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The Factors Driving Blockchain Technology Adoption Decision in the Supply Chain of Soft Drinks

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Abstract

Over the past several years, blockchain technology has become more and more significant and widely accepted. However, there is a few of empirical study on the organizational and technological characteristics unique to the soft drink supply chains that are crucial in propelling its adoption. The aim of this research is to identify the enablers and experimentally evaluate their interdependencies and adoption impact to establish a comprehensive framework for blockchain adoption in the soft drink supply chain. To extract logic from the data gathered from 101 respondents, the TOE Framework was used. The study found that in terms of how significant the two most notable factors that influence blockchain adoption in the supply chain are the relative benefit (security) of the technology and the external pressure (competitive pressure). Our analysis also demonstrates that creating a legal framework for blockchain technology use is essential for its widespread adoption.

Keywords: *blockchain; adoption; factors; supply chain; manufacturing industries; and soft drinks supply chain*

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1.0 Introduction

In the field of supply chain management, blockchain technology has recently grown in prominence. For example, Maersk tracked its containers globally in an effective manner using an IBM blockchain system (Tapscott, 2016). Customers can access information about the dates and conditions of harvesting, pressing, and bottling of each bottle or case of wine, along with many other details, thanks to a blockchain-based solution developed by Ernst and Young's EZ Lab (www.ezlab.it) and the Catina Volpone vineyard (www.cantinavolpone.it) in Puglia, Italy (Tapscott, 2016). In a similar vein, Walmart and IBM have effectively deployed a blockchain-based system for farm-to-table tracking of pig products in China, offering complete supply chain transparency.

The potential of blockchain technology in verifying and certifying the origin, authenticity, and integrity of products like wine bottles, coffee beans, medicines, and diamonds has been demonstrated by blockchain solutions providers like Everledger (everledger.io), Provenance (provenance.org), and Bext360 (bext360.com) through pilot projects and typical use cases (Lansiti & Lakhani, 2017). The benefits of blockchain technology go beyond just enabling traceability, improving transparency, and establishing product provenance, as these examples demonstrate. In fact, blockchain is a distributed ledger (database) that allows supply chain partners to interact and create, verify, validate, and securely store various kinds of records. Thus, blockchain promises to enhance supply chain coordination and process efficiency in addition to offering traceability and making the entire history of items digitally available (Shrier *et al.,* 2016).

The supply chain has evolved into a system that consists of various commodities that are circulated through several parties and require the cooperation of stakeholders. Additionally, due to the quick spread of technology, there is a greater need than ever for increased product visibility and source-to-store traceability. For instance, blockchain has a promising future since it allows the supply chain to improve transaction visibility, transparency, and correctness over the course of the process. Businesses, especially those involved in supply chain management, have noticed bitcoin's underlying Blockchain technology. Approximately 62% of supply chain executives claimed to have employed Blockchain technology, according to Barnes et al.'s (2019) study even though applications for the supply chain based on blockchain are still in their infancy, we think this technology will have a significant impact on the system. According to Wamba et al. (2020), a

Blockchain network operates as a distributed ledger, with transactions recorded in blocks that are linked chronologically to create a tamper-proof chain that is normally retained in all network nodes.

Although it is generally acknowledged that Blockchain technology enables quicker, easier auditable interactions and permits the transmission of immutable data among supply chain participants, adoption and revolutionizing the supply chain will take time (Gopalk et al. 2020 & Barnes et al. 2019). Currently, the bulk of Blockchain applications are conceptual, and there is little actual information on how to deploy it. In general, supply chains are still in the early stages of the development and application of blockchain technology. As a result, as the technology advances, businesses will have a lot of chances (Barnes et al., 2019) especially for the variables influencing the decision to adopt blockchain technology in the soft drink supply chain.

