EXPLORING THE IMPACT OF BLOCKCHAIN ON ENHANCED ACCOUNTING INFORMATION SYSTEMS IN MAJOR CORPORATIONS: A COMPARATIVE ANALYSIS

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Introduction

For the purposes of storing and verifying transactional data, the blockchain technology is used. For the system to operate, discrete pieces of information, which are referred to as "blocks," must be incorporated into a distributed ledger. This ledger is maintained by a network of peer-to-peer computer devices that are associated with one another. The technical development at issue has the potential to be revolutionary, and it has already had a significant influence on the market structures and business strategies of a variety of different sectors, including accounting. It may be difficult for academics to keep up with the most recent breakthroughs in blockchain technology due to the quickly developing body of information on the topic. In the field of accounting, conducting a systematic literature review (SLR) on contemporary research concerning blockchain technology has the potential to result in the discovery of insightful new information (Bonsón, 2019).

Several literature evaluations have been carried out in a variety of academic fields to investigate the possible uses of blockchain technology. These fields include business and management, supply chains, FinTech, the Internet of Things, and urban studies. However, there has only been one literature review done in the topic of accounting, and it was restricted to a total of sixteen papers and twenty industry reports or websites. In the disciplines of accounting and auditing, ideas for possible applications of blockchain technology have been offered by several writers. On the other hand, an in-depth investigation of these applications has not yet been carried out. The investigation into question has arrived at the conclusion that the phenomena of blockchain are one that has not yet been investigated to its full extent. Because of this, further study has to be conducted in order to get a full grasp of this developing technology and the ways in which it may influence the domains of accounting and auditing (Dumay, 2019).

After being confirmed by network nodes, a transaction cannot be changed and is

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resistant to being reordered after it has been recorded on a blockchain. This immutability is the primary benefit of blockchain technology. The immutability of transactions serves as the essential underpinning for the integrity of blockchain technology. This guarantees that all parties involved have access to a record that is consistent and accurate. As a result of the decentralised nature of the blockchain's underlying design, all participants in the network are able to see any ledger modifications that are made (Dai, 2019).

It is possible that using blockchain technology may strengthen the competitive advantage of a firm and create trust among market players. This is especially true in situations where transparency is of substantial importance. The process of transaction verification being carried out in a decentralised manner is one of the defining characteristics of blockchain technology. Because the blockchain protocol runs on every computer connected to the network, it cannot be compromised by a single point of failure because it is distributed over the whole network. It is unlawful for persons to participate in any kind of coordinated action that has the goal of evading controls, changing, or destroying official accounting records (Tang, 2019). Because of this, it is possible that the implementation of blockchain technology into the accounting systems of companies may result in a decrease in the likelihood of fraudulent acts being committed (Gurtu 2019). The introduction of blockchain technology can make it easier to automate more transactions, reduce the amount of data that is lost, improve the capabilities of transaction monitoring, and speed up the process of identifying changing customer needs throughout the process. The fundamental and most significant difference between blockchain and traditional databases is that the former uses a novel control mechanism that makes transactions unchangeable. Conventional databases store data in a linear fashion (Procházka, 2018).

According to the forecasts provided by the World Economic Forum, by the year 2025, the contribution that blockchains will make to the global gross domestic product (GDP) is anticipated to be no less than 10%. This prediction indicates that there will be a considerable growth in the acceptance and integration of blockchain technology in the future years, even though blockchain technology is still in its infancy and is underutilised in the majority of businesses at the current time. According to the conclusions of recent study, it has been forecasted that blockchain technology would have a substantial influence on corporate value, with an expected generation of $3.1 trillion in value by the year 2030. As a result, it is appropriate to explore the possible influence of this revolution on the basic principles of accounting and, because of this, the attitude that practitioners and theorists take towards the discipline of accounting. Because of this, it has been determined that it is both timely and relevant to undertake a literature study on the present status of blockchain technology

in the area of accounting (Jones, 2019). The modern technology will have a big influence on the surrounding environment of accounting, and this impact will result in consequences that are both good and bad. It is envisaged that this systematic literature review (SLR), which will serve as a vital reference point for professionals, experts, and academics, will come into its own as the accounting information systems area moves closer to its anticipated next revolution (La Torre, 2021).

