DOES CRYTOCURRENCY TRANSACTIONS BENEFIT ICT BUSINESSES IN UYO METROPOLIS: EVIDENCE FROM A FIELD SURVEY

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Abstract: In this study, we examined the effect of crypto currency transactions on ICT businesses in Uyo with the objectives of investigating the determinants of crypto currency ownership among ICT businesses and the effect of crypto currency transactions on their business performance through a survey of 60 specific ICT businesses within Uyo. Logit regression was used to examine the determinants of crypto currency ownership among ICT businesses while spearman's rank correlation was used to examine the effect of crypto currency transactions on their business performance. The survey data indicates that over 95 percent of respondents are aware of the existence of crypto currencies and over 60 percent says they have good knowledge of crypto currencies while majority of those who own crypto currencies are those with good knowledge of crypto currencies. Knowledge of crypto currencies, low transaction cost, transaction security, and the expected impact of crypto currencies on the monetary system were identified as significant determinants of crypto currency ownership while the rank correlation coefficient of 0.43 shows a moderate positive correlation between crypto currency transaction and business performance. It is recommended that public and private institutions should invest more in financial technology and consider ways to take advantage of crypto currency technology

Keywords: Crypto Currency, Blockchain, Mining, ICT Businesses

1. INTRODUCTION

Over the years, technological progress has brought unimaginable changes that have shaped our social, economic and political life.Concerning the world's

monetary system, we have come a long way, from the days of the barter system to the era of fiat money (paper currencies). Fiat currencies have had many advantages. For instance, they don't require physical commodity reserves and countries can control their own money supply. Moreover, currencies can be valued constantly against each other in a floating exchange rate system and the governments are generally trusted to be a central regulating force that ensures that transactions are fair, accurate, and not manipulated.

Years before now, advocates of free market economies foresaw bigger changes in the monetary system. Hayek (1978) stated that if the government removed itself as an obstacle from the free market system, individuals and monetary entrepreneurs would provide the optimal quantity and variety of monetary products. He argued that if the forces of competition can make virtually all other products into better quality products at lower prices, the same can work in the monetary industry with benefits such as more stable purchasing power, increased difficulty of counterfeiting and increased divisibility. Friedman (1999) stated that the internet has a huge potential to reduce the influence of the government on the economy (Friedman and Schwatz, 2008).

With the growth in the internet and internet users, money has increasingly been digitalized.Most countries have electronic payment systems such as the Automatic Clearing House (ACH) system in the U.S. and the Giro system in Germany for moving money between bank accounts. Most countries also have mobile money platforms that enable people and business to move money between each other using their mobile phones. There are payment card systems such as MasterCard and Visa which allow people to move money electronically. We also have remittance systems such as Western Union that move money electronically to people across countries. Payment systems such as PayPal, Payeer, Payoneer and the likes provide currency transfer services between people and businesses in multiples countries(Evans, 2014). Businesses in which their operations are centered on the internet had depended totally on these payment systems to carry out their operations.

Today, with increased innovation in computing and networked systems, there is a new kind of currency and payment system called crypto currencies, powered by a new distributed ledger technology called the blockchain. The emergence of crypto currencies brings back the memory of Hayek's statement, because it comes with a plea to reduce the impact and possibly eliminate the need for a central monetary authority when doing online transactions. According to Nikamoto (2009), the creator of the bitcoin which is the first crypto currency, bitcoin is a peer-to-peer electronic cash that allow online payment to be sent from one party to another without relying on a financial institution. Consequently, several hundreds of crypto currencies have been created and more are emerging. Notable crypto currencies are Bitcoin (BTC), Ethereum (ETH), Ripple (XRP), Litecoin (LTC), Dash (DASH), Dogecoin (DOGE).

Happenings in the commercial world shows that crypto currencies are no longer some obscured curiosity. In 2017, the population of people using crypto currency was estimated to be between 5 to 10 million (Heilman and Rauchs, 2017). The demands for crypto currencies have grown astronomically making crypto currencies to have an unprecedented appreciation in value. For instance, the market value of bitcoin reached an all-time high of $19,000 in December, 2017. The emergence of crypto currencies has increased commercial activities on the internet, creating a new kind of economy. This new economy is growing fast with the daily increase in the number of internet users especially for commercial purposes.

Heilman and Rauchs(2017) in their study identify hundreds of crypto currency organization offering wallet and exchange services to individuals and organization who want to invest or trade in crypto currencies. Some of such organizations include Blockchain, CoinBase, Xapo, CoinGate and Luno Nigeria. Other companies and individuals engage in mining (the process of creating more of a particular crypto currency). In Nigeria, there are many virtual money exchangers that offer crypto currency exchange services to the public.

According to LeBlanc (2016), hundreds of popular ICT businesses, online stores and other businesses around the world accept major crypto currencies as a means of payment. Notable of such companies are Google, Microsoft, Wikipedia, Amazon, Virgin Airlines, Lions Gate Firms, Dell and KFC Canada (*https://99bitcoins.com/ who-accepts-bitcoins-payment-companies-stores-take-bitcoins/*). Studies also show that some financial institutions have invested in crypto currencies. Notable of such institutions are Visa and MasterCard (Heilman and Rauchs, 2017).

The acceptance of crypto currencies as a means of payment by leading ICT companies such as Google and Microsoft is likely to increase the spiral of acceptance of crypto currencies by many ICT businesses around the world because most of such business are dependent on the products and services offered by these ICT giants.

With this recent rise in popularity of crypto currencies, many still wonder what it is and how it works; investors are now trying to determine whether or not to invest into this new asset class, governments are considering ways to regulate crypto currencies in order to mitigate or eliminate its potential disrupting influence. As with any investment into a new technology, there are many factors to consider when assessing their future. In order to make an informed decision, one must look at the origins of the technology as well as the potential applications and limitations in the foreseeable future.Even more interesting is the fact that crypto currencies emerged in 2009 amidst the global financial crisis- a fact that many believe is crucial to understanding of the rationale behind the emergence of crypto currencies. A study about crypto currencies could thus be expected to create a sparkling interest among all economic agents.

As often the case when there is a revolutionary innovation, the emergence of crypto currencies has sparked mixed responses from individuals, business organizations and governments around the world. Optimists feel that crypto currencies will fundamentally alter payments, economics, and even politics around the world. Pessimists feel that crypto currencies will suffer an inevitable and spectacular collapse. Still, others draw some religious connotation to its emergence. But underlying these differing views is a significant confusion about what crypto currencies are and how it works.