1.1 Use of blockchain technology in supply chain management

According to Barnes et al., (2019), a supply chain is usually made up of independent businesses that are actively involved in the upstream and downstream flows of goods, services, money, and/or information from a source to a client. Cooperation and information sharing between participants are essential for the efficient management of a supply chain (Barnes et al., 2019). By enabling direct communication between supply chain participants and the exchange of reliable, tamper-proof data, blockchain technology holds the potential to significantly enhance supply chain management and meet performance goals (Wamba et al., 2020). This technology's capacity to provide complete product traceability and improve visibility throughout the various supply chain phases is one of its primary advantages. For example, the UK-based blockchain solutions provider Provenance was able to track fish caught by fishermen in Indonesia and provide consumers with strong proof of compliance to standards from the origin and along the chain by utilizing smart tagging and blockchain technology

The Walmart and IBM pilot project to digitally trace pig goods in China from the farm to the customer's table is another example of blockchain-enabled product tracking. The technology made it possible to quickly and digitally access all the information about a certain pork product, including its batch number, origin, manufacturing, temperature during storage, and shipping information (Yiannas, 2017). Apart from monitoring items, blockchain technology provides effective methods for gathering and combining comprehensive product data, which may be utilized for product authentication, origin certification, and quality and integrity assurance (Gopalk et al. 2020). For example, blockchain-based solutions have been developed by the startup Everledger to generate and manage unique identifying data for individual product units across multiple industries. The solutions enable jewelers comply with rules in the diamond sector (Lansiti & Lakhani, 2017), as well as tracking and authenticating wine bottles (Tapscott, 2016). They also provide quality assurance. Members of the supply chain may potentially utilize blockchain to exchange data on capacity, demand, and inventory. Then, by judiciously aggregating this data across the various supply chain layers, supply chain coordination and operational effectiveness may be enhanced (Lansiti & Lakhani, 2017).

Implementing blockchain-enabled smart contracts to automate supply chain member transactions may also result in a higher level of coordination and operational efficiency (Wang et al., 2019). Reaching supply chain sustainability objectives requires the use of blockchain technology (Lansiti & Lakhani, 2017& Wang et al., 2019). According to Barnes et al., (2019) and product provenance knowledge does in fact aid in the battle against product counterfeiting, and product tracking capabilities aid in the more effective planning and execution of reverse logistics operations, including product takeback, product reuse, remanufacturing, and recycling (Gopalk et al. 2020).

The technology may also be used by supply chain members to share sustainability-related data from the different processing and transportation stages the product went through. Then, by aggregating this data, the overall product carbon footprint can be efficiently evaluated, as it has been demonstrated by Barnes et al., (2019) for transportation operations in the food industry. Blockchain technology may also be used by Supply chain members to upload certificates of compliance with different sustainability standards, which may then be compiled to ascertain claims of product and supply chain sustainability (Gopalk et al. 2020). Furthermore, using blockchain technology is believed to improve supply chain risk management (Lansiti & Lakhani, 2017& Wang et al., 2019) and supply chain resilience (Gopalk et al. 2020) in addition to lowering transaction costs between the supply chain members (Wamba et` al., 2020).

2.0 Literature Review

2.1 Theoretical Literature Review

2.1.1 TOE Framework Model

The (TOE) framework was designed in 1990 by Ternatzky and Fleisher. The TOE-Model identifies three factors that affect an organization's decision to embrace a certain invention. (Tornatzky and Fleisher, 1990) The model is described in terms of contexts like technological, organizational, and environmental. Based on several research conducted by numerous authors and demonstrated to have a substantial impact on the adoption of a specific invention, many factors have been found in the technological environment. For instance, according to the study conducted by Kalaitz et al., (2020) on the drivers of Blockchain adoption and perceived benefits in the food supply chain revealed that factors like relative advantage, perceived challenges, and compatibility had a big impact on the adoption of Blockchain technology on soft drinks manufacturing industries.

The adoption of Blockchain Technology in the organizational context has also been found to be significantly impacted by organizational characteristics and resources, such as organization size, organizational readiness, top management support, value chain readiness, business models, technological readiness, and Blockchain knowledge. Similar studies (Beck, Becker, Lindman & Rossi, 2017; Pilkington, 2016; Mendling et al, 2017; Wang et al, 2016) using the TOE Model to understand the adoption of Blockchain Technology and the study revealed that top management support and organizational readiness have a positive impact on adoption of blockchain technology in supply chain manufacturing companies.

Numerous elements are included in the environmental context, including the scope and organization of the industry, pressure from rivals, the macroeconomic environment, assistance from the government, and the regulatory environment. Relative advantage, organizational readiness, and external pressure were found to have more significance influences in understanding different new IT adoption, so the study used only the TOE Model to understand the factors influencing the adoption of Blockchain (Trevol et al., 2019).