Review of Literature

In the field of machine learning, there are many different text mining techniques, each of which is intended to accommodate certain data sources and desired goals for an in-depth analysis. For the purpose of carrying out an exhaustive literature review in a dependable and objective manner, the researcher made use of a technique known as Latent Dirichlet Allocation (LDA) modelling (Marrone, 2019). The research shows the benefits of employing LDA, some of which include higher objectivity, improved replicability, broader generalizability, enhanced statistical power, and the possibility to detect buried language traits. According to the findings of academic research, LDA has been recognised as a relevant and practical method for managing literary corpora of varied sizes. The authors emphasise the use of LDA as a method that gives higher dependability in comparison to other exploratory review approaches. (Fullana, 2021). This is because the algorithm may be re-executed on the same stack of papers, resulting in the exact same set of results. Since it relies on more than simply a static word frequency estimate, the LDA methodology is a well-liked way for determining what themes are being discussed. In addition, it is suggested that better human analysis be integrated with the techniques of machine learning since these two types of analysis "constitute complementary methodologies for scrutinising financial discourse." In line with the aforementioned counsel, the hybrid strategy was put into action, which included the use of manual review, citation analysis, and LDA analysis.

One is able to determine the articles that are most representative of a certain topic by using a technique known as Latent Dirichlet Allocation (LDA). In addition, one might discover patterns and trends within the subject matter by doing an analysis of the themes that are created by LDA. The use of latent dirichlet allocation, abbreviated as LDA, makes it possible to investigate the underlying connections that exist between the various words and topics included in a particular dataset (Canelón, 2019). The use of LDA makes it easier to understand the concept that a document has a certain count of topics that reflect the probability distribution of a vocabulary. This is because LDA displays the topics in a tree-like structure. The employment of grid-search as well as topic coherence is applied to maximise the range of subjects that are taken into account. In addition to this, the model provides a

collection of articles that demonstrate the maximum possible degree of correlation with each individual topic (Al-Htaybat, 2018).

The deployment of blockchain technology has the potential to revolutionise the recognition of data by moving away from the conventional double-entry accounting system and towards a triple-entry system. This move will be necessary to implement blockchain technology. This modern method produces three entries for every transaction: one for debiting, one for crediting, and one for the cryptographic signature that verifies the legitimacy of the transaction. Within the context of this architecture, the blockchain technology performs the role of a decentralised middleman by disseminating the information, automating the process of storing it, and confirming the transaction (Wang, 2019). In addition to this, it could function as a safe and dependable accounting platform, which would reduce the likelihood of fraudulent or erroneous accounting practises being used. The blockchain would function as a ledger for both financial transactions that took place inside an organisation as well as financial activity that took place between parties, such as bank deposits and bill payments. As a result of this, it is probable that the responsibility of checking ledger transactions will be given to an accountant (Siew, 2020).
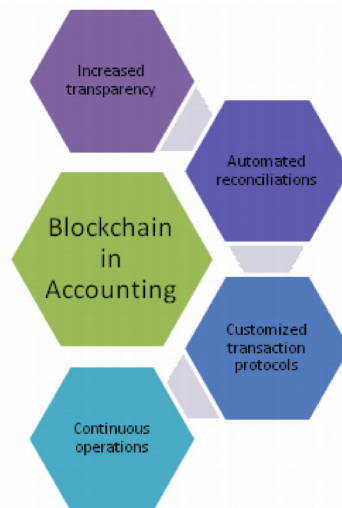
Methodology

The purpose of this study is to evaluate the role that blockchain technology plays in the accounting procedures used by various commercial entities. The researchers want to conduct their investigation via a quantitative approach. The authors gathered the primary data themselves with the use of a questionnaire with just a few questions and no open-ended responses that they gave to the respondents. The researcher used the convenience sampling approach to obtain a sample size consisting of 135 different people. When

attempting to interpret previous research carried out in a relevant topic, secondary data is used. During the research, the SPSS programme was employed to carry out in-depth analyses and derive conclusions based on the information that was gathered.