Indeed, there is need to understand the workings of the crypto currency model and the level of influence on the operations of economic agent especially because the essential attribute of anything considered as money is acceptability and it is the effect it has on the operations of economic agents that will propel such acceptability. This gives rise to some essential questions, such as; why do ICT businesses use crypto currencies? Is crypto currency transactions associated with business performance? With these questions in perspective, this study investigates the determinants of crypto currency ownership among ICT businesses in Uyo, and examines the correlation between crypto currency transactions and the performance of ICT businesses in Uyo.

The emergence of crypto currencies has polarized expert opinion about the functioning and the future of the world's monetary system. Firms and individuals are considering whether or not they should invest in crypto currencies, governments are considering ways to apply its technology and also regulate the system. However, there are few literatures on this subject. This study is therefore an expose of this new and seemingly controversial subject. The discussion and empirical findings of this study is a significant addition to existing literature. The rest of the study is organized as follows; section two contains the literature review, section three is the methodology of the study, section four contains the findings of the study while section five is the summary, conclusion and recommendations of the study.

2.   LITERATURE REVIEW

2.1. Conceptual Framework

2.1.1 Definition of Crypto Currencies: Crypto currencies are digital currencies in which cryptography is used to create digital tokens to facilitate and secure transactions in a decentralized network system (Nikamotor, 2009). Chiu and Koeppl (2017) refer tocrypto currenciesas digital records of ownership of nominal balances that can be used to pay fortransactions without the need of a third party financial institution. Understanding the technicalities of how crypto currencies are created requires knowledge of cryptography and the decentralized network system called blockchain. However, without having such knowledge, crypto currencies could simply be understood as electronically created currencies used for transactions

without reliance on a third party financial institutions such as the central bank and commercial banks.

2.1.2 Crypto Currency Technology: Crypto currency is an application of an open source technology called the blockchain. The blockchain is a distributed ledger technology (DLT) with the protocols and supporting infrastructure that allow computers in different locations to process and validate transactions and update records in a synchronized way across a network without the need of a trusted third party financial institution. In such a system, transactions are conducted in a peer-to-peer fashion and broadcast to the entire set of participants who work to validate them in batches known as "blocks". Since the ledger of activity is organized into separate but connected blocks, this type of DLT is often referred to as "blockchain technology" (Chiu and Koeppl 2017)

The block chain platform consists of a system for sending, receiving, and recording value securely usingcryptographic methods; an incentive scheme forobtaining human and machine effort for performing functions required by the system; an opensourcesoftware licensing model; and a governance structure. Just as the internet facilitates digital transfer of information, the blockchain as an internet based technology facilitates digital transfer of value(Evans 2014). The blockchain technology solved the problem of double spending which arose from the digitalization of money. Trade in form of e-commerce had necessitated the use of digital tokens. This posed a problem because digital records can be copied and re-used for payment (Dourado and Brito2014). Traditionally, this problem has been solved by relying on a trusted third party such as the banks who manage a centralized ledger by crediting and debiting buyers and sellers account.

Companies such as Visa and MasterCard work with banks around the world to issue debit and credit cards to facilitate trusted digital money transactions. Moreover, payment systems such as paypal, payoneer, payeer, perefect money and others have also emerged in collaboration with banks around the world to facilitate cross border digital transactions. In time, the brands of these later kinds of payment systems have been regarded as currencies and are traded by virtual money exchangers. The value of these pseudo currencies is derived from the fact that users trust the third party to prohibit double spending.

The creation of crypto currencies with the emergence of the blockchain technology goes a step further to remove the need for a third party financial institution. The trust in crypto currencies is based on the distributed ledger technology which ensures that there is a distributed verification, updating and storage of the records of transactions histories. This is done by forming a blockchain. A block is a set of transactions that has been conducted by users of crypto currencies. A chain is created from these blocks containing history of past transactions that allow the creation of a ledger where one can publicly verify the amount of balances

or currencies. The blockchain is thus an incorruptible ledger of economic transactions which can be programmed to record not just financial transactions but virtually everything of value(Evans 2014).

Areas in which blockchain technology is being rapidly explored include the capital markets, financial services, identity and reputation management, governance, supply chain, auditing, insurance, healthcare, and others.

2.1.3. Cryptocurrency Mining: Mining is the process of creating more of a particular type of crypto currency. The blockchain platform is operated by independent miners around the world who are either single individuals or firms. As stated earlier, the blockchain contains an incentive scheme forobtaining human and machine effort for performing functions required by the system. The incentives here are the reward automatically generated and given to miners in form of new coins for performing their functions and thus increasing the supply of that particular crypto currency. This is similar to printing new notes. The miners use powerful computers to tally transactions. Their function is to update and validate each transaction to ensure the authenticity of the transactions thereby ensuring that each transaction is safely processed and secure without any power or incentive to manipulate the system. These activities involve solving complex mathematical problems in the network and this is called prove of work (PoW) (Narayanan Et al 2015).

Anybody who has the knowledge of the workings of the blockchain and the resources can engage in mining much the same as anybody can create a blog and host it on the internet and then compete with other bloggers with similar content in sharing information to internet visitors.

2.1.4. Structure of the Crypto Currency Industry: The crypto currency industry has many participants. They include miners, wallet service providers, exchangers and individual wallet holders. Miners work to validate and secure transactions in the network, wallet service companies provide platforms where individuals can store their coin and make transactions while exchangers buy from and also sell crypto currencies to users.
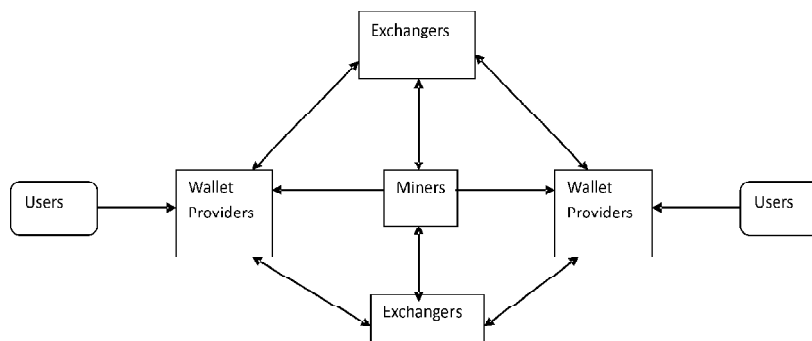
Users create wallets and store their coin. Wallet service providers charge little fees for each transactions made by a user. Users also send and receive payment through the wallets. Exchangers are companies with large stock of crypto currencies and conventional currencies. Users buy coins from exchangers and also sell to them in exchange for conventional currencies such as dollar, euro and naira. Exchangers make profit by selling coins to users at a price slightly higher than the one they bought from them(Gandal and Hałaburda,2014).