3.0 Empirical Review

Review of Tanzania's Soft Drinks Supply Chain's Use of Blockchain Technology. Block chain technology enables businesses to track every step of the supply chain. It also increases customer satisfaction by enabling customers to follow the progress of an order they have made, including where it is created, how it is shipped, and when it will arrive. As a result, this shows that blockchain technology is a crucial technology for the manufacturing sector. For instance, according to Joseph et al. (2020), blockchain technology enables transparency, security, decentralized ledgers, and a reliable network for long-term supply chain management. However, the study found that using the TOE Model Theories to examine the obstacles to the adoption of Blockchain Technology.

Clohessy& Roger, (2019) conducted the study on the Blockchain adoption based on TOE model, where the study revealed that organizational factors such as top management support, organizational readiness and organizational support as one of the elements of TOE model as the main factors that influence the adoption of Blockchain Technology. Moreover, this study identified the advantage and potential use cases that organizations and firms contemplating adopting the technology can leverage.

Additionally, the study conducted by Dutta et al., (2020) on Blockchain Technology in supply chain operations. A total number of 178 articles were considered and observed in relation with the study on the use of Blockchain Technology in supply chain operations. The study examined several industrial sectors such as shipping, manufacturing, automotive, aviation finance, technology, energy, healthcare, agriculture and food, e-commerce and education. Furthermore, the study revealed that, Blockchain system has many characteristics such as decentralized ledger, distributed notes and storage mechanism, consensus algorithm, smart contracting and asymmetric encryption, which enhance security, transparency and visibility within the supply chain.

Also, based on Song et al., (2019) on the study of application of Blockchain technology on traceability. The purpose of the study was to investigate the challenges and importance related to Blockchain Technology in private and public sector, and entrepreneur perspective. Information was gathered from 46 respondents using semi-structured interview. The study used TOE model to understand the challenges. In addition, the study highlighted the difference between permissioned and permission less Blockchain and classifies new ideas in Blockchain Technology adoption.

Yang et al., (2018) conducted the study on the factors affecting the adoption of Blockchain Technology Diffusion. The research revealed 13 factors after the data collection and data analysis in 3 levels. The first is strategic level which includes factors like Necessary collaboration, necessary change in basic assumptions, market position adoption, compliance, sector pressure, organizational size and investment hesitation.

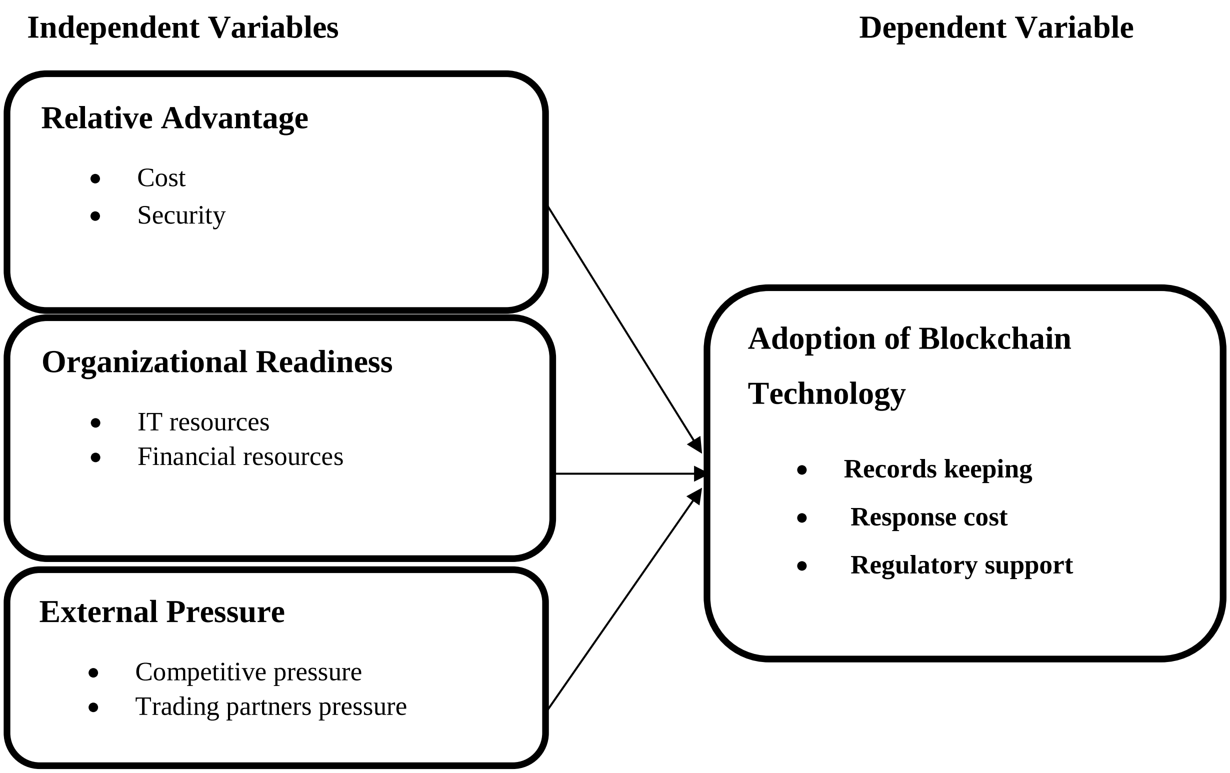
On the other hand, difficulties with its adoption are apparently present. For instance, its adoption is influenced by variables like business size, top management support, technology expertise, trading partners, and competitive pressure (Kalaitzi et al., 2019). The literature also identifies barriers to the successful deployment of a Blockchain-based procurement system, such as inadequate infrastructure, a lack of government backing, reluctance to change, and inadequate Blockchain expertise among process stakeholders. The study also found that the adoption of Blockchain Technology is necessary to increase the efficiency, simplicity, and transparency of public procurement because it allows for the interoperability of information systems involved in the process.

