RESHAPING THE FINANCIAL SERVICES DELIVERY IN SAUDI ARABIA: THE ROLE OF BLOCKCHAIN TECHNOLOGY

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ABSTRACT

In respond to the call by the subject matter of this book on management in a context of digital transformation with particular focus on the role of blockchain technology in effective financial services delivery in Saudi Arabia. This chapter examined reshaping the financial services delivery in Saudi Arabia with particular focus on the role of blockchain technology. The financial sector has in the past experience major changes due to the effect of technology and digital era. The new era is geared towards replacing the traditional financial methods in the delivery of financial services, where services are almost done manually. Due to traditional nature of financial methods, service delivery is therefore considered not effective enough to achieve the desire customer satisfactions. Therefore, a new technology has emerged to reshape the financial industry landscape drastically forcing the financial firms to transform and retain their financial stronghold. The study covered 39 employees of 8 banks in Riyadh district, Saudi Arabia through a cross-sectional survey research design with a quantitative survey questionnaire approach. An email survey procedure was employed to distribute and retrieve the copies of questionnaire distributed to the respondents. In all only 39 copies of questionnaire among those returned were usable. A SmartPls analysis technique that deals with reflective constructs was used to analyse the data collected whereby the finding among others revealed overall support on the relationship between blockchain technology and effective financial service delivery ($p<0.001$ with t value of 13.465). In other words, it shows that blockchain technology affects the financial service delivery, suggesting that effective service delivery in the banking industry is a function of blockchain technology. It draws a conclusion that blockchain technology enhances financial service delivery in the financial industry.

Keywords: *Blockchain technology, Financial service, Service delivery, Financial industry, Saudi Arabia.*

1. INTRODUCTION

Generally, there are several sectors that make up the total sectors in any economy across the globe, and among these sectors is the financial sector. Financial institutions are made up of all those economic units that provide people with the opportunity to save and accumulate wealth. In other words, it covers all the financial institutions such as the banking sector (e.g. central banks, retail and commercial banks, internet banks, credit unions, savings, and loans associations, investment banks), investment companies, asset management funds, brokerage firms, insurance companies, and mortgage companies. In the recent times, the financial sector appears to gain more attention than the

other sectors of the economy may be due to its role and fragile nature to the economy of the country.

The financial sector has in the past experience major changes due to the effect of technology and digital era. The new era is geared towards replacing the traditional financial methods in the delivery of financial services, where services are almost done manually. Because of its traditional nature, service delivery is therefore considered not effective enough to achieve the desire customer satisfactions. In the new financial era, customers want quick and fast service delivery with very limited time making the world to be

on the fast lane. For this purpose, the quick and fast services delivery demand has continued to increase [1] in such that businesses that could not meet up with this demand may be force to close down. Thus, the rapid growth of technology is changing the financial systems around the world, and the financial services traditional players must reshape their services to cope with the changes in the world technological services.

According to [2] points out the financial service delivery ineffectiveness in the financial industry due to the technological changes. In the developed countries such as U.S.A and Europe, financial firms are already adapting to these technological changes in the financial sector. This could be more reason why people perceive their financial service delivery as effective. Thus, they demonstrate more effective financial services delivery than other part of the world. However, in country such as Saudi Arabia, financial service delivery is considered ineffective especially when compared to those of the western countries. In Saudi Arabia, the financial firms appear to be managing the changes. However, coping effectively means that it must adapt to new kinds of technology that deals with the increased demand of financial services coupled with intensive global competition in the financial sector [1]. The adaption of this new technology offers the customers the most effective service since customers are trying to use the financial services that offer ease of use, convenience, efficiency, and speed.

One of these technologies that offer these financial services deliveries is blockchain technology. More evidently, [3, 4] noted that the existence of blockchain technology is now shaken and reshaping the financial industry landscape drastically forcing the financial firms to transform and retain their financial stronghold. Thus, financial firms particularly those in the developed countries such as U.S.A. and now, Europe is acknowledging the blockchain technology effects particularly on generate new revenue, deliver process efficiency, etc. [3, 4]. Blockchain determines cryptocurrency and bitcoin with many unique qualities such as creating systems with no downtime among others. As argued, blockchain technology is believed to be the next generation of technology in the financial domain.