All crypto currency transactions by users and exchangers are validated and secured in the blockchain network by miners. Transactions in the blockchain network are anonymous.Miners compete with each other in the network to solve these blocks (a set of transactions) using cryptographic hash functions. This competition among many miners does not give any miner power and incentive to manipulate the system. The more the miners, the better for the system in terms of transaction efficiency and system transparency. This is akin to the perfectly competitive market model in which no market participant has control over the price or output in the market due to numerous market participants.

2.2. Theoretical Framework

2.2.1 Festival of the Commons: This is an opposite concept of an economic theory called the tragedy of the commons which is derived from a market failure scenario in which shared public goods is over exploited. In this scenario, each user has an incentive to use the good until the good is depleted. Rose (1986) put forward the concept of "festival of the commons" which portrays a scenario where individuals use of common good does not deplete the good but instead adds to it. It was initially called the "comedy of the commons" but was later modified as festival of the commons. It was stipulated as an economic theory governing public goods such as knowledge in which increased participation in acquiring knowledge leads to improvement in knowledge for the benefit of all.

Crypto currencies which are based on an open source technology create a festival of the commons. Investment in the infrastructure and innovation of the system is shared by all. The shared benefit is also manifested in terms of increase in value of the common currencies. Generally, currencies are shared goods because its value is enhanced by the economic activities that the currency enables. This means that currencies are valuable because people use it and the more they use it the more its value increases. Unlike national currencies, which are generally restricted to use within a country's border, crypto currencies are global and can therefore be easily adopted and used by almost anybody who is part of the networked global society(Antonopoulos, 2015).

The identified benefits derived from this festival includes; low transaction cost, high transaction speed, reduction in the cost of check back fraud, limitless

and anonymous transactions. For instance, Hayes(2016) pointed out that a transaction of $100 with a credit card would cost $3.37 while bitcoin transaction of similar value would cost $0.61, making credit card transactions 5.5 times more costly for that operation. Naware (2016) also pointed that the crypto currency system does not differentiate between local and international transactions and hence are not subject to interest rate and exchange rate charges. Also, crypto currency payments is confirmed in 10 to maximum of 30 minutes while a bank might take several days to confirm huge online transactions (Seaman, 2014).

However, critics have pointed out that the festival may soon end because of the indentified flaws of the crypto currency system. Notable among them are; increase in illegal transactions, lack of government regulation and extreme price volatility. According to Douman (2016), the anonymity feature in the crypto currency system allows for huge underground transactions. It is notable that the recent rise in ponzi schemes coincides with the popularity of crypto currencies. Osterrieder et al(2018) pointed out that one can expect to lose or gain more than 10% once every 20 days from trading crypto currencies due to price volatility. Such volatility is said to arise from the fact that crypto currencies are not backed by tangible assets. It could be added that lack of governmental regulations has brought a considerable level of apprehension among prospective crypto currency users as they consider the system's trust and sustainability. Also, a system which intends reduces the monetary sovereignty of states may not be attractive to the authorities.

New models of how the crypto currency system could work has been proposed and worked upon in recent times(Gupta, Lauppe and Ravishankar2017).The two popular propositions are; centralizing crypto currencies as opposed to the current decentralized model and backing crypto currencies with real assets such as gold. Many central banks across the world have entered the crypto currency frenzy by announcing that they are exploring and experimenting on the blockchain technology, hence the prospect of central bank of crypto currencies has attracted a lot of attention. While the possibility of centralizing crypto currency operations is still being considered, the move to create asset backed crypto currencies is on. For example, a new crypto currency called GoldBitsCoin (GBC) entered the crypto currency market in 2018 with a plan to back it up with gold. This obviously brings back the memory of the gold standard and the old debate.

2.3. Review of Empirical Literatures

Studies about crypto currencies are as fresh as the subject. Researchers are kin to find out the effect of cryptocurrency transactions on businesses and other economic agents. A search for existing studies on this subject reveals the following;

McWilliams, Niculescu-Marcu and Cruz(2018) studied the economic impact of smart ledger technologies on world trade with particular reference to crypto

currency technologies. They use world trade data to make forecast taking into consideration the challenges to world trade which smart ledger technologies will overcome. They showed that smart ledger technologies could boost world trade by $35 billion per annum; that the cost of importing a single container will reduce by $46 and that world GDP will be boosted by $10 to$20 billion, adding 450,000 to 900,000 worldwide annual demands for labor. They added that it will reduce the potential impact of Brexit on the UK and the EU and the current President Trump's protectionist trade policy.

Daugherty, Trkla, and Janas (2018), who are members of the Foley blockchain task force, in their study surveyed the opinion of businesses and investors about the emerging issues in the crypto currency industry including regulations and security. Their study reveals among other things that 58% of the respondent do not want central control of crypto currencies by the central banks, 89% desire a formalized self-regulation of the crypto currency system, less than 30% feel that the system is subject to security threat and 58% says they are willing to take legal and security risk to invest in crypto currencies or develop crypto currency business.

Henry, Huynh and Nicholls (2017) did a crypto currency awareness survey in Canada with particular reference to bitcoin. They used bitcoin OmnibusSurvey (BTCOS) to track the ubiquity and usage of bitcoin in Canada as well as the reasons people use bitcoin.Among the analytical methods used was logit regression. They found that about 64 percent of Canadians have heard of bitcoin, but only 2.9 percent own it. They also found that 29% of business and individuals who own bitcoin was because of interest in a new technology, 11% to 14% hold it for easy international transactions, transaction convenience and high return on investment, 7% cited fraud prevention and another7% cited being able to make anonymous transactions. Other findings includes; that awareness of bitcoin was strongly associated with men and thosewith college or university education and also moreconcentrated among unemployed individuals while bitcoin ownershipwas associated with younger age groups and a high school education. They found that knowledge of bitcoin technology is positively correlated with bitcoin adoption.