Currently, the bulk of Blockchain applications are conceptual, and there is little actual information on how to deploy it. Additionally, little studies (Yang et al., 2018; Dutta et al., 2020; Wang et al., 2016 & Cohessy & Rogers, 2019) have been done on topics like organizational readiness, technical comprehension, scalability, and interoperability with current systems when using Blockchain in the supply chain (Hinita et al., 2021). Therefore, this study's objective was to offer a comprehensive analysis of how Blockchain technology fits into the supply chain network.

3.1 Conceptual Framework

The adoption of blockchain technology is a dependent variable, while relative advantage, organizational readiness, and external pressure are independent variables. These variables were derived from objective number three on the factors influencing the adoption of blockchain technology, as shown in the general conceptualization diagram below (Figure 1).

Figure 1: Conceptual framework



3.2 Variables Description

3.2.1 Relative Advantage

The relative advantage of an innovation can be defined by the increase in the economic benefit and the impact that the innovation brings compared to existing systems that it replaces (Hlotiuk & Moormann (2018). Relative advantage is often found to be positively correlated with the adoption of innovation. It is also found to be an antecedent of technology adoption in the supply chain context (Hinita et al., 2021). Literature reports that, compared to other existing systems, blockchain technology better ensures data integrity improve data availability from multiple sources and supply chain members. In addition, it is widely admitted that using this technology reduces the cost of transactions between supply chain members According to Holtiuk and Moormann (2018), the relative advantage of an invention is determined by its impact and increased economic gain when compared to the systems it replaces. Adoption of innovation is frequently found to be positively connected with relative advantage. In the context of the supply chain, it is also discovered to be a precondition for technological adoption (Hinita et al., 2021). According to published research, blockchain technology provides superior data availability from numerous sources and supply chain participants than other current systems. Furthermore, it is well acknowledged that utilizing this technology lowers the cost of transactions amongst supply chain participants (Wamba et al., 2020). Be aware that the transaction cost considered here differs from the idea of the blockchain's total cost of ownership. In fact, research such as Wang et al. (2019) emphasize that implementing blockchain technology is difficult. As far as we are aware, no comprehensive analysis of the total cost-related effects of blockchain adoption—that is, the implementation costs, the ensuing lower transaction costs, and the return on investment—has been done. This signifies a significant void in the literature, wherein the financial consequences of implementing blockchain technology within a supply chain must be examined. We concentrate on adoption enablers in our study. For this reason, we have added the ability of blockchain to reduce transaction costs to our list of facilitators.

3.2.2 Organization Readiness

According to Mendling et al. (2017), organizational readiness is the state of the organization's technological and financial resources as they relate to the adoption and use of technology. In order to put blockchain technology into practice, one must purchase a variety of hardware and software products and make use of advanced information systems for data collection, storing, and transmission (Wang et al., 2019). Thus, in our supply chain blockchain adoption model, this dimension includes elements that represent the company's technological capabilities (Mendling et al., 2018); the knowledge and proficiency in utilizing the technology; and the accessibility of the capital needed to put the technology into practice (Wang et al., 2019). According to the literature currently in publication, senior management commitment affects how inter-organizational information systems are adopted. According to Tafiq et al. (2018), management commitment does in fact enable the allocation of the required financial and human resources for the implementation of the organizational change and the technology. We therefore propose that management commitment can facilitate the adoption of blockchain technology and link it to the organizational readiness component.

