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Assessing citizens' behavior towards blockchain cryptocurrency adoption in the Mano River Union States: Mediation, moderation role of trust and ethical issues

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ABSTRACT

Digital transformation and technologies have drastically channeled innovative global market trends from conventional commerce to digital currency. Therefore, this study examined the influence of trust on citizens' behavior (CB) in decision-making towards blockchain cryptocurrency. The study employed a quantitative method to collect data from Africans in the diaspora of the Mano River Union sub-region. We combined SPSS and Smart PLS for data analysis. The proportion of males in the population was 52%, females were 48%. The analysis outcome found that citizen's behavior $R^2 = 43\%$ and trust in cryptocurrency $R^2 = 45\%$ variance were explained by the study model. Results also show a positive relationship between technology attachment and citizen's behavior ($r^2 = 25\%$), blockchain transparency (BT) on trust crypto ($r^2 = 68\%$), BT on CB ($r^2 = 38\%$) as well as trust in Crypto on CB ($r^2 = 25\%$). Meanwhile, the moderation effects of ethical issues negate the relationship between trust and consumer's behaviors, while the mediation of trust supports the association between cryptocurrency and citizen's behavior (68%). The development of BT should entail an inclusive approach; as such, the Mano River Union must not be left behind. "The internet is central to data transfer, but the blockchain is central to value transfer," hence the ethical issues and trust in crypto-enabler will ensure easy adaptability across the globe and Africa in particular.

1. Introduction

Digital transformation has drastically brought about innovative global marketing trends from traditional commerce to e-commerce. The advantages of this transformation are less process time, cost, errors, and mistakes for developers/innovators and users [1]. Companies lose their online customers, vendors, and consumers' propensities to trust, positively related to consumer confidence. The popularity of bitcoin and Ethereum as electronic commerce have gained tremendous attention in the liberal trade order [2]. Sub-Sahara has joined and adopted the trend of blockchain cryptocurrencies for e-commerce usage. Though we have observed the drastic growth and prospects of Blockchain cryptocurrencies, considering the ongoing development, the stakeholders must note its challenges ranging from acceptability to public trust [3].

The proliferation of innovative initiatives could be an effective tool for adopting Blockchain technology in sub-Sahara Africa. Tama et al. [4], describe Blockchain as a public digital ledger in which transactions are recorded. Transactions recorded on a blockchain are immutable i.e. cannot be modified. Also, Blockchain uses a peer-to-peer network maintained in only one decentralized ledger. The immutability property of Blockchain makes it a potential technology in various businesses and government services to ensure transparency (Kong & Hung, 2016). Scholars add that Cryptocurrencies such as Bitcoin and Ethereum are built on blockchain technology. Thus, cryptocurrency is a virtual currency that uses cryptography to validate the owner of a unit of value of the currency [5]. Despite the rise of cryptocurrencies, governments are

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cynical about accepting existing cryptocurrencies as a legal payment platform. Gathii's [6] cynicism underlines that cryptocurrencies are volatile and have records of scams and illegal transactions. Thus, it is logical for a country to explore the intricacies of developing a stable and regulated cryptocurrency. A previous study found that trust plays a pivotal role in users' intentions. In the context of uncertainty and dependency, trust, therefore, perform a predominant role in the socio-economic interaction of users [7]. The three main dimensions of trust (i.e., competence, integrity, and benevolence) are presented in this research measure [8]. Hence, scholars posit that Since uncertainties exist in Internet transactions, trust is a critical factor influencing the successful proliferation of e-commerce.

Conversely, e-commerce benefits both merchants and consumers; it also has limitations, such as the physical separation between the developers, users, and merchandise. To reduce these barriers, it is incumbent on the innovator to develop a trustworthy relationship to foster consumers' loyalty [9]. Crypto functional compatibility is one of the appropriate steps for gaining consumer trust to attract them to use blockchain technologies [10]. For instance, the proponent of this highly discussed area has thoroughly examined the introduction of cryptocurrencies in interested countries to adopt disruptive technology. Also, Tunisia replaced her digital currency with the blockchain-based version in 2015 [11]. Muhayiddin et al. [12], added that though there was an existence of eDinar, a blockchain cryptocurrency on the coin market in Tunisia, there were no details to verify its usage. Additional commentary's noted that the eDinar coin uses a delegated proof-of-stake (DPOS) which is claimed to have better data protection [13]. Another case study is eKrona which has been under analysis and inquiry by Riksbank, the central bank of Sweden, since 2017 [14].