According to the ING international survey (2018), conducted across Europe, USA and Australia with a total of 15 countries using a sample size of 1000 per country, 66% of people living in these countries have heard about bitcoin which is the most popular crypto currency while 9% actually own it and 25% expect to own it in the future. 35% believes that crypto currencies will defines the future of online payment. Crypto currencies ownership was more among men than women and also popular among young people. Over 60% says that conventional assets such as cash, gold, real estate, stocks and government bonds are less risky than bitcoin, over 15% says they are of equal risk and over 25% says they have higher risk than bitcoin. The ING international survey is usually conducted several times

a year with the aim of having a better understanding of how people around the world save, invest and feel about money.

Puneet, Deepika and Kaur(2017), studied the trends, perspectives and challenges in the crypto currency industry. They surveyed a number of ICT business. Their study indicates that bitcoin which is the leading crypto currency has been accepted for payments by leading ICT companies in the world such as WordPress, Microsoft, Dell, Google and Internet Archive. This suggest that the use of crypto currencies among ICT business operators should be high because a lot small ICT companies around the world uses the products of these leading ICT companies.

Baumann and Lesoimeir (2017) studied the outlook of crypto currencies for 2018. They pointed out that bitcoin was the most search word in google in 2017. They also show that crypto currencies is the fourth greatest financial bubble in history behind the Dotcom bubble, the US great recession and the Japan asset bubble. They also indicated that as at 2017, crypto currency space represents 0.67% of the assets managed by top 400 established asset managers and that the crypto currency assets represent only 0.58% of the global stock market. They predicted a brighter outlook for crypto currencies in 2018 and in years to come, drawing parallel between what happened during the early 1990's when the internet emerged and what is currently happening in the crypto currency industry.

Hileman and Rauchs(2017) did a crypto currency bench marking study. They did a systematic investigation into the crypto currency industry by collecting empirical data. In their survey, they gathered data from nearly 150 crypto currency companies and individuals covering 38 countries and five regions of the world. Study participants reported crypto currency trading in 42 different national currencies while 53% of exchanges support national currencies other than the five global reserve currencies (USD, CNY, EUR,GBP, JPY). Their study reveals that 79% of payment companies have existing relationships with banking institutions and payment networks and that the difficulty of obtaining and maintaining these relationships is cited as the biggest challenge of this sector. On the average, national-to-cryptocurrency payments constitute two-thirds of total company transaction volume, whereas national-to-national currency transfers and cryptocurrency-to-cryptocurrency payments account for 27% and 6%, respectively.

Spenkelink(2016) studied the factors that influence the adoption of crypto currencies in the Netherlands from multiple stakeholders' perspectives. They surveyed the employees from the four biggest Dutch banks, the Dutch Central Bank, the three largest Dutchcryptocurrency exchanges, senior payments consultants, Payment Service Providers, cryptography experts and the largest Dutch company that accepts cryptocurrency, Thuisbezorgd.nl. Their findings shows that low transaction costs,fast cross border transactions, partialanonymity and lowbarriers to entry into the system make it very easy for newcomers to enter the

cryptocurrency ecosystem and start using it, either as payer or payee. He also identified price volatility and the governance system of the blockchain as factors that make people to be skeptical about the use of crypto currencies.

Sovbetov, (2018) examineshort- and long-run factors that influence pricesof cryptocurrencies with reference to Bitcoin, Ethereum, Dash, Litcoin, and Monero from 2010 to 2018 using ARDL technique on weekly data basis. He developed some index by sampling top 50 cryptocoins that haveproportional contribution to market capitalization weights. Thus, he derive fewcryptomarket factors such as total market capitalization, trading volume, and volatility and use them as explanatory variables for cryptocoin pricemovements alongside control variables such as stockmarket movements, gold prices, and interest rates. Among other things, he found a weak form of negative impactrunning from stock markets to cryptocurrency market, in particularBitcoin. Error-correction models for Bitcoin, Etherem, Dash, Litcoin, and Moneroshow that co integrated series cannot drift too far apart, and converge to a longrunequilibrium at a speed of 23.68%, 12.76%, 10.20%, 22.91%, and 14.27%respectively.

Anyfantaki, Arvanitis and Topaloglou (2018) investigated the degree to which crypto currencies provide diversification benefits to investors. They used a stochastic spanning methodology to construct optimal portfolios with and without crypto currencies and evaluate their comparative performance. Empirical analysis indicate that the rate at which investors expand their investment with crypto currencies is higher than that of the traditional assets such as stocks, bonds and cash, because of the potential diversification benefits. This provides better investment opportunities for some risk averse investors. Their analysis also shows that the daily average return of cryptocurrencies is higher than that of stocks and bonds. The study therefore pinpoints return on investment as a major determinant of crypto currency ownership.

From the reviewed literature, most studies focused on the reasons for owning crypto currencies. Although the studies show that major ICT firms have accepted bitcoin as a means of payment, motivated by factors such as low transaction cost, transaction speed and other advantages, no study was found that attempt to show whether or not crypto currency transactions is associated with the performance of ICT businesses. Moreover, no study conducted in Nigeria was found although crypto currency is a trending issue among economic agents in Nigeria. This study bridges these identified gaps.

3. METHODOLOGY

3.1. Research Design

In this study, a survey design is adopted because primary data about the preference of crypto currencies among ICT businesses and its effect on their business activities is used for the analysis.

3.2. Area of Study

Uyo is the capital city of Akwa Ibom in southern Nigeria, a small state in the Nigerian Federation. Uyo is the most populated city in the state with heavy presence of academic, commercial and public administrative activities. The last population census in 2006 put the population of the city at 427,873(Wikipedia, 2018). Compared to big cities in Europe and America, Uyo is classified as less developed. However, residents have access to electricity and telecommunication services. The telecommunication companies provide internet services to individuals, businesses and the government who make use of the products of Microsoft, Google, WordPress and other ICT giants, and in recent times, crypto currency has become a trending subject among residents.

3.3. Population and Sample of the Study

The target population of this study is ICT businesses with strong internet presence within Uyo metropolis in which their operations involves doing online transactions. Such businesses include; software developers, web developers, bloggers and online stores. In a popular Nigerian business directory called BussinessList, we identify about 240 ICT businesses operating in Uyo (businesslist.com.ng). The study adopts a simple random sampling of 60 ICT businesses within Uyo metropolis. This represents over 20% of the research population.