[1] believes that blockchain technology would be a disruptive innovation technology which would direct financial services. It therefore implies that the financial industry should quickly look into its opportunities and challenges. The technology is considered as a strategic opportunity for financial institutions. From the above, this paper recognises the role of blockchain technology in the effective financial service delivery. It argued that blockchain technology to a greater extent plays a significant dramatic role in reshaping the financial industry. Therefore, this paper aims at linking blockchain technology to effective financial service delivery with a particular interest in Saudi Arabia.

2. LITERATURE REVIEW

2.1 Understanding Blockchain Technology
Blockchain technology is relatively a new branch in the area of digital technology and therefore the task of defining the concept could be challenging. The creation of Blockchain is to power both cryptocurrency and bitcoin because of the problem of trust in the financial system.

According to [5], blockchain technology deals with digital public ledger records executed and shared among parties involved. Every single transaction in the ledger is confirmed by the popular agreement of the participants in the system. Once this information is recorded, it cannot be wiped out or expunged. In other words, it is a technology that validated transaction records in one transaction made. In an attempt to conceptualized blockchain technology, [6] described it as a decentralized distributed ledger technology that gives room to digitally create, validate and encrypt any transaction in such that it is the incorruptible way. The body further explained the technology to mean a block of transactions which are connected to earlier or prior group of transactions called chain which can be reproduced and shared among parties involved.

Indeed, blockchain technology keeps accounts of all executed transactions without deleting any. Good examples of blockchain technology ares Bitcoin and cryptocurrency

Furthermore, the Federation of Indian Chambers of Commerce and Industry [7] simply defined blockchain technology as a

"peer-to-peer distributed ledger encrypted and secured in such that it can only be updated with the parties consent.

In other hand, it is a "distributed ledger technology that securely keeps account of all transactions which creates intermediaries of trust among the parties involved. Blockchain technology functioned through the validation of transactions via a distributed network for the purpose of creating lasting verifiable ledger information. The technology does its verification by securing distributed storage thereby improving the issue of trust among parties involved. This technology tends to revolutionaries how the world performs any kind of transaction and which will impact everyone (banking, power, education, health care etc.). In essence, blockchain technology is a technology mainly for transactions validation through a distributed network for the purpose of creating a permanent, verified and unalterable ledger of information.

2.2 Blockchain Technology and Financial Services Delivery

According to [8]; [9] acknowledged that there is a relationship between blockchain technology and financial services. For example, the study noted that blockchain technology brings about quick services even beyond supporting bitcoin. The study further observed that blockchain is a transformative agent in payments which the banks are now relying on. Its benefits include among others financial inclusion, reduced fraud, money transfers and transaction details. Take mobile payment for example, it has been projected that mobile payments are expected to increase beyond expectation to the tone of 3 trillion Euros by 2020 and Mobile Money savings beyond 2 billion USD for few African countries.

In India, [10] connected blockchain technology with financial inclusion. For this purpose, the study reviewed relevant literature on financial inclusion, adoption, and blockchain technology with particular interest in India literature. The study claimed that resolving that financial exclusion requires four major challenges which include banking products, financial illiteracy etc. Thus, they argued that these challenges can be resolved by blockchain technology yet there is a need for adequate

understanding of technology adoption in India. It was this understanding that led the authors to come up with a research agenda that deals with antecedents of adoption, adoption patterns, and outcomes of adoption. The paper very theoretical in nature made a contribution to how blockchain can be used to resolved financial inclusion in India with the aim of linking rural Indians to global supply chain networks.