The significant reason for choosing the Mano River Union (MRU) states and citizens is the insufficient existing literature regarding Blockchain cryptocurrency in the sub-region. More so, MRU could potentially improve and increase the blockchain crypto market. Thus, we empirically examine the moderator role of ethical concerns in using blockchain Cryptocurrency. The objectives of this study are to showcase the essentiality of the moderating role of ethical considerations and mediating role of trust that influences citizens' behavior towards a decision to use cryptocurrency. Thus, the research question remains: What are citizens' philosophical ethics and attitudinal behavior in adopting Blockchain Cryptocurrency in Sub –Sahara. The case of the Mano River Union States? Data collected the Mano River Union States.

2. Theoretical background and literature review

Previous studies highlight that entrepreneurs usually seek Consumer Trust to domesticate new technology like cryptocurrencies. Hence, trust in emerging disruptive technologies plays a leading role in facilitating e-commerce [15]. Thus, it enhances the efficient satisfaction of consumers' needs [16]. While Cryptocurrency scholars argue that it facilitates secure and fast online monetary transactions, Blockchain is the medium used to undertake the said transaction [17]. Due to its decentralized system, no central or independent party can verify its transactions for security features [18]. However, some envisage the fluctuation of price and embedded risk of cryptocurrency [19]. E-commerce has been identified as one of the biggest platforms that solicit the trust of cryptocurrencies [20]. Poravi et al. [21] contest that Consumer Trust in mining is usually carried out in most political jurisdictions that legitimise the usage of cryptocurrencies. Essentially, global users' shared experiences and perceptions about blockchain cryptocurrency also aided the trust towards this disruptive technology [22]. Yet Difranzo's [23] quantitative analysis shows the fragility of the cryptocurrency market.

Recently, Greenberg and Bugden [24], raised a concern about the motivations behind state-backed cryptocurrencies. Hudson [25]; on the one hand, argues that blockchain cryptocurrencies are a new form of financial control mechanism, which is frequently motivated politically. On the contrary, Calhoun et al. [26], elucidate that the fear of potential competition of cryptocurrencies with central banks and governments gives the power to cut loose from the monopoly built by central banks and governments. Al-Amri et al. [27], underline the notion about centralized control of cryptocurrencies as pointless, thus contravening its three pillars, i.e. decentralization, transparency, and immutability. Consequently, it gives governments, not citizens, power to control their assets. Hudson [25] discussed crypto's situational and structural aspects that influence trust. He adds that situational facets are acknowledged as the platform which expedites its adoption. Commentators posit that though these currencies have become more mainstream, criminal activity has profited with cryptocurrencies. Despite this, Nolasco Braaten & Vaughn [28], identified the forensic objects trend on digital devices to track transactions and malicious actions. According to Gryshova & Shestakovska (2018) findings, public trust has the greatest stake on trading volume and price volatility. Comparably, Bibi et al. [29], explore the impact on the effect of networks on blockchain cryptocurrency e-commerce. Corbet [30] adds that the availability of trust and ethics towards using a higher level of technical innovation dictates the successful facilitation of the blockchain cryptocurrency ecosystem. Consequently, Al-hussaini et al. [31], note that the cryptocurrency market is still inefficient, a typical case of the adverse trust in Litecoin.

3. Conceptual framework and hypotheses development

This study proposes a conceptual model to investigate the moderation role of ethical concerns towards the adoption of blockchain Cryptocurrency e-commerce in the Mano River Union States. Moderation and mediation are often interchangeably used, however, distinctive in strategy, concepts, and statistical approaches [32,33]. Moderation is usually strenthened in high or low effects, while mediation intervenes the underlying mechanism of trust in crypto to citizens' behavior [33]. This study employs Ethical concerns to determine the strength between Trust in Crypto and citizens' behavior. Fig. 1 shows how TC potentially mediates between technology attachment (TA) and blockchain transparency (BT) to citizens' behavior. Similarly, Ethical concerns was explored to ascertain the moderating effect between TC and CB. Again, the mediation argument shows the indirect relation between TC and citizens' behavior. We consider age, education, and frequency control variables, probably affecting the constructs mentioned above. Given the differences between males and females regarding cognitive formations to service qualities based on their personal needs [34]. Our study also explains the theoretical justification for each hypothesis in the next section and graphical Fig. 1