3.4. Instrument of Data Collection

The research instrument used in the study is a structured questionnaire. This was meant to ensure objectivity in obtaining data from each respondent.

3.5. Analytical Techniques/ Model Specification

The analytical techniques of this study are based on the specific objectives.

3.5.1 Objective 1: To investigate the determinants of crypto currency ownership among ICT businesses in Uyo, Logit regression was used.

3.5.1a Logit Regression: This is a probabilistic regression model that is used to examine factors that determines the occurrence and non occurrence of an event. It is used when the dependent variable is dichotomous (binary) which is usually the case when the dependent variables have only two outcomes such as car ownership, house ownership, and in the case of this study, crypto currency ownership. The logit regression model of this study is as follows;

$$\ln(Pi/1\text{-}Pi) = \Sigma\beta_k Xi \tag{1}$$

Where

Pi= the probability that an event will occur

1-Pi = the probability that an event will not occur

β_k= coefficients of the explanatory variables

Xi= explanatory variables

Equ(1) is expanded to show the specific variables for this study as follows;

$$CCO = F(CSI, TCI, VSI, PII,) \qquad (2)$$

$$+ \quad + \quad + \quad +$$

Where

CCO = crypto currency ownership

CSI= crypto currency Security Index

TCI= Transaction cost Index

VSI= Value Stability Index

PII= Potential Impact Index

Apriori Expectation

All independent variables are expected to have a positive effect on the dependent variable because secured transactions, low transaction cost, stable crypto currency value is expected to encourage the ownership of crypto currencies and also enhance business performance. All variables were derived from the response of the businesses contacted.

CryptoCurrency Ownership (CCO): This is measured in binary.Ownership of crypto currencies is represented by 1 while no ownership is represented by 0

CryptoCurrency Security Index (CSI): This is developed by dividing the weight of respondents rating of crypto currency transactions in terms of transaction security by the weight of the highest rating. Respondents are required to rate the security of crypto currency transactions in the scale of 0 to 4 with each rating carrying a weight of 0, 3, 6, 9 and 12 respectively.

Transaction Cost Index (TCI): This is developed by dividing the weight of respondents rating of crypto currency transactions in terms of transaction cost by the weight of the highest rating. Respondents are required to rate the cost of crypto currency transactions in the scale of 0 to 4 with each rating carrying a weight of 0, 3, 6, 9 and 12 respectively.

Value Stability Index (VSI): This is developed by dividing the weight of respondents rating of crypto currency in terms of value stability by the weight of the highest rating. Respondents are required to rate how stable the value of crypto currencies has been in the scale of 0 to 4 with each rating carrying weights of 0, 3, 6, 9 and 12 respectively.

Potential Impact Index (PII): This is developed by dividing the weight of respondents rating of crypto currency transactions in terms of its potential impact

on the existing financial system by the weight of the highest rating. Respondents are required to rate the potential impact of crypto currencies in the scale of 0 to 4 with each rating carrying a weight of 0, 3, 6, 9 and 12 respectively.

3.5.2) Objective 2: To examine the association between crypto currency transactions and the performance of ICT businesses in Uyo, Spearman's Rank correlation was used.

3.5.2a) Spearman's Rank Correlation: This is a measure of the degree of association between two variables with respect to their relative rankings. If there are no significant changes in rankings, the correlation coefficient will be high, indicating high degree of association. If the difference in ranking is huge, the correlation coefficient will be low, indicating low degree of association. The correlation coefficient is given as

$$R = \frac{6\Sigma D^2 + (T^3 - T)/12}{N(N^2 - 1)} \tag{2}$$

Where

R = rank correlation coefficient

D = difference in rankings

T = number of ties rankings

N = number of observations

In this study, the association between crypto currency transactions and the performance of ICT businesses is examined using the rank correlation between crypto currency acceptance index(CAI) and business performance index(BPI).

Cryptocurrency Acceptance Index (CAI): This is constructed by taking the average of CSI, TCI, VSI and PII for each respondent. We assume that respondents rating of crypto currencies in these areas give information about their level of acceptance of crypto currencies for online transactions.

Business Performance Index (BPI): BPI is developed by taking into consideration the responses of businesses about their returns, employment and new investment. Respondents are required to rate their business performance in these areas in the scale of 0 to 4. Zero is the lowest rating while four is the highest. Each rating is given a weight of 0, 3, 6, 9 and 12 respectively. The sum of each of the weight for the ratings is then divided by the sum of the maximum weight.

$$BPI = \Sigma Pi/\Sigma Pmax \tag{3}$$

Where

Pi= the weight for each rating

Pmax= the maximum weight for each rating

For example, if a respondent's ratings are 3, 6 and 9. BPI will be 18/36 which is 0.5

4. DATA ANALYSIS AND DISCUSSION OF FINDINGS

Table 1: Summary of Survey Data

Questions	Responses/ No of Respondent					Total
2	**Type of Product/Services**					
	Web Development	Software Development	Cyber Cafe	Blogging	Others	
	13	12	11	8	12	56
3	**Crypto Currency Awareness**					
	Yes	No				
	54	2	56			
4	**Knowledge of Crypto Currencies**					
	Poor	Fair	Good	Very Good		
	8	10	25	11	54	
5	**Ownership of Crypto Currencies**					
	Yes	No				
	29	25	54			
6	**Transaction Cost**					
	Very High	High	Moderate Low	Very Low		
	0	5	15	14	2	36
7	**Security**					
	Very insecure	Insecure	Fairly Secure	Secure	Very secure	
	2	10	16	7	1	36
8	**Value Stability**					
	Very unstable	Unstable	Fairly Stable	stable	Very stable	
	9	22	5	0	0	36
9	**Potential Impact on the Financial System**					
	Very low	Low	Moderate	High	Very High	
	2	10	18	5	1	36
10	**Profitability**					
	Very poor	Poor	fair	good	Very good	
	0	7	9	6	2	24
11	**Employment of New Workers**					
	Very poor	Poor	fair	good	Very good	
	0	8	15	1	0	24
12	**New Investment**					
	Very poor	Poor	fair	good	Very good	
	0	7	7	8	3	24