Also, attempt by [11] looked into how SMEs can be included in blockchain technology. Its major objective was to present the concept of BcLFEP as an integrated solution to facilitate the logistics financing (LF) for capital-constrained SMEs in E-commerce retail. It proposed a blockchain-enabled logistics finance execution platform (BcLFEP) as an integrated solution to facilitate LF for E-commerce retail. In that case, a conceptual framework is proposed to organize the major objects. Then the specific design for these objects and its related system were demonstrated accordingly. The study adopted a case study approach which includes several experiments and demonstrative that tends to verify the effectiveness of BcLFEP. Among others the study concludes that blockchain agent is related to SMEs finance, however, blockchain agents should be designed for specific requirements in different scenarios of LF or even SCF.

[12] related blockchain technology with both crowdfunding and FinTech. The study adopted a systematic review of influential publications among 402 papers published between 2010 and 2018. It argued on the research gaps on the applications of both FinTech: crowdfunding and blockchain. The analysis result revealed among others that crowdfunding and blockchain could be disruptive financial intermediation. The paper lacks empirical evidence on blockchain technology.

Like the current study, [13] related blockchain to finance. It examined the benefits of blockchain technology to finance. For example, it helps in decentralizing, replicating and tampering resistant (immutable). Being a theoretical paper, the study claimed that blockchain is still an evolving area of study. Therefore, it would be difficult make conclusions about the technology even the

cryptocurrencies which is major part of blockchain technology. Finally, it is concluded that blockchain technology will support both micropayments and micro financial Services.

Other authors such as [14]; [15]; [16]; [10] and [17] equally examined blockchain technology in relation to finance and financial inclusion in some countries in the world. However, these papers are theoretical based, and therefore do not offer any empirical evidence on how blockchain technology affects financial services delivery.

Although not empirical based, [3]; [4] believes that blockchain technology impacts on the financial industry through many means such as generating new revenue, deliver process efficiency, improve end-user experience and reduce risk in business operations. [3]; [4] asserts that the benefits of blockchain technology to the financial industry are huge particular in the areas of security, transparency, trust, privacy programmability, high-performance and scalability.

Also, [1] related blockchain technology to financial technology (FinTech). The study claimed that Blockchain has made a remarkable impact in the last few years particularly in the ICT domain. The study claimed that the introduction of blockchain technology help ease of the processes in the financial service delivery. Therefore, with blockchain technology the financial industry would be able to resolve the issue of financial services demand including global competition in the financial sector.

2.3 Conceptual Model

Figure 1 diagrammatically explains the relationship between the independent and dependent variables in this study. Thus, the purpose of this model is to demonstrate the relationship between blockchain and effective financial services delivery. The model first indicates an independent variable (blockchain technology) with a dependent variable (effective financial service delivery). The model is based on the theory that blockchain technology affects effective financial service delivery. The direction of the arrow in the diagram demonstrates a "causal" relationship between independent and dependent variables.

Thus, financial service delivery becomes effective through the use of blockchain technology.
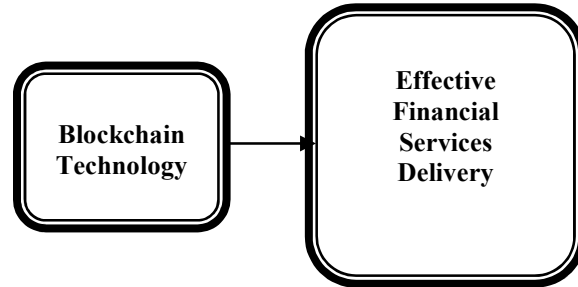

Figure 1: Blockchain technology and effective financial services delivery

2.4 Hypothesis Development

H1: Blockchain technology is effectively related to financial services delivery among the banks in Saudi Arabia

3.   METHODOLOGY

The study adopts a cross-sectional survey research design with a quantitative survey questionnaire approach. The population of the study covered all financial industry in Saudi Arabia in particular banking industry (Sekaran, Robert & Brain, 2001). It covered 8 banks in Riyadh district. Only banks currently using blockchain technology were included in the study. The specific population covered all the employees of the banks covered by this study. The study assumed a census nature due to the fact that all the population was included in the study. An email survey procedure was employed to distribute and retrieve the copies of questionnaire. In all, only 39 questionnaires among those returned were usable, and these were used for SmartPLS analysis for the study.