Sensitivity and specificity are measures of a test's ability to correctly classify a person as having a specific response or not. Sensitivity refers to a test's ability to designate an individual with correct response as positive. A highly sensitive test means that there are few false negative results, and thus fewer cases of incorrect responses are missed. The specificity of a test is its ability to designate an individual who does not have a disease as negative. A highly specific test means that there are few false positive results (Moll, 2019).

It is desirable to have a test that is both highly sensitive and highly specific. This is frequently not possible. Typically, there is a trade-off. For many clinical tests, there are some people who are clearly normal, some clearly abnormal, and some that fall into the Gray area between the two. Choices must be made in establishing the test criteria for positive and negative results.

The probability of having correct responses, given the results of a test, is called the predictive value of the test. Positive predictive value is the probability that a patient with a positive (abnormal) test result has the disease. Negative predictive value is the probability that a person with a negative (normal) test result is truly free of disease. Predictive value is an answer to the question: If my patient's test result is positive, what are the chances that my patient does have the disease?

Predictive value is determined by the sensitivity and specificity of the test and the prevalence of disease in the population being tested. (Prevalence is defined as the proportion of persons in a defined population at a given point in time with the condition in question.) The more sensitive a test, the less likely an individual with a negative test will have the disease and thus the greater the negative predictive value. The more specific the test, the less likely an individual with a positive test will be free from disease and the greater the positive predictive value.

Research Hypothesis

There is no impact of using blockchain technology in accounting and increased transparency for leading organisations.

There is no impact of using blockchain technology in accounting and automated reconciliations for leading organisations.

There is no impact of using blockchain technology in accounting and customised transaction protocols for leading organisations.

There is no impact of using blockchain technology in accounting and continuous operations for leading organisations.

Critical Analysis and Interpretation

This part of the study is involved in presenting the data analysis based on the information collected from the respondents, the sample population were chosen using convenience sampling method. The data is analysed used SPSS statistical package and the tools used are percentage rate analysis, regression analysis and sensitivity, specificity, F1 scores.

Table 1: Percentage rate analysis

Gender	Frequency	Percent
Male	78	57.8
Female	57	42.2
Age	**Frequency**	**Percent**
18 - 25 years	42	31.1
26 - 35 years	44	32.6
36 - 45 years	18	13.3
Above 45 years	31	23
Nature of Industry	**Frequency**	**Percent**
Accounting department	62	45.9
Auditing services	50	37
Consultancy and others	23	17
Type of Family	**Frequency**	**Percent**
Nuclear Family	80	59.3
Joint Family	55	40.7
Level of Management	**Frequency**	**Percent**
Lower Level Management	62	45.9
Middle Level Management	33	24.4
Top Level Management	21	15.6
Entreprenuer / Business Owner	19	14.1
Work experience	**Frequency**	**Percent**
Less than 3 years	37	27.4
3 - 6 years	36	26.7
6 - 9 years	24	17.8
9 - 12 years	27	20
Above 12 years	11	8.1
Total	135	100

Based on the overall analysis it is noted that 57.8% were male respondents, 31.1% were in the age group of 18 - 25 years, 45.9% were working in accounting department, 59.3% were in nuclear family, 45.9% were in Lower Level Management and 27.4% possess less than 3 years of experience.

Regression Analysis

The next step is to understand the nature of impact of the independent variables towards the dependent variable.