Source: Field Survey, October 2018

The table above shows that out of the 60 ICT businesses sampled, 56 completed and returned their questionnaires. Most of the businesses sampled offered services such as web development, software development, internet browsing (cyber café) blogging and others and 54 out of the 56 respondents said they are aware of the existence of crypto currencies. Among the 54 respondents, 29 said they own crypto

Figure 1: Knowledge of Crypto Currencies
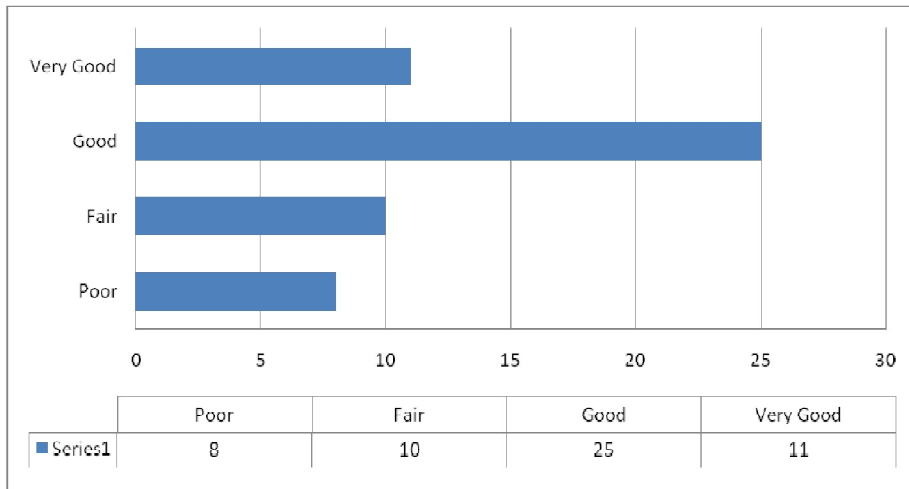
Source: Field Survey, October, 2018

Figure 2: Crypto Currency Ownership
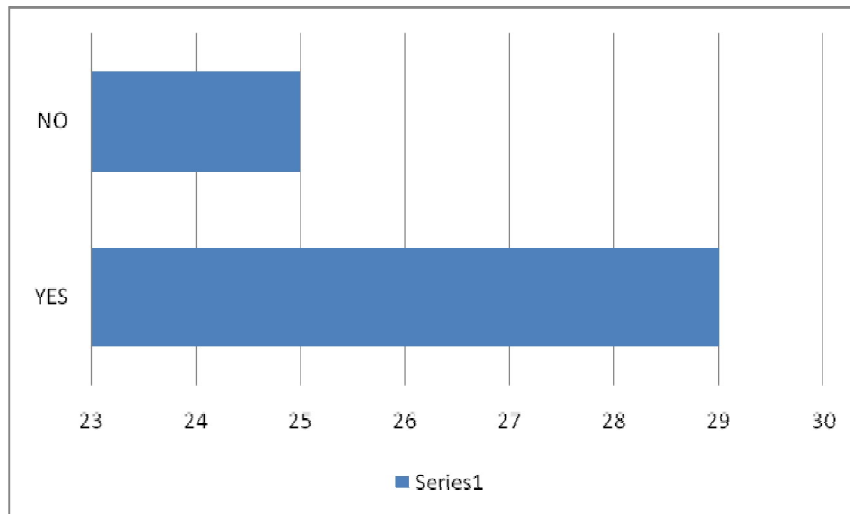
Source: Field Survey, October, 2018

currencies. Also, out of the 54 respondents, 36 rated their knowledge of crypto currencies as good and very. The ratings of these 36 respondents concerning crypto currency transactions in terms of transaction cost, security, value stability and its potential impact on the financial system were used to examine the determinant of crypto currency ownership. Among these 36 respondents who had at least a good knowledge of crypto currencies, 24 own crypto currencies and the ratings of these 24 about their business performance are use for the analysis of the second objective of this study.

The two charts above gives a vivid picture of respondents rating of their knowledge of crypto currencies and crypto currency ownership. The first chart shows that 36(25 and 11) respondents which represent 66.7% of those who are aware of the existence of crypto currencies rate their knowledge of crypto currencies as good and very good respectively while the rest (10 and 8) of the 54 respondents rate their knowledge as fair and poor respectively. The second chart shows that 29 respondents own crypto currencies while 25 do not.

Table II: Knowledge and Ownership of Crypto Currencies

	Knowledge of Crypto Currencies				
Ownership of Crypto Currencies	Poor	Fair	Good	Very Good	Total
Yes	1	4	14	10	29(53.7%)
No	7	6	11	1	25(46.3%)
Total	8(14.8%)	10(18.5)	25(46.3%)	11(20.4%)	54(100%)

Source: Field Survey, October, 2018

Table II is a cross tabulation of how respondents rate their knowledge of crypto currencies and those who own crypto currencies. It shows that 29 respondents which represent 53.7% of the respondents who rate their knowledge of crypto currencies have at least a crypto currency and 24 of these 29 respondents are those who rate their knowledge of crypto currencies as good and very good. The ratings of these 24 respondents about their business performance are used in the analysis to examine the effect of crypto currency transactions on ICT businesses.

Table III: Average Index Rating

	CSI	TCI	VSI	PII	CAI	BPI
AVERAGE	0.465278	0.590278	0.222222	0.451389	0.500521	0.510258

Source: Field Survey, October, 2018

Table III shows average indexes constructed from the ratings of the 36 respondents who had at least a good knowledge of crypto currencies with respect to security of transactions (CSI), transaction cost (TCI), value stability (VSI) and potential impact on the existing monetary system (PII). It also shows the average index of acceptance of crypto currencies (CAI) among the 24 ICT businesses that have at least a good knowledge of crypto currencies and also own crypto currencies; and the average index of their business performance (BPI).

4.1. Determinants of Crypto Currency Ownership

Table IV: Logit Regression Result

Dependent Variable: CCO

Variables	Coefficients	P Values	Significance Level
C	-11.90135	0.0206	2.1%
CSI	9.666388	0.0707	7.1%
TCI	10.42011	0.0470	4.8%
VSI	-3.515624	0.4324	43.5%
PII	8.699514	0.0831	8.4%

Source: Author's computation Using Eviews

R^2 = 0.614574

$Pi/(1-Pi) = e^{-11.901+9.666CSI+10.420TCI-3.516VSI+8.699PII}$

Table IV shows that transaction security (CSI), transaction cost (TCI) and the expected impact of crypto currencies on the monetary system (PII) are positive and significant determinants of crypto currency ownership at 7.1%, 4.8%, and 8.4% levels of significance respectively while value stability (VSI) did not have a statistically acceptable level of significance to explain ownership of crypto currencies although it shows value stability (VSI) as a negative determinants of crypto currency ownership. This result means that as crypto currency security index (CSI), transaction cost index (TCI) and Potential impact index (PII) increase by 1%, the probability that the ICT businesses will own crypto currencies increases by 9.67%, 10.42% and 8.7% respectively.