4.   DATA ANALYSIS RESULT

4.1 Descriptive analysis result

The descriptive analysis variable revealed 33 males and 6 females for gender giving a percentage of both 84.6 and 15.5 respectively with a mean of 1.15 and .366 standard deviation. It also shows the age brackets for the respondents with 16 of them falling below 30 years, 10 of them between 36-40years, 9 of them in the age bracket of 30-35years old while the rest of them are 41 years

and above, all accounting for 41, 25.6, 25.6 and 10.3 respectively with a mean of 2.05 and standard deviation of 1.05. Accordingly, the marital status revealed that 22 married and 12 singles accounting for 56.4 and 43.6 percent's respectively with mean of 1.56 and .50 standard deviation. The department variable shows that majority of them totaling 16 are in the accounting department, 8 of them are in sales department, 7 of them are also from customer relations while the rest are in the corporate banking department.

Their years of experience shows that 15 of the respondents who participated in the study have between 6-10 years experience indicating 38.5% with a mean of 2.10 and a standard deviation of .788 respectively. The result equally shows that 14 of them have above 10 years experience which amount to 35.9% while the rest 10 of them have between 1-5 years experience representing 25.6%.

The data analysis result also presented their various organizations the respondents are working. For example, it shows that majority of them numbering 15 are from Al-Rajhi accounting for 38.5% while 9 of them are from Alinma representing 23.1% respectively with a mean of 3.36 and a standard deviation of 1.97 accordingly. The rest of them are from Al-ahly, Alwatanyah, NCB, Mohmad, PKF and Riyad accounting for 5.1, 38.5, 10.3, 7.7, 2.6, 10.3 and 2.6 respectively.

Furthermore, table 1 depicts all the demographic particulars of the respondents who participated in the study, showing their gender, age, marital status, departments, years of experience and names of their organizations.

Table 1: Descriptive Analysis Result

Variables	Freque-ncy	Percen-tage	Mean	Standar-d deviatio-n
GENDER: Male Female	33 6	84.6 15.4	1.15	.366
AGE: Less than 30years 30-35years 36-40years 41years and above	16 9 10 4	41.0 23.1 25.6 10.3	2.05	1.050
MARITAL STATUS: Single Married	12 22	43.6 56.4	1.56	.502
DEPARTME NT: Customer Relations Accounting Sales Corporate banking Others	7 16 8 3 5	17.9 41.0 20.5 7.7 12.8	2.56	1.252
YEARS OF EXPERIENC E: 1-5years 6-10years Others	10 15 14	25.6 38.5 35.9	2.10	.788
NAME OF YOUR ORGANIZA TION: Alinma Al-ahly Al-Rajhi Alwatanyah NCB Mohmad PKF Riyad	9 2 15 4 3 1 4 1	23.1 5.1 38.5 10.3 7.7 2.6 10.3 2.6	3.36	1.967

4.2 Measurement Model

4.2.1 Criteria for Evaluating the Quality of the Measurement Model (Outer Model).

The following criteria such as R^2, Composite reliability (CR), Discriminant validity, Cronbach's Alpha, outer loadings and outer weights were used to evaluate the quality of the measurement model (outer model).
For example, the outer loadings for the reflective models are the key indicators demonstrating the results of single regressions of each indicator variable on their corresponding construct. Loadings are generally expected to be greater than .6. For this study, one could see that all the outer loadings for the reflective constructs are greater than 0.6 threshold as suggested by [12].

Furthermore, the outer weights are the results of a multiple regression of a construct on its set of indicators. They are the primary criterion to assess each indicator's relative importance in formative measurement models. It is also expected to be greater than .7.

Cronbach's Alpha is a measure of internal consistency reliability that assumes

equally indicator loadings. In the context of PLS SEM, it represents a conservative measure of internal consistentcy reliability. The internal consistency reliability of above 0.7 threshold including a composite reliability score of above 0.7 are consider quite good and acceptable. It implies that all the items were validated and reliable.

