the research ethics have been maintained to make this survey process comfortable for the participants.

Data analysis technique

“*SPSS software*” has been used to interpret the collected data and make it understandable for all. It has served as a statistical platform that has made the data analysis process perfect [7]. Accompanied by the vast machine learning algorithm, IBM SPSS software has systematically improved the authenticity and reliability of the data. Depending on this advanced statistical analysis process, the decision-making method also has become easy for the researcher.

RESULTS

Frequency analysis

Based on alternative research variables, the “frequency analysis table” is engaged in analysing different perspectives. Generally, this statistical table displays the distribution of contrast observation to identify the relationship among the research variables [8]. In the above table, the “mean values” have become *1.45, 0.63, 3.00, 3.37, 2.92, 2.69, 3.55, 2.41, 3.18, and 3.04*. This indicated that all the variables are sharing a common value to maintain coordination among them. Contradictory, the “median values” have become *1, 1, 3, 4, 3, 3, 4, 3, 4, and 4*. This showed the data falls which were found in the exact middle of the data set. All these values indicated there was perfect frequency between the research variables.

Statistics												
		Age	Gender	All the features and effectiveness of blockchain technology are valuable for enhancing the productivity of the supply chain management process	The impact of blockchain technology is effective in improving the process of supply chain	There are several advantages to blockchain technology	The importance of blockchain technology in supply chain analytics cannot be ignorable	Using blockchain technology supply chain analytics has experienced greater transparency	The security system of specific supply chain companies become high with the collaboration of blockchain technology	Blockchain technology is supporting logistics and financial services	Blockchain technology increases the efficiency and speed of the supply chain process	
N	Valid	51	51	51	51	51	51	51	51	51	51	51
	Missing	0	0	0	0	0	0	0	0	0	0	0
	Mean	1.45	.63	3.00	3.37	2.92	2.69	3.55	2.41	3.18	3.04	
	Median	1.00	1.00	3.00	4.00	3.00	3.00	4.00	3.00	4.00	4.00	
	Mode	2	1	4	4	4	4	4	3	4	4	
	Std. Deviation	.945	.599	1.296	1.113	1.214	1.364	1.006	1.388	1.212	1.248	
	Minimum	0	0	0	0	0	0	0	0	0	0	
	Maximum	3	2	4	4	4	4	4	4	4	4	
	Sum	74	32	153	172	149	137	181	123	162	155	

Figure 2: Frequency analysis (Source: SPSS)

Descriptive statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	51	0	3	1.45	.945
Gender	51	0	2	.63	.599
All the features and effectiveness of blockchain technology are valuable for enhancing the productivity of the supply chain management process	51	0	4	3.00	1.296
The impact of blockchain technology is effective in improving the process of supply chain	51	0	4	3.37	1.113
There are several advantages to blockchain technology	51	0	4	2.92	1.214
The importance of blockchain technology in supply chain analytics cannot be ignorable	51	0	4	2.69	1.364
Using blockchain technology supply chain analytics has experienced greater transparency	51	0	4	3.55	1.006
The security system of specific supply chain companies become high with the collaboration of blockchain technology	51	0	4	2.41	1.388
Blockchain technology is supporting logistics and financial services	51	0	4	3.18	1.212
Blockchain technology increases the efficiency and speed of the supply chain process	51	0	4	3.04	1.248
Valid N (listwise)	51				

Figure 3: Descriptive statistics (Source: SPSS)

Using and observing the current collection of data, this table is showing the relationship and trend between research variables. In order to summarise the data, the “standard deviation” values are valuable [9]. According to the naive table, the “standard deviation” values are **1.296, 1.113, 1.214, 1.364, 1.006, 1.388, 1.212, and 1.248**. These showed all the data have maintained an optimistic relationship among them.