3.2.3 External Pressure

The impacts coming from the organization's surroundings are referred to as external pressure to accept the innovation (Lasinti & Lakhani 2017). According to Grosby et al. (2016), the adoption of inter-organizational information technologies may be significantly influenced by the influence of external parties. This dimension includes external demands on the organization as well as external supportive elements in our theoretical model for blockchain adoption in the context of supply chain management. We map the following facilitators to the external pressure category, building on this and findings from the body of existing literature: trade partner and competitive pressure for using blockchain technology (Wang et al., 2019).

Table 1: Studies used TOE Model on adoption of Blockchain Technology

Authors	Technology context	Organizational Context	Environmental Context
Barnes et al, (2019)	Perceived Usefulness, Compatibility, Relative Advantage, Complexity and range of technology.	Top management support, Organizational readiness, firm size.	Business competition, trading partners support, government support, customer influence.
Gokalpet al, (2020)	Relative Advantage, Complexity, Compatibility, Standardization, trust	Organizations IT resources, top management support, Organization size, Financial resources	Competitive pressure, trading partners pressure, government policy, inter-organization trust
Malik et al, (2020)	Perceived benefits, complexity, compatibility,	Organizational innovativeness, Organizational learning capacity.	Competitive industry, trading partner's readiness, government support, standard uncertainty.
Kulkarni et al, (2020)	Perceived security, BCT infrastructure, knowledge, relative advantage, transaction cost	The scope of the organization	Customer preparedness, government policy, competitive pressure, and partner readiness
Trevol et al, (2019)		Top management support, Organizational readiness.	

Source: Researcher, (2023)

4.0 Methodology and Materials

4.1 Study Design and Setting

A quantitative research design was used in the study. Moreover, a questionnaire-based quantitative research methodology let the researcher gather data from a sizable sample size to examine the hypotheses (D'Souza, 2017).

4.2 Population and Sample Size

101 individuals from the Bakhresa Group of Companies who worked primarily in the soft drink industry were the intended audience, and they provided enough data to record the study's goals. Since there were less than 200 people in the company, there was no sampling and 101 people from the entire population participated in the survey. One respondent was the sample size for the qualitative study, and 100 respondents were the sample size for the quantitative study.

4.3 Methods of Data Collection

The study used a questionnaire to gather data on respondents' perceptions of the variables driving the adoption of blockchain technology at the Bakhresa Group of Companies. Additionally, more data were gathered by asking direct questions from 101 respondents for this study.

4.4 Analysis of Data

A quantitative analysis method was used to collect and examine the data. Moreover, a questionnaire was used to collect quantitative data, which was then evaluated using both factor analysis and descriptive analysis.

5.0 Results

5.1 Data Analysis

5.1.1 Factor Analysis on Relative Advantage

The first independent variable to emerge from this article was relative advantage. It comprises two sub variables that were primarily used to assess the relative advantage's impact on the dependent variable of blockchain technology adoption. This variable was measured effectively using factor analysis. PCFA was used to determine the loading of the variables based on the analysis items.

Table 2: Factor analysis for Relative Advantages

Code	Items	PCFA	Status
V201	Cost	.983	Retained
V202	Security	.956	Retained

Source: *Researcher's Own Construct (2023)*

Data eligibility for factor analysis was suggested by Table 2. The study showed that each sub variable, which evaluates sampling adequacy, had a Kaiser-Meyer-Olkain (KMO) of greater than 0.6 and a Bartlett's of sphericity, or the p-value (Sig) =.000. For data to be deemed appropriate for factor analysis, D'Souza & Jolliffe (2017) state that the correlation matrix must display a minimum of some correlations with $r = 0.3$ or above. A Kaiser-Meyer-Olkain value of 0.6 or above is required, and the Bartlett's of sphericity must be statistically significant at $p<0.05$. As a result, the information from this study was appropriate for additional investigation.

5.1.2 Factor Analysis on Organizational Readiness

Utilizing a basic regression model, the independent variable of organizational readiness is compared to the dependent variable of blockchain technology adoption to ascertain or quantify its association. This variable was effectively measured using factor analysis. To show how the variables were loaded, PCFA was used to the analysis items.