General guidelines on Cronbach's Alpha for Construct Reliability and Validity are:

- Below 0.60 unacceptable
- 0.60–0.70 minimally acceptable
- 0.70–0.80 respectable
- 0.80–0.90 very good
- Above 0.90 strong

For the model measurement, this was done using the following: internal consistency (composite reliability), convergent validity (average variance extracted) and discriminant validity) [18] as indicated in Tables 2 and 3 respectively. The study accepts 0.7 threshold for cross loadings and composite reliability as suggested [19].

The average variance extracted (AVE) was also determined via the discriminant validity where a minimum value of 0.5 is accepted as valid [23]. Meanwhile the present study achieve AVE value of 0.7 and above. The result depcited in table 1 suggests that the measurement model has achieved satisfactory internal reliability and convergent validity [20] and [22].

From table 2, it shows that only 11 items of blockchain technology coded BC met the threshold loading factor above 0.7 with Average Variance Extracted (AVE) of 0.775 and internal consistency reliability of above 0.7 threshold including a composite reliability score of above 0.7 are consider quite good and acceptable. It implies that all the items were validated and reliable.

Table 2: Measurement Model and Structural Model Specification Results

Latent variables	Items	Loadings	AVE	Cronbachs Alpha	Composite Reliability
Blockchain Technology	Q1 BC	.759	0.775	0.944	0.952
	Q10BC	.726			
	Q11BC	.854			
	Q13BC	.830			
	Q14BC	.835			
	Q15BC	.729			
	Q2 BC	.842			
	Q3BC	.849			
	Q4BC	.743			
	Q7BC	.872			
	Q8BC	.756			
Effective Financial service Delivery	Q2FS	.921	0.642	0.941	0.954
	Q3FS	.959			
	Q4FS	.881			
	Q5FS	.744			
	Q6FS	.819			
	Q7FS	.939			

Figure 2 shows the loading factors of all the reflective items measuring the variables in this study. Statistically, it shows that all items met the loading factor which a threshold of 0.7 and above to be included in the study. Thus, the scores as indicated by figure 2 show that every item met the threshold.
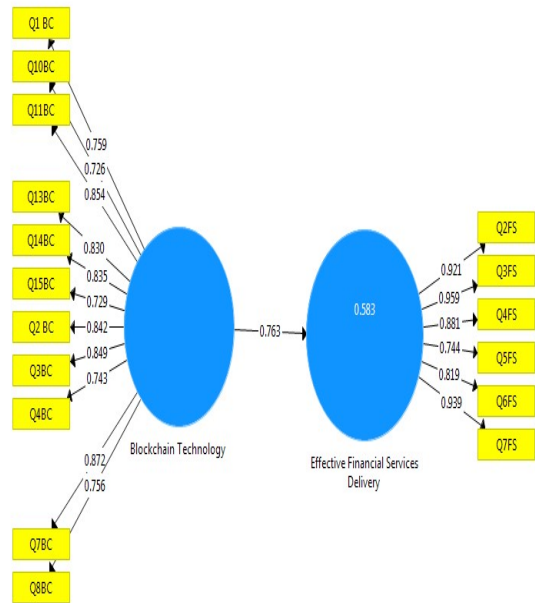

Figure 2: Loading Factors of construct

4.4 The Correlations and Discriminant Validity Results

Table 3 displays the outcome of the discriminant validity for the all the theoretical constructs. For example, it shows that each construct correlates since it is less than the square root of the average variance extracted

[21, 25]. The result implies that the constructs are truly distinct from order constructs by empirical standards. Thus, showing that each construct is unique and captured phenomenon not represented by other constructs in the model.

Table 3: Discriminant Validity of Constructs

Latent Variables	1	2
Blockchain Technology	0.801	
Effective Financial service delivery	0.763	0.880

Note: Diagonals (bold face) represent the square root of the average variance extracted while the other entries represent the correlations.