Bar graph analysis

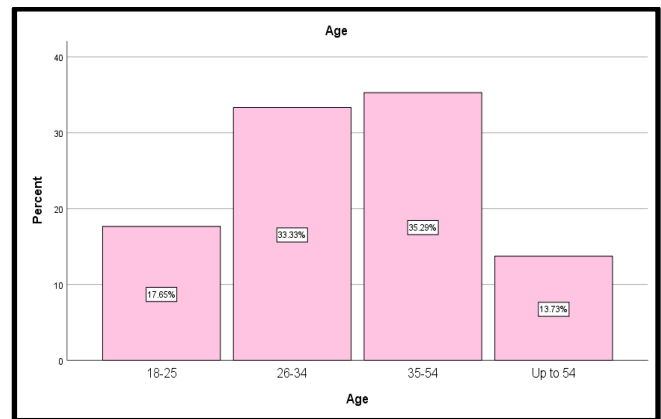


Figure 4: Age (Source: SPSS)

The researcher has developed four different age groups which mentioned specific age criteria. There were a greater percentage of respondents belonging to the “35-54 years old age group” at **35.29%**. It showed the “35-54 years old age group” had more knowledge about the impact of blockchain technology in the supply chain management process. On the contrary, respondents who were up to 54 years old had less knowledge about the research topic as they remained at **13.73%**.

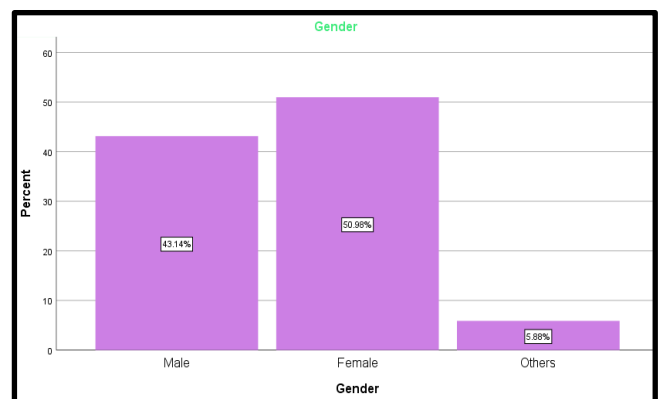


Figure 5: Gender (Source: SPSS)

According to the survey, among all the gender groups females had the greater knowledge regarding blockchain technology as they have participated **50.98%**. On the other hand, males participated with **43.14%** that was less than female percentage. The other gender group had little knowledge regarding the topic as they participants only **5.88%**.

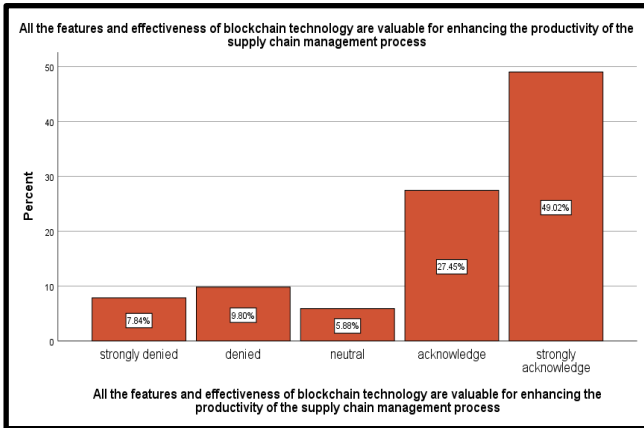


Figure 6: Effectiveness of blockchain technology for enhancing the productivity of SCM process (Source: SPSS)

Regarding the effectiveness of blockchain technology in the SCM process, there was 49.02% of the population strongly acknowledged as well as 27.45% of the population acknowledged it. This indicated that all the features are effective in blockchain technology to enhance the productivity of the SCM process.