Table 3: Factor analysis for Organizational Readiness

Code	Items	PCFA	Status
V301	IT Resources	.864	Retained
V302	Financial Resources	.972	Retained

Source: *Researcher's Own Construct (2023)*

The data were found to be suitable for factor analysis based on Table 3. The analysis showed that each sub variable, which assesses sampling adequacy, had a Kaiser-Meyer-Olkain (KMO) value more than 0.6 and a Bartlett's of sphericity, or p-value (Sig) =.000. For data to be deemed appropriate for factor analysis, D'Souza & Jolliffe (2017) state that the correlation matrix must display a minimum of some correlations with $r = 0.3$ or above. A Kaiser-Meyer-Olkain value of

0.6 or above is required, and the Bartlett's of sphericity must be statistically significant at $p<0.05$. As a result, the information from this study was appropriate for additional investigation.

5.1.3 Factor analysis on External pressure

A simple regression analysis was conducted to present external pressure as a third independent variable. The findings of this study are displayed in Table 4 and comprise two subfactors: competitive pressure and trade partner pressure. This variable was measured effectively using factor analysis. PCFA was used to determine the loading of the variables based on the analysis items.

Table 4: Factor analysis on External pressure

Code	Items	PCFA	Status
V401	Competitive pressure	.875	Retained
V402	Trading partner’s pressure	.797	Retained

Source: *Researcher’s Own Construct (2023)*

Table 4 demonstrated the data's eligibility for factor analysis. The study showed that each subvariable, which gauges sampling adequacy, had a Kaiser-Meyer-Olkain (KMO) value more than 0.6 and a Bartlett's of sphericity, or p-value (Sig) =.000. D'Souza & Jolliffe (2017) state that a correlation matrix displaying at least some correlations of $r = 0.3$ or above is necessary for data to be deemed appropriate for factor analysis. Both the Kaiser-Meyer-Olkain value and the Bartlett's of sphericity must be statistically significant at $p<0.05$ and 0.6, respectively. As a result, the study's data were appropriate for additional investigation.

5.1.4 Factor Analysis on Adoption of Blockchain Technology

Three dimensions were used to measure the dependent variable, which was the use of blockchain technology: response cost, record keeping, and regulatory support. This variable was measured effectively using factor analysis. For additional analysis, PCFA was applied to every component.

Table 5: Adoption of Blockchain Technology

Code	Items	PCFA	Status

V801	Response cost	.814	Retained
V802	Record keeping	.795	Retained
V803	Regulatory support	.974	Retained

Source: *Researcher's Own Construct (2023)*

Table 5 presented the data's eligibility for factor analysis. The analysis showed that the sample adequacy was measured by Bartlett's of sphericity, or the p-value (Sig) =.000. Pallant (2005) states that a correlation matrix displaying at least some correlations with r = 0.3 or higher is necessary for data to be deemed appropriate for factor analysis. At $p<0.05$, the Bartlett's of sphericity ought to be statistically significant. As a result, the study's data were appropriate for additional investigation.

5.2 Inferential Analysis

Inferential analysis looks for answers to demographic and sample-related queries that remain untested in the research. The bivariate nature of the study's independent and dependent variables was defined in this section by the researcher to gauge how strongly the variables related to one another. Subsequently, multiple linear regressions were employed to ascertain the nature of the link between the variables.

5.2.1 Correlation Analysis

To find out whether there is a link between the variables or how strongly they correlate, the researcher in this study used a crucial correlation matrix. The researcher used correlation analysis to explain the linear relationship between two variables depending on the direction and degree of the link. Several statisticians offer guidelines for explaining the link between variables. Whereas, the weak association is shown by Pearson correlation (r) = 0.10 to 0.29 or -0.10 to -0.29; the moderate relationship is indicated by r = 0.30 to 0.49 or -0.30 to -0.49; and the strong Relationship is indicated by r = 0.5 to 1.0 or -0.5 to 1.0.

The adoption of blockchain technology and relative advantages have a strong positive relationship (r=.965, p-value =.000), according to the results of the summary of correlation table of variables. This suggests that there is a significant relationship between relative advantage and adoption of blockchain technology. Additionally, the results showed a strong connection between organizational preparedness and blockchain technology adoption, with (r =.945, p-value =.000) indicating a favorable influence of organizational readiness on blockchain technology adoption. The research also showed that there is a positive correlation (r =.921, p-value =.000) between the adoption of blockchain technology and external pressure, suggesting that the two variables have a substantial positive relationship.