4.3 Structural Model

Table 4 which represents the SmartPLS structural model result demonstrates the relationship between blockchain technology and effective financial service delivery. Overall, the result revealed that blockchain technology is statistically and significantly (ß =-76%; p>0.01) related to effective financial service delivery. The result revealed an R^2 of **0.583** representing 58 percent of variance explained by the blockchain technology on the effective financial service delivery. Also, the path coefficient for the relationship between the variables is 13.465, suggesting that blockchian technology positively affect effective financial service delivery.

Table 4: Path Coefficients and Hypotheses Testing Result

Overall Model result						
Hypot hesis	Relatio nship	Be ta	Stan dard Erro r	T - Stati stics	P- Val ue	Decis ion
H1	Blockc hain Techno logy->Effect ive financia l service deliver y	0.7 62	0.057	13.46 5	0.0 0	Supp orted

Figure 3 diagramatically demonstartes the relationship between the independent and dependent variables in this study. It shows that blockchain technology through its reflective

measurement otherwise called first order components statistcially and significantly affact the effective financial services delivery. The overall t-statistics value of 13.465 eqully indicates the the significance of the relationship between the varaibles.
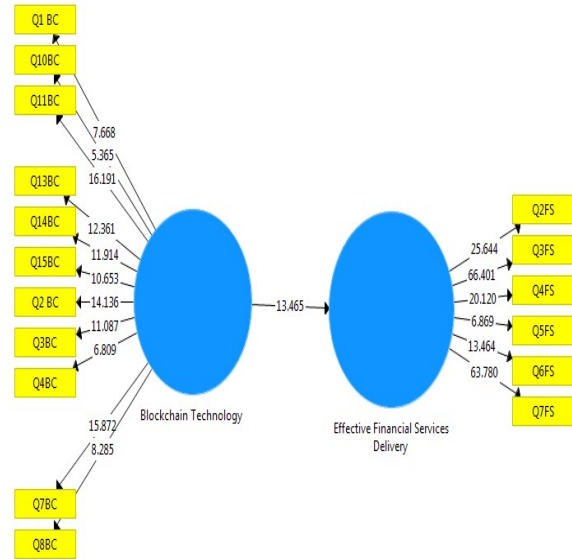

Figure 3: The relationship between blockchain technology and effective financial service delivery.

Based on the Smart PLS analysis output result, it shows that the Path Coefficient was able to explain that standardized regression coefficient (beta) shows the direct influence of the independent variable to dependent variable the effective financial service delivery (13.465). In Table 4, it is shown that blockchain technology which is the independent variable has a positive direct relationship with the dependent variable- effective financial service delivery in the model as shown in Fig. 4.
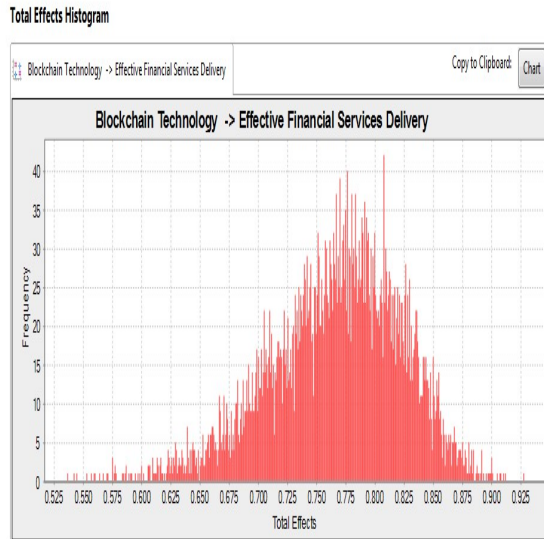
Total Effects Histogram

Figure 4: Pictorial representation of the relationship between blockchain technology and effective financial service delivery.

5. Discussion of findings

The study major objective is to determine the relationship between blockchain technology and effective financial service delivery in Saudi Arabia. Specifically, it looks into how blockchain technology is affecting the financial service delivery of the financial industry in Saudi Arabia. Hence, the study hypothesized blockchain technology- effective financial service delivery.