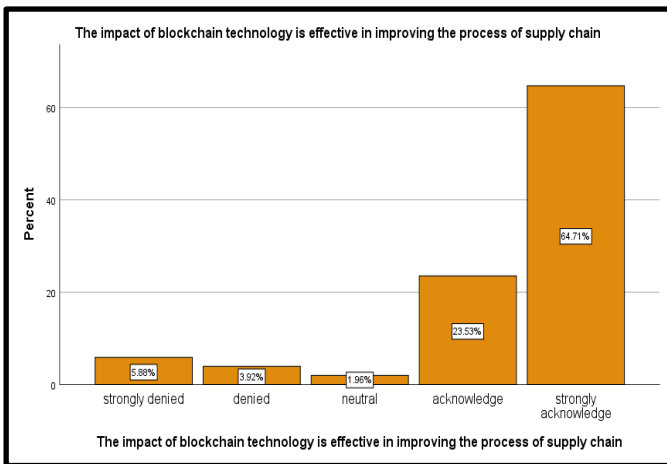


Figure 7: Blockchain technology is effective in improving SCM (Source: SPSS)

In this statement, most of the participants strongly acknowledged as the percentage has become **64.71%** whereas **23.53%** of the participants also acknowledged this. It highlighted that the impact of modern and advanced blockchain technology is really effective in order to improve the process of SCM.

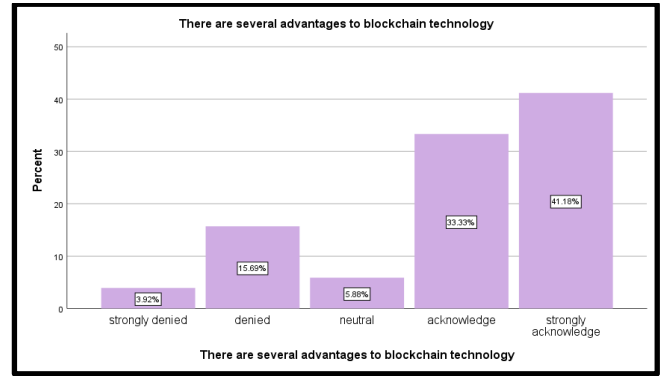


Figure 8: There are several advantages of blockchain technology to improve SCM service process (Source: SPSS)

Following the survey, it has been understood that most of the people have experienced the different types of advantages of blockchain technology improve SCM service process. In supporting this statement, **41.18%** of the candidates strongly acknowledged and **33.33%** of the candidates acknowledged. Thus, due to not having much idea, **5.88%** of the people were neutral during survey process.

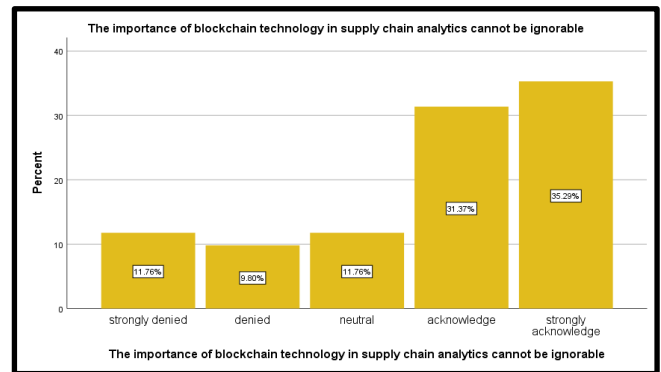


Figure 9: The importance of blockchain technology in supply chain analytics cannot be ignorable (Source: SPSS)

According to the above bar graph, **35.29%** of the population strongly acknowledged whereas **31.37%** of the population acknowledged this statement. It showed that the majority of the business operators have gained knowledge that in managing supply chain analytics, there is the collaboration of blockchain technology is essential.