Table 2: Regression Analysis

R	R Square	Adjusted R Square			
.900a	0.902	0.813			
ANOVA	**Sum of Squares**	**df**	**Mean Square**	**F**	**P Value**
Regression	137.637	4	34.409	141.459	.000b
Residual	31.622	130	0.243		
Total	169.259	134			
Regressions	**B**	**Std. Error**	**Beta**	**t**	**P Value**
(Constant)	0.297	0.17		1.753	0.08
Increased transparency	0.014	0.09	0.016	0.155	0.88
Automated recons	0.359	0.085	0.361	4.24	0.00
Customised transaction	0.304	0.117	0.328	2.605	0.01
Continuous ops	0.235	0.075	0.242	3.149	0.00

The overall analysis shows that the value of R squared is 0.813 which shows that the model is a best fit, also the F value is at 141.45 at 5% level of significance with p value being 0.00. Hence there lie significant relationships among the variables.

The regression equation is framed as

Y (Blockchain in Accounting) = 0.297 + 0.014 x increased transparency + 0.359 x automated reconciliations + 0.304 x Customised transactions + 0.235 x Continuous operations

Sensitivity, Specificity and F1 scores

This part is involved in understanding the sensitivity, specificity, accuracy and F1 scores based on the confusion matrix

Table 3: Confusion matrix 1

Increased transparency		Blockchain technology		Total
		Positively influenced	**Negatively influenced**	
Positively influenced	**Count**	17	11	28
	%	100.00%	9.30%	20.70%
Negatively influenced	**Count**	0	107	107
	%	0.00%	90.70%	79.30%
	Count	17	118	135
	%	100.00%	100.00%	100.00%
Sensitivity / Recall	60.71%			
Specificity	100.00%			
Precision	100.00%			
Accuracy	91.85%			
F1	75.56%			

From the above analysis it is noted that the sensitivity is 60.71%, specificity is 100%, precision is 100%, and accuracy is at 91.85% and F1 score s 75.56% hence most of the respondents have stated that the application of blockchain technology in accounting can enable in increased transparency.

Table 4: Confusion matrix 2

Automated reconciliations		Blockchain technology	Total	
		Positively influenced	Negatively influenced	
Positively influenced	Count	14	3	17
	%	82.35%	17.65%	12.60%
Negatively influenced	Count	3	115	118
	%	2.54%	97.46%	87.40%
	Count	17	118	135
	%	100.00%	100.00%	100.00%

Sensitivity / Recall	82.35%
Specificity	97.46%
Precision	82.35%
Accuracy	95.56%
F1	82.35%

From the above analysis it is noted that the sensitivity is 82.35%, specificity is 97.46%, precision is 82.35%, accuracy is at 95.56% and F1 score is 82.35% hence most of the respondents have stated that the application of blockchain technology in accounting can enable in smarter automated reconciliations.

Table 5: Confusion matrix 3

Customised transactions		Blockchain technology		Total
		Positively influenced	Negatively influenced	
Positively influenced	Count	12	5	17
	%	70.59%	29.41%	12.60%
Negatively influenced	Count	5	113	118
	%	4.24%	95.76%	87.40%
	Count	17	118	135
	%	100.00%	100.00%	100.00%

Sensitivity / Recall	70.59%
Specificity	95.76%
Precision	70.59%
Accuracy	92.59%
F1	70.59%

From the above analysis it is noted that the sensitivity is 70.59%, specificity is 95.76%, precision is 70.59%, accuracy is at 92.59% and F1 score is 70.59% hence most of the respondents have stated that the application of blockchain technology in accounting can enable in making and processing customised transactions.

Table 6: Confusion matrix 4

Customised transactions		Blockchain technology		Total
		Positively influenced	Negatively influenced	
Positively influenced	**Count**	15	2	17
	%	88.24%	11.76%	12.60%
Negatively influenced	**Count**	2	116	118
	%	1.69%	98.31%	87.40%
	Count	17	118	135
	%	100.00%	100.00%	100.00%
Sensitivity / Recall	88.24%			
Specificity	98.31%			
Precision	88.24%			
Accuracy	97.04%			
F1	88.24%			

From the above analysis it is noted that the sensitivity is 88.24%, specificity is 98.31%, precision is 88.24%, accuracy is at 97.04% and F1 score is 88.24% hence most of the respondents have stated that the application of blockchain technology in accounting can enable in customised transactions.