Table 6: Correlation Analysis Matrix

			Adoption of Blockchain Technology	Relative advantage	Organizational readiness	External pressure
*	Pearson Correlation	Adoption of Blockchain Technology	1.000	.965	.945	.921
		Relative advantage	.965	1.000	.973	.917
		Organizational readiness	.945	.973	1.000	.866
		External pressure	.921	.917	.866	1.000
	Sig. (1-tailed)	Adoption of Blockchain Technology	.	.000	.000	.000
		Relative advantage	.000	.	.000	.000
		Organizational readiness	.000	.000	.	.000
		External pressure	.000	.000	.000	.
	N	Adoption of Blockchain Technology	101	101	101	101
		Relative advantage	101	101	101	101
		Organizational readiness	101	101	101	101
		External pressure	101	101	101	101

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

Source: *Researcher's Own Construct, (2023)*

5.2.2 Regression Model Analysis

Table 7: Model Summary for Relative advantages

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.972[a]	.936	.923	.25891

a. Predictors: (Constant), cost and security

Source: *Researcher's Own Construct, (2023)*

Based on the obtained results, the study concluded that relative advantages (Cost and Security) enhance the adoption of blockchain technology. Specifically, the model is more supportive to the extent that independent variables influence the adoption of blockchain technology, supporting it by.936 R square, or 93.6%.

Table 8: ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	81.819	2	20.455	305.148	.000[b]
1	Residual	6.502	99	.067		
	Total	88.321	101			

a. Dependent Variable: adoption of blockchain technology

b. Predictors: (Constant), cost and security

Source: *Researcher's Own Construct, (2023)*

With a significant sign of P-value =.000, which denotes that the model is significant because the P-value is less than 0.05, Table 5.9 shows that the model was significant.

Table 9: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.105	.060		18.520	.000
Cost	-.018	.104	-.022	-.172	.864
Security	-.001	.074	.682	-.013	.000

a. Dependent Variable: adoption of blockchain technology

Source: *Researcher's Own Construct, (2023)*

$$\text{From } Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

$$\text{Then Y} = 1.105 + -.022X_1 + .682X_2 + .060$$

Where by Y= adoption of blockchain technology, β_0= Constant, ($\beta_{1,}$ $\beta_{2,}$) = Regression coefficient of independent variables, ε= Error term, X_1= Cost, X_2= Security.

The findings showed that cost had no discernible impact on the uptake of blockchain technology (β=-0.022, P-value=.864). Given that the p-value is higher than the 0.05 cutoff point, this suggests that costs have a negative influence on the adoption of blockchain technology, but it is not statistically significant. Additionally, the study showed that security influences blockchain adoption positively and that this link is significant (.000) and sufficient (.682, or 68.2%) in terms of adoption.

Table 10: Model summary for Organizational readiness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.970[a]	.941	.938	.23259

a. Predictors: (Constant), IT resources, and Financial resources.

Source: *Researcher's Own Construct, (2023)*

Based on the results, the study concluded that organizational readiness (financial and IT resources) enhances the adoption of blockchain technology. Specifically, the model is more supportive to the extent that independent variables influence the adoption of blockchain technology, with a support value of 94.1%, or .941 R square.

Table 11: ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	83.127	2	16.625	307.314	.000[b]
1	Residual	5.194	99	.054		
	Total	88.321	101			

a. Dependent Variable: adoption of blockchain technology

b. Predictors: (Constant), IT resources and financial resources

Source: *Researcher's Own Construct, (2023)* With a significant sign of P-value =.000, which denotes that the model is significant because the P-value is less than 0.05, table 11 shows that the model was significant.

Table 12: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.212	.172		-1.234	.220
IT Resources	.266	.079	.165	3.375	.001
Financial resources	.251	.099	.206	2.541	.013

a. Dependent Variable: adoption of block chain technology

Source: *Researcher's Own Construct, (2023)*

$$\text{From } Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

$$\text{Then } Y = -.212 + .165X_1 + .206X_2 + .172$$

The study's findings showed that financial resources and IT resources have a positive relationship that is sufficiently contributing to the adoption of blockchain technology, with financial resources having a positive relationship that is below the cutoff points of 0.05 and significantly influencing adoption of blockchain technology by.206, or 20.6%, and significant by.001.