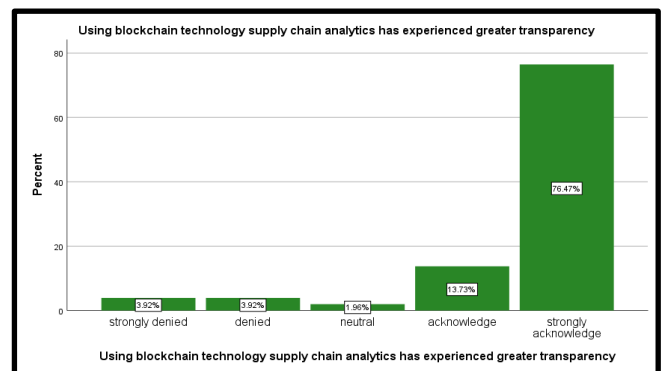


Figure 10: Using blockchain technology supply chain analytics has experienced greater transparency (Source: SPSS)

It has been understood following the above bar chart that **76.47%** of the population is “strongly acknowledged” and **13.73%** of the population is “acknowledged” regarding the above statement. Thus, **1.96%** of the population was not interested in answering it as they had no such knowledge about this matter. Contradictory, **3.92%** of the population is “strongly denied” and **3.92%** of the population is “denied”. This highlights that supply chain analytics has experienced greater transparency by using advanced and modern blockchain technology in their work system.

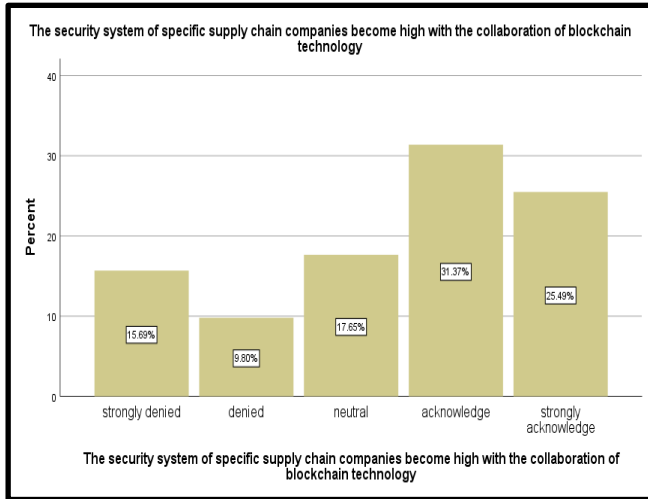


Figure 11: The security system of specific supply chain companies becomes high with the collaboration of blockchain technology (Source: SPSS)

Regarding the security system of supply chain companies, most of the respondents of the survey have acknowledged as the percentage has become **31.37%** whereas **25.49%** have strongly acknowledged. This signified that the majority of supply chain companies are experiencing high-quality security systems with the collaboration of blockchain technology.

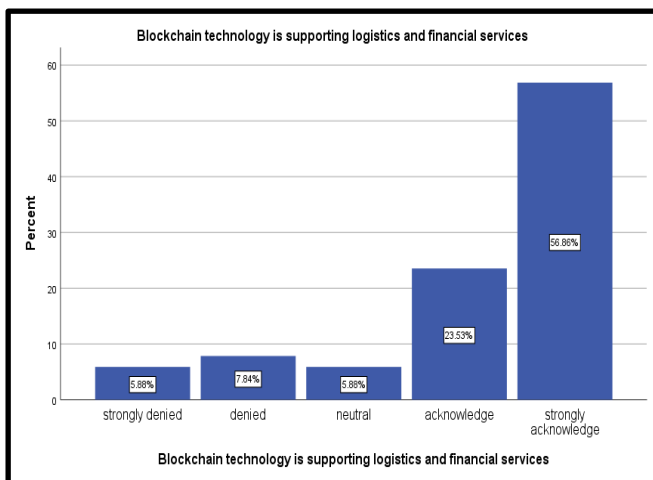


Figure 12: Blockchain technology is supporting logistics and financial services (Source: SPSS)

Balockcahin’s ability in supporting logistics and financial services, there were **56.86%** of the people strongly acknowledged and **23.53%** of the people acknowledged. It emphasises the effectiveness of blockchain technology and its capability of supporting both logistics and financial services perfectly.