Discussion

By using blockchains, individual workers within a company are given the ability to quickly record transactions into the distributed ledger using their own personal computing devices. It is possible to record transactions in a non-online environment and then bring them up to date afterwards. Because the whole ledger is available to everyone, using a distributed ledger eliminates the need to store any information in separate databases. This is because everyone has access to the entire ledger.

High levels of control and automation

Within an accounting system, the assignment of permissions to members of the operational team is accomplished via a process that relies heavily on the development of control levels. Blockchains, which may be managed on a variety of different node levels, make it possible to reach an automated agreement about the inputs of transaction data. With this level of automation, organisations are able to delegate varied degrees of control

to workers, which they may use to split duties among cross-functional teams. This level of automation also enables businesses to reduce the risk of human error.

Continued operations

Due to the decentralised nature of blockchain technology, the usage of a blockchain-based accounting system assures the ongoing functioning of accounting operations inside a business. This is the case even in the event of a partial outage of the system, which is why blockchain technology is becoming more popular. When compared to a centralised accounting database, this provides a significant benefit due to the fact that the latter regularly requires shutdowns for maintenance, which may result in interruptions to the functioning of the business.

Customized transaction protocols

Several different blockchains of the second generation, such as Ethereum, are equipped with the capability to include computer code into the network protocol. Because of this function, the network is able to carry out tasks on its own provided that certain predetermined requirements are met. Despite the fact that the essential feature in question has been used as the foundation for intelligent contracts, its potential applications in the field of accounting should not be ignored. It is usual practise for businesses to hire software engineers in order to construct algorithms that are capable of automating accounting operations. It is possible to consider certain activities, including periodic amortisation, discounted cash flows, risk evaluations, and inventory thresholds in specified ledgers, to be simple enough to automate. Both the improvement of worker productivity and the streamlining of business processes should be considered essential goals.

Increased transparency

Every member of the organisation has access to the distributed ledgers maintained by blockchain technology. Visibility of entries in real time amongst executive staff and board members is favourable to efficient team cooperation when it comes to working on projects together. As a direct result of this, the capacity of managers and the teams they lead to make choices in a timely manner may be improved.

Conclusion

The use of blockchain technology has the potential to usher in a wave of revolutionary transformation across the auditing sector. The usage of smart contracts has the potential to provide stakeholders with access to information that has already been pre-validated. This is because smart contracts are capable of autonomously performing certain auditing processes that are implemented on a blockchain platform. Individuals working inside the

accounting ecosystem have the ability to take up auditing obligations on behalf of other companies, according to the conclusions of the study that was conducted. Multiple parties are now able to check accounting information thanks to the usage of blockchain technology and the capacity of companies to keep a continuous flow of information. In order to improve audit quality and narrow the expectation gap that exists between auditors, consumers of financial statements, and regulatory authorities, one possible option would be to use blockchain technology to automate certain auditing tasks that are performed by external auditors. The authors suggest the development of a new category of auditor in order to provide attestation services for the purpose of conducting objective assessments of blockchain controls.

Regarding the possible influence that blockchain technology might have on the auditing industry, there is not widespread agreement among scholars. The researchers anticipate that the practise of auditing will continue to develop, which will lead to the appearance of unique characteristics and a rise in the field's level of complexity. The use of blockchain technology makes it possible to create a ledger that is decentralised and open to the public. This makes it possible to conduct real-time audits of several businesses at the same time. According to the findings of this investigation, auditors will need to improve their skill sets in order to analyse data relevant to individual companies as well as the overall accounting ecosystem.

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