Table 13: Model summary for External pressure

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.971[a]	.942	.939	.23043

a. Predictors: (Constant), competitive pressure, and trading partners pressure

Source: *Researcher's Own Construct, (2023)*

The findings show that the model is more supportive of the extent to which independent variables impact the adoption of blockchain technology; that is, the model is supportive by 94.2%, or.942 R-square. As a result, the study concluded that external pressure that is, pressure from trading partners and competitors improves the adoption of blockchain technology.

Table 14: ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	83.223	2	16.645	313.463	.000[b]
	Residual	5.098	99	.053		
	Total	88.321	101			

a. Dependent Variable: adoption of blockchain technology

b. Predictors: (Constant), competitive pressure and trading partner pressure

Source: *Researcher's Own Construct, (2023)*

The model's significant sign of P-value =.000, which shows that the model is significant because the P-value is less than 0.05, is shown in Table 14.

Table 15: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.909	.083		10.896	.000
Competitive pressure	.320	.090	.269	3.566	.001
Trading partner pressure	.039	.078	.049	.494	.622

a. Dependent Variable: adoption of blockchain technology

Source: *Researcher's Own Construct, (2023)*

$$\text{From } Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

$$\text{Then } Y = .909 + .269X_1 + .049X_2 + .083$$

The study's findings showed that, while trading partner pressure is insignificant in its influence on blockchain adoption by.049, or 4.9% above the 0.05 cutoff points, competitive pressure has a positive relationship with adoption of blockchain technology. It is sufficient, influencing by.269, or 26.9%, and significant by.001.

6.0 Discussion

Based on the data, it can be concluded that organizational readiness has the lowest average prominence value, while relative advantage (security) and external pressure (competitive pressure) have the highest. Therefore, the advantages (relative advantage) that blockchain technology offers over other current technologies (security) are what first drive its adoption in the supply chain. This is followed by external adoption pressure from the likes of competitive pressure and... Conversely, organizational preparedness appears to have no bearing on the choice to use financial and information technology. (Holotiuk & Moormann, 2018; Sharma et al., 2020). This final finding implies that adoption decisions might be made independently of organizational preparation, meaning that blockchain would frequently be the catalyst for broader organizational change. The existing body of research on digital transformation, which contends that significant technical adoption will lead to organizational digitalization, supports this conclusion (Hartley and Sawaya, 2019; Kalaitzi et al., 2020). Furthermore, the study found that the factors that have the biggest effects on the adoption of blockchain technology are competitive pressure, security, and IT resources. On the other hand, trading partners and cost have little effect on the adoption of blockchain technology.

7.0 Conclusion

This study was carried out using a limited sample of 101 in Tanzania's Soft Drinks Supply Chain Manufacturing Industries. It is imperative to take this element into account when extrapolating the results of the study. Future research on the use of blockchain technology in small and large businesses may be carried out in Tanzania and other regions. In the future, longitudinal research may be carried out to investigate the factors impacting the various business types' adoption of blockchain technology in supply chains. This would enable product developers to ensure client-specific product adjustments. Numerous contexts, such as smart cities, surveillance systems, the Internet of Things, smart cities, tourism and hospitality, agriculture, and healthcare, can be studied in relation to blockchain adoption and applications. Future studies could build upon the proposed integrated TOE framework to examine the variables influencing blockchain technology adoption in various micro and large businesses that operate in the manufacturing and service sectors. The study revealed that the three main categories of enablers that influence blockchain adoption in the soft drink supply chain are security, competitive pressure, and financial resources. Results also point to the necessity of educating consumers and supply chain experts about the benefits of blockchain technology over current ones to encourage widespread use of the technology. Our research also shows that to encourage the adoption of blockchain technology in soft drink supply chains, it is essential to create technological standards, facilitate interoperability between various blockchains and between blockchains and businesses' systems, and modify laws and regulations to facilitate exchange processes and business models enabled by blockchain technology.

8. 0 Limitations and Recommendations for Further Studies

The findings show that creating a legal framework for blockchain technology use is essential for its widespread adoption. This implies that to support blockchain-enabled business models and exchange operations, legislators must also try to draft new legislation or modify those that already exist. It is true that laws pertaining to data security and privacy have an impact on blockchain technology, and it may be required to create new laws or amend current ones to encourage the use of this technology.

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