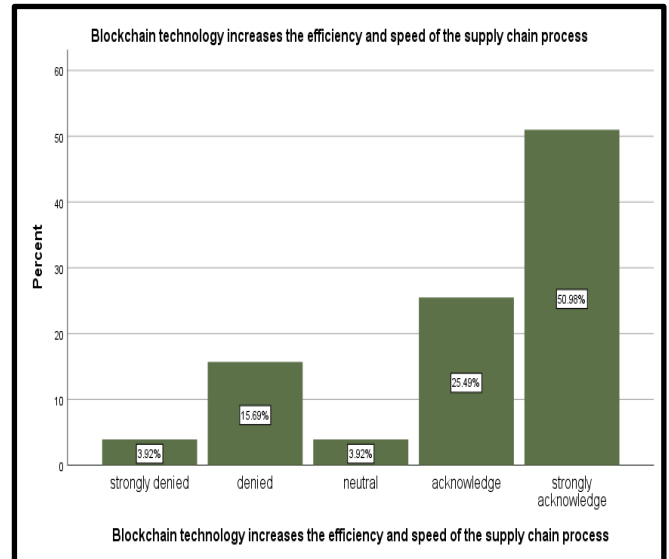


Figure 13: Blockchain technology increases the efficiency and speed of the supply chain process (Source: SPSS)

Regarding the efficiency and speed management power of blockchain technology, there were **50.98%** of people strongly acknowledged and **25.49%** of the people acknowledged it. Depending on this result it has become understood that blockchain technology is able to increase both efficiency and speed of the supply chain process to maintain its revenue and competitiveness against other existing business competitors.

Identifying the linear connection between the different existing research variables, the table of “correlation analysis” is very useful. According to the rule of this table, the table is identified as bearable in the case of 1 which is greater than 0 ($1 > 0$) [10]. In this table, “P-value” is the main key tool that is engaged in describing the authentic value. According to this table, there are all the numerical numbers less than 0 and larger than 0 presented. Although, it does not highlight any type of weak connection between variables rather it shows a positive collaboration.

Correlation analysis

		Correlations									
		Age	Gender	All the features and effectiveness of blockchain technology are valuable for enhancing the productivity of the supply chain management process	The impact of blockchain technology is effective in improving the process of supply chain	There are several advantages to blockchain technology	The importance of blockchain technology in supply chain analytics cannot be ignorable	Using blockchain technology supply chain analytics has experienced greater transparency	The security system of specific supply chain companies become high with the collaboration of blockchain technology	Blockchain technology is supporting logistics and financial services	Blockchain technology increases the efficiency and speed of the supply chain process
Age	Pearson Correlation	1	.833**	.882**	.712**	.868**	.873**	.639**	.908**	.820**	.867**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	51	51	51	51	51	51	51	51	51	51
Gender	Pearson Correlation	.833**	1	.722**	.603**	.729**	.760**	.479**	.838**	.727**	.742**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.000	.000
	N	51	51	51	51	51	51	51	51	51	51
All the features and effectiveness of blockchain technology are valuable for enhancing the productivity of the supply chain management process	Pearson Correlation	.882**	.722**	1	.887**	.953**	.939**	.874**	.923**	.955**	.976**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000	.000
	N	51	51	51	51	51	51	51	51	51	51
The impact of blockchain technology is effective in improving the process of supply chain	Pearson Correlation	.712**	.603**	.887**	1	.836**	.869**	.939**	.805**	.929**	.853**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000
	N	51	51	51	51	51	51	51	51	51	51
There are several advantages to blockchain technology	Pearson Correlation	.868**	.729**	.953**	.836**	1	.951**	.822**	.933**	.921**	.965**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	51	51	51	51	51	51	51	51	51	51
The importance of blockchain technology in supply chain analytics cannot be ignorable	Pearson Correlation	.873**	.760**	.939**	.869**	.951**	1	.798**	.947**	.918**	.935**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000	.000
	N	51	51	51	51	51	51	51	51	51	51
Using blockchain technology supply chain analytics has experienced greater transparency	Pearson Correlation	.639**	.479**	.874**	.939**	.822**	.798**	1	.737**	.887**	.842**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.000
	N	51	51	51	51	51	51	51	51	51	51
The security system of specific supply chain companies become high with the collaboration of blockchain technology	Pearson Correlation	.908**	.838**	.923**	.805**	.933**	.947**	.737**	1	.907**	.925**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	51	51	51	51	51	51	51	51	51	51
Blockchain technology is supporting logistics and financial services	Pearson Correlation	.820**	.727**	.955**	.929**	.921**	.918**	.887**	.907**	1	.947**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000		.000
	N	51	51	51	51	51	51	51	51	51	51
Blockchain technology increases the efficiency and speed of the supply chain process	Pearson Correlation	.867**	.742**	.976**	.853**	.965**	.935**	.842**	.925**	.947**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	51	51	51	51	51	51	51	51	51	51

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

Figure 14: Correlation analysis (Source: SPSS)

Regression analysis

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	81.411	7	11.630	193.126	.000 ^b
	Residual	2.589	43	.060		
	Total	84.000	50			

a. Dependent Variable: All the features and effectiveness of blockchain technology are valuable for enhancing the productivity of the supply chain management process

b. Predictors: (Constant), Blockchain technology increases the efficiency and speed of the supply chain process, Using blockchain technology supply chain analytics has experienced greater transparency, The security system of specific supply chain companies become high with the collaboration of blockchain technology, The impact of blockchain technology is effective in improving the process of supply chain, The importance of blockchain technology in supply chain analytics cannot be ignorable, There are several advantages to blockchain technology, Blockchain technology is supporting logistics and financial services

Figure 15: ANOVA analysis (Source: SPSS)

The correctness of data has been identified with the help of the “ANOVA analysis” table. Following the jurisdiction of this table, in case of “significant value” becomes <0.001, the data is acceptable [11]. In the above-mentioned table, the “significant value” becomes 0 which is less than 0.001 (0<0.001). It indicated there were all the existing data was valid and reliable.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.984 ^a	.969	.964	.245

a. Predictors: (Constant), Blockchain technology increases the efficiency and speed of the supply chain process, Using blockchain technology supply chain analytics has experienced greater transparency, The security system of specific supply chain companies become high with the collaboration of blockchain technology, The impact of blockchain technology is effective in improving the process of supply chain, The importance of blockchain technology in supply chain analytics cannot be ignorable, There are several advantages to blockchain technology, Blockchain technology is supporting logistics and financial services

Figure 16: Model summary analysis (Source: SPSS)

In the “model summary analysis” table, depending on the “R-value” and “R-square value” the research variables’ validity is judged. In the above table, the “R-value” becomes 0.984 and the “R-square value” becomes 0.969. As having valid data is highly essential in the SPSS analysis process, this table is identified as helpful [12]. The values are showing that all the collected data were correct and there is an optimistic relationship among the “research variables”.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.313	.140		-2.239	.030
	The impact of blockchain technology is effective in improving the process of supply chain	-.029	.145	-.025	-.199	.843
	There are several advantages to blockchain technology	-.017	.138	-.016	-.124	.902
	The importance of blockchain technology in supply chain analytics cannot be ignorable	.112	.118	.118	.954	.345
	Using blockchain technology supply chain analytics has experienced greater transparency	.226	.124	.176	1.831	.074
	The security system of specific supply chain companies become high with the collaboration of blockchain technology	.096	.094	.103	1.019	.314
	Blockchain technology is supporting logistics and financial services	.111	.139	.104	.797	.430
	Blockchain technology increases the efficiency and speed of the supply chain process	.582	.138	.561	4.229	.000

a. Dependent Variable: All the features and effectiveness of blockchain technology are valuable for enhancing the productivity of the supply chain management process

Figure 17: Coefficient analysis (Source: SPSS)

“Coefficient analysis” is considered the approximation of a coded model that is generally connected with the existing research variables. This table is mainly based on the “significant value” and its individual row highlights each response of the research variables [14]. Basically, it describes the size and direction of the relationship and according to this table, the research variables have become valid and authentic. Similarly, according to the above table, it has been identified that there is a positive connection between the research variables of this research topic.

Reliability and validity test

Reliability Statistics	
Cronbach's Alpha	N of Items
.981	10

Figure 18: Reliability test (Source: SPSS)

Based on the regulation of the “reliability statistics” in the case of having the value of “Cronbach’s Alpha” larger than “0.70 (value > 0.70)”, the entire result of the data set is acceptable [14]. In the above table, the value of “Cronbach’s Alpha” becomes **0.981** which is greater than **0.70 (0.981 > 0.70)**. It showed that collected data and result is valid and reliable as well as there was an optimistic connection among variables.

DISCUSSION

Features of Blockchain technology

Blockchain technology or BT consists of several efficient tools and features, which have increased its popularity and acceptance in business organisations, especially in organisations involved with supply chain activities. Consequently, this technology is regarded as a “distributed computing paradigm” and utilising the tools and features of this technology can improve communication and collaboration among team members [15]. “Encryption algorithms”, “distributed consensus mechanisms”, “smart contracts” and “point-to-point transmission” are among the core features of BT. Apart from this, “digital crypto currency” is regarded to be the main feature of BT as it enables to utilise of Ethereum or Bitcoin, which are used for exchange or trading in the global business market. There are several other efficient features and tools of BT, including “decentralised computing infrastructure”, “decentralised database”, “shared and distributed accounting ledger”, “transaction platform”, “open source software” and “software development platform”.

BT consists of effective “peer-to-peer network” features that enable users to establish collaboration and connect with other users which helps to establish efficient business relationships and manage procedures. On the other hand, the most common features of BT that help in business organisations are “immutability”, “data-security”, “smart contract” and “traceability” [16]. A BT not only stores datasets but also enables users to keep the confidentiality of stored data by locking or securing the data through various means. Therefore, BT has been identified to consist of efficient features that can provide enormous opportunities and benefits to business organisations, especially for managing supply chain operations.

Advantages of blockchain technology

Implementation and proper utilisation of blockchain technology or BT can provide various advantages and opportunities to business organisations. Proper implementation of this technology can enable an organisation to increase the security and safety of business procedures and activities. Additionally, the technology mainly ensures the safety of stored datasets and confidential information through encryption, which ensures proper protection and data security. The technology helps to integrate through online collaborative platforms that enhance interaction and engagement between organisations or users [17]. On the other hand, increasing the use of advanced technology and the internet has increased the prevalence of cyber-attacks and integrating BT helps to ensure protection by reducing cyber threats.

It has been observed that BT is among the most efficient and popular examples of a “decentralised network system” and enables to access of collaborative data systems and financial transactions in various platforms and segments. “Transparency”, “immutability” and “autonomy” are major

components of BT that helps to use innovative "distributed consensus algorithm" for resolving traditional issues associated with "distributed database synchronising" [18]. The integration of BT provides an effective opportunity for SCM, including the traceability of materials and goods. This technology increases the transparency of activities and enables business leaders to optimise supply chain processes more effectively. Thus, the implementation of BT comes with numerous advantages and opportunities for businesses and supply chain procedures and improves the performance of SCM.