4.2. Crypto Currency Transactions and the Performance of ICT Businesses in Uyo

Table V: Rank Correlation Result

ICT Businesses	CAI	BPI	Ranks of CAI	Ranks of BPI	D(Differences in Ranks)	D^2
B	0.4375	0.25	7	8	-1	1
D	0.5	0.4166	5	6	-1	1
F	0.4375	0.5	7	5	2	4
G	0.45	0.333	6	7	-1	1
H	0.4375	0.333	7	7	0	0
I	0.625	0.25	3	8	-5	25
L	0.4375	0.666	7	3	4	16
M	0.5625	0.5	4	5	-1	1
N	0.6875	0.333	2	7	-5	25
O	0.3125	0.5	8	5	3	9
P	0.3125	0.666	8	3	5	25
Q	0.5	0.5833	5	4	1	1
R	0.5	0.666	5	3	2	4
S	0.4375	0.5	7	5	2	4
T	0.5	0.75	5	2	3	9
V	0.5625	0.25	4	8	-4	16
W	0.5	0.333	5	7	-2	4
Z	0.4375	0.5	7	5	2	4
AB	0.4375	0.75	7	2	5	25
AC	0.5	0.25	5	8	-3	9
AE	0.8125	0.75	1	2	1	1
AF	0.5625	0.833	4	1	3	9
AH	0.5625	0.5833	4	4	0	0
AJ	0.5	0.75	5	2	3	9
Total(ΣD^2)		203				

Source: Author's computation

$$r = \frac{1 - 6(203) + (43^3 - 43)/12}{24(24^2 - 1)}$$

$$r = 1 - 0.5681 = 0.4319$$

Table V shows the rankings of crypto currency acceptance index (CAI) of those 24 businesses that have at least a good knowledge of crypto currencies and also owns crypto currencies; and their business performance index (BPI). The result indicates that there are no big differences in the rankings of the two variables,

producing a rank correlation coefficient of 0.4319. This indicates a moderate and positive correlation between CAI and BPI.

4.3. Discussion of Findings

The findings of this study shows that low transaction cost, transaction security and anonymity, and the expected impact of crypto currencies on the financial system are significant determinants of crypto currency ownership among ICT businesses. Undoubtedly, these businesses are attracted to the cost saving abilities and expected future gains from crypto currencies. Also, majority of the respondents who own crypto currencies are those who have a good knowledge of crypto currencies, pointing to knowledge of crypto currencies as one of the determinants of crypto currency ownership. This conforms to the findings of Henry, Huynh and Nicholls (2017).

The fact that over 60 percent of the ICT businesses sampled said they have a good knowledge of crypto currencies could be because crypto currency transactions is one of the payment options for the services of leading ICT firms such as Microsoft, Google, WordPress and others who have already adopted some crypto currencies as a payment option. Therefore, these businesses are likely to investigate about crypto currencies as a payment option either for the purchase of the products of other ICT firms who have already accepted crypto currencies or as a payment option for their own services.

There is a moderate positive correlation between the ratings of crypto currencies among ICT businesses that actually do crypto currency transactions and the ratings of their business performance. This shows that their use of crypto currencies may have made their operations cost effective and thus increase their profitability. Moreover, most of these businesses may have become active players in the crypto currency industry either by investing in crypto currency mining, engaging in crypto currency trading to take advantage of the frequent price swings in the exchange market or provide any other crypto currency related services. This may well explain the reason for this positive correlation because as shown in the study, a good number of businesses sampled rate their new investment as good and very good compared to profitability and employment. Also, the work of Anyfantaki, Arvanitis and Topaloglou(2018), shows that the average daily returns from investing in crypto currencies is higher than that of conventional financial assets such as stocks and bonds.

Also, as shown in this study, over 95% of the respondents are aware of the existence of crypto currencies. This could be attributed to the recent rise in the popularity of crypto currencies. For instance, in 2017, bitcoin was reported to be the most searched word in Goggle. This provided a lot of incentives for bloggers to do research and provide information about crypto currencies to meet that huge

information demand. Thus, crypto currencies as a subject has featured frequently in online pop ups, making more and more people especially businesses whose operations is largely internet centered to be aware of crypto currencies.

4.4. Policy Implications of Findings

The findings of this study stressed the need for and the importance of financial technology (Fin Tech) in the development of the financial sector and the economy. This draws the attention of regulators and other stakeholders in the financial sector to the need for more investment in the Fin Tech industry. Fin Tech has over the years improved operations in the financial sector leading to the much talked about cashless economy. With the emergence of the blockchain technology and consequently crypto currencies, crypto currencies may become the focus of speculative investment, a vehicle for currency conversion and trading; and an alternative for retail transactions and thus increasing the number of financial products available in the financial sector.

Thus, it is rational to consider financial sector policies that focus on creating a framework for efficient crypto currency transactions and also curtail undesirable strides that may arise. It is also rational to consider the possibility of a less centralized financial sector model, something akin to the public ledger (block chain) of the crypto currency model.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary

In this study, we examined crypto currency transactions among ICT businesses in Uyo with the aim of identifying the determinant of crypto currency ownership and the relationship between crypto currency transactions and business performance. A survey of 60 ICT businesses in Uyo was conducted. Data was analyzed using Logit regression and Spearman's rank correlation. Logit regression was used to examine the determinants of crypto currency ownership while spearman's rank correlation was used to examine the correlation between crypto currency transactions andthe performance of ICT businesses. The result shows that low transaction cost, transaction security and the expected impact of crypto currencies on the economy are the significant determinants of crypto currency ownership. It also shows a moderate positive correlation between crypto currency transactions and the performance of the businesses sampled.