Statistically speaking, the study found overall support on the relationship between blockchain technology and effective financial service delivery (p<0.001 with t-value of 13.465). The study revealed that blockchain technology affects the financial service delivery, suggesting that effective service delivery in the financial industry is a function of blockchain technology. It is found that blockchain technology is a significant predictor of effective financial delivery. Implicatively, financial industry such as the banks using blockchain technology would be able to deals with the high increase in financial services demand and the huge increase in the competition worldwide in the financial sector [1]. With the adoption of this blockchain technology the financial industry would be able offer the customers the most effective service since customers are trying to use the financial services that offer ease of use, convenience,

efficiency, and speed. Consistently, [8] reported that blockchain technology makes transactions fast and easy, and it can do more than just support Bitcoin. Supportively, [3]; [4] alleged that blockchain technology impacts on the financial industry through many means such as generating new revenue, deliver process efficiency, improve end-user experience and reduce risk in business operations while empirical study by [1] claimed that the introduction of blockchain technology has positively improved the ease of the processes in the financial service delivery.

This study establishes connection with the previous studies on the issue being investigated. For example, [8] reported that blockchain technology makes transactions fast and easy, and it can do more than just support Bitcoin. Supportively, [3]; [4] alleged that blockchain technology impacts on the financial industry through many means such as generating new revenue, deliver process efficiency, improve end-user experience and reduce risk in business operations while empirical study by [1] claimed that the introduction of blockchain technology has positively improved the ease of the processes in the financial service delivery. Additionally, both [10, 11] strongly believe that blockchain technology can positively affect financial delivery particularly in the area of financial inclusions.

Further finding in this study revealed that the financial industry in Saudi Arabia can achieve high transparency, better security and privacy in business operations while improving the high increase in financial services demand and the huge increase in the competition worldwide through blockchain technology. It also shows statistical significance (p<0.01) relations with verification of records and performance of any kind of transactions. Implicatively, the finding shows that financial industry would be able to decentralise distributed ledger thereby giving room to create, validate and encrypt any transaction digital assets that happened and get recorded in an incorruptible way. Also, it demonstrates that validation of transactions through a distributed network for the purpose of creating a permanent, verified and unalterable ledger of information become very possible. Practically and statistically speaking, blockchain

technology has positive association with effective financial service delivery. Thus, blockchain technology financial services can be highly improved.

6. Conclusions and Implications

The study aimed at establishing the relationship between blockchain technology and effective financial service delivery with particular focus on Saudi Arabia. It examined how blockchain technology through its decentralized distributed ledger technology, transaction validation etc. enhance financial service delivery in the financial sector. Based on the analysis conducted on the data collected from the respondents, it is concluded that blockchain technology is statistically and significantly related to effective financial service delivery. This implies that blockchain technology is indispensable in attempt to enhance the effectiveness of financial service delivery within the financial sector. Therefore, the financial industry must as a matter of necessity, recognise and adapt to blockchain technology for effective financial service delivery. As a way of implication, the financial industry in particular the banking industry including the customers would find the finding of this study very interesting. For example, the financial industry would be able to offer better and easy financial service while the customers increase demand will be met. Also, financial industry would be able to reduce risk in business operation.

Additionally, since, customers, demands must be met in terms of quick service, new revenue generation, deliver process efficiency, improve end-user experience and reduce risk in business operations; blockchain technology therefore becomes indispensable to achieving these demands. Finally, the study adds to few empirical literatures currently existing in the blockchain technology domain particularly in Saudi Arabia.

6.1 Limitation and Suggestions for future studies

The study only focused on the blockchain technology-effective financial service delivery within the financial industry in particular the banking industry without consideration to other financial industries such as the insurance and stock broken firms as such generalising the finding may appear a little bit challenging. Therefore, there is a need for future studies of this nature to cover industries aforementioned for additional insight on the blockchain technology-effective financial service delivery.

Secondly, since environment differs considerably, future studies in this area of study may want to consider using other financial industries such as the insurance and stock across the world. In this case, the present study may be replicated and the finding can be more generalized.

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