Impact of blockchain technology on supply chain management

Increasing competition, the emergence of smart technologies and changing consumer preferences have transformed supply chain activities and procedures. On the other hand, the implementation of BT in SCM provides numerous opportunities and advantages which have increased its significance and acceptability in business organisations for managing complex supply chain activities. It has been observed that this technology improves business innovation and inventory of the SCM by enabling to access "innovative platforms" for business and also provides an efficient competitive advantage [19]. Additionally, utilising this technology helps to ensure "end-to-end" encryption and transparency of procedures and activities along with simplifying SCM procedures.

It has been observed that globalisation and increasing attention toward "inter-and-intra-organisational collaboration" have increased the complexities of SCM. In this context, the integration of novel technologies, such as BT can help to prevent these complexities and improve the performance of SCM [20]. On the other hand, the implementation of BT into SCM has introduced an "automotive supply chain" which is more efficient, speedy and flexible for managing complex procedures and changing consumer demands. On the other hand, this technology has also posed an effective influence on improving the sustainability of SCM through incorporating efficient approaches such as RFID into management and logistics.

Integrating BT into business organisations and SCM provides numerous advantages and has the potential to transform SCM performance and procedures. "Supply chain finance" and "traceability" has been identified to be the major advantages of BT on SCM that can improve the flexibilities and efficiency of SCM along with thoroughly changing the performance [21]. Therefore, BT provides several types of advantages and opportunities for SCM that can eventually provide an efficient competitive advantage and improve business performance. Moreover, BT enhances the transparency of the procedures and activities that enhances visibility and enables forecasting demand more effectively. Thus, it can be stated that the integration of BT into SCM has the potential to improve SCM performance and ultimately improve business capability and performance.

Sustainability of advancing supply chain analytics depending on blockchain technology

In the contemporary era, the global business environment is constantly shaping and transforming, which has posed a major impact on environmental sustainability. Due to these practices, consumers' focus and concerns are increasingly shifting to the sustainability performance of SCM. It has been identified that digital technologies, especially "blockchain technology" has the potential to improve the sustainability of the supply chain [22]. On the other hand, "supply chain analytics" or SCA involves analysing associated information, procedures and activities including "warehouse management", "procurement", "order management" and "inventory management". This system is basically the digitalisation of the SCM and incorporating BT into these processes improves the performance of SC and helps to increase the sustainability of the procedures.

Effective SCA enables users to access a comprehensive perception of the entire network along with providing relevant information about the "upstream and downstream" activities of SCM. On the other hand, the SCA market has been estimated to be worth 8.8 billion Dollars by 2025 which indicates its popularity and acceptance in business organisations [23]. It has been identified that the integration of BT in SCM enables business organisations to establish a collaborative network of suppliers and employees and transforms "end-to-end" procedures. This technology also ensures proper maintenance of sustainability and "operation management" by improving SCM activities and performance [24]. Thus, it can be stated that BT can be regarded to be the most influential and innovative technology to influence SCA in business organisations.

CONCLUSION

In the present study, the context of blockchain technology and its impact on supply chain analytics has been explored. Relevant and reliable data has been collected by using a primarily quantitative approach and the findings have been illustrated descriptively. Considering the overall aspects, it can be stated that the integration of BT into business organisations and SCM provide various opportunities and advantages and increase the flexibility and efficiency of the SCM. Increasing competition, changing consumer preferences and constantly changing business environment has increased SCM complexities and challenges, which can be prevented by incorporating advantages and smart technologies such as BT.

BT consists of several efficient features, including "transparency", "immutability", "decentralisation", "autonomy" and crypto currency. These features have enabled business organisations to increase the security, transparency and confidentiality of stored data. Proper implementation of this technology provides various advantages such as increasing traceability of the supply chain, improving flexibility and speed along with providing a competitive advantage. This technology also increases the

sustainability of SCM and enables it to sustain and compete in the contemporary business environment. Thus, it can be stated that this study has provided effective insights associated with the impact and effectiveness of BT on advancing supply chain analytics.

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