5.2. Conclusions

Crypto currencies are no legal tender but they have managed to function as money. Even more alluring is the fact that it is powered by a distributed ledger technology

(the blockchain) which eliminates the need for a trusted third-party financial institution in online transactions. Crypto currencies with its alluring blockchain technology have brought excitement and fears as we consider its implications for monetary control and regulations in the nearby future. However,crypto currency transactions is increasing globally even in the face of this uncertainty. For instance, the total market capitalization of crypto currencies is over 100 billion USD (coinmarketcap.com), and there is much investment into its technology to improve and sustain its operations.

The technological environment has appealed to people's desire for convenience leading to an upsurge in the use of electronic payment systems, even though people generally complain of high bank charges on these services. In such an environment, businesses who do frequent online transactions will naturally sort for more cost saving and convenient options and at this point, crypto currencies may present itself as a better option. Although this level of electronic transactions within the banking system is still very low compared to total money supply, its growing popularity indicates that as more and more people make use of electronic payment, more and more people will likely consider crypto currencies as a viable alternative.

This study has contributed greatly to the body of knowledge by revealing the determinants of crypto currency ownership and the correlation between crypto currency transactions and the performance of ICT businesses in Uyo. However, due time and financial constraint, the views and opinion of many ICT businesses within Uyo were not accessed. Crypto currencies are still very new in the economic space; there are inherent risk and much concern about its price volatility. Therefore, researchers in related discipline should conduct studies to investigate the factors responsible for the extreme price volatility in the crypto currency market and the effect of crypto currency transactions on the Nigerian financial system.

Although the expected impact of crypto currency transactions on the existing monetary system is yet to be fully ascertained, the technological environment which has promoted rapid growth in the use of electronic payment systems and the growing use of the internet for commercial activities provides a fertile ground for crypto currency transactions to grow. As shown in this study, crypto currency transactions is already attractive to economic agents especially those who carry out their business operations mainly on the internet. Thus, it appears that the main issue is not whether or not crypto currency technology will play a mainstream role in economic transaction but rather when it will eventually assume that role.

5.2. Recommendations

From the findings of this study, the following recommendations are offered;

1) Stakeholders in the financial sector should invest more in the Fin Tech industry and possibly leverage on crypto currency technology for

operational efficiency because as shown in this study, crypto currency transactions comes with low transaction cost and speed.

2) Policy makers in the financial sector should develop and implement financial sector models that will allow for the integration of crypto currency transactions in the trading of national currencies to draw from the gains of the increased transactions in crypto currencies to the financial sector and the real sector of the economy because as shown in the study, crypto currency transactions has a positive effect on the performance of ICT businesses.

3) There should be proactive policies aimed at creating a regulatory framework and providing market information that will guide dealings in the crypto currency market within the economy to avoid the bubbles that may result from the expected future increase in speculative dealings in the crypto market.

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APPENDIX
Survey Data

Businesses	CCO	CSI	TCI	VSI	PII
A	0	0.25	0.5	0.25	0.25
B	1	0.5	0.75	0	0.5
C	0	0.25	0.25	0	0.25
D	1	0.75	0.75	0	0.5
E	0	0.25	0.5	0.25	0.25
F	1	0.25	0.75	0.25	0.5
G	1	0.5	0.5	0	0.25
H	1	0.5	0.5	0.25	0.5
I	1	0.75	0.75	0.25	0.75
J	0	0	0.5	0.25	0
K	0	0.25	0.75	0.25	0.25
L	1	0.5	0.75	0.25	0.25
M	1	0.5	0.75	0.5	0.5
N	1	0.75	1	0.25	0.75
O	1	0.5	0.5	0	0.25
P	1	0.25	0.5	0	0.5
Q	1	0.5	0.5	0.25	0.75
R	1	0.5	0.75	0.25	0.5
S	1	0.5	0.5	0.25	0.5
T	1	0.5	0.75	0	0.75
U	0	0.5	0.25	0.25	0.25
V	1	0.75	0.75	0.25	0.5
W	1	0.25	1	0.25	0.5
X	0	0.25	0.25	0	0.25
Y	0	0.5	0.5	0.25	0.5
Z	1	0.25	0.75	0.25	0.5
AA	0	0	0.75	0.5	0
AB	1	0.75	0.25	0.25	0.5
AC	1	0.75	0.5	0.25	0.5
AD	0	0.5	0.5	0	0.5
AE	1	1	0.75	0.5	1
AF	1	0.75	0.5	0.25	0.75
AG	0	0.5	0.5	0.25	0.25
AH	1	0.5	0.75	0.5	0.5
AI	0	0.25	0.25	0.25	0.5
AJ	1	0.5	0.5	0.5	0.5
AVERAGE		0.465278	0.590278	0.222222	0.451389

Source: Derived by Author from Survey Instrument

Businesses	CAI	BPI
B	0.4375	0.25
D	0.5	0.4166
F	0.4375	0.5
G	0.45	0.333
H	0.4375	0.333
I	0.625	0.25
L	0.4375	0.666
M	0.5625	0.5
N	0.6875	0.333
O	0.3125	0.5
P	0.3125	0.666
Q	0.5	0.5833
R	0.5	0.666
S	0.4375	0.5
T	0.5	0.75
V	0.5625	0.25
W	0.5	0.333
Z	0.4375	0.5
AB	0.4375	0.75
AC	0.5	0.25
AE	0.8125	0.75
AF	0.5625	0.833
AH	0.5625	0.5833
AJ	0.5	0.75
Average	0.500521	0.510258

Source: Derived by Author from Survey Instrument

CCO = Crypto Currency Ownership

CSI = Crypto Currency Security Index

TCI = Transaction Cost Index

VSI = Value Stability Index

PII = Potential Impact Index

ANALYTICAL SAMPLE
Calculating BPI

Q	0(0)	1(3)	2(6)	3(9)	4(12)	Pi	Pmax=12
10 12			✓				6
11 12	✓						0
12 12				✓			9
Totals						15	36
BP1	15/36= 0.4166						

Source: Author's computation

Calculating LCI, CSI, VSI, PII, CAI

Questions	0(0)	1(3)	2(6)	3(9)	4(12)	P	P max=12
4		✓				3	12
TC1= 3/12= 0.25							
5			✓			6	12
CSI= 6/12 = 0.5							
6	✓					0	12
VSI= 0/12= 0							
7				✓		7	12
PII= 9/12= 0.75							
CAI= (TCI+ CSI+VSI+PII)/4 =(0.25+0.5+0 +0.75)/4= 0.375							

Source: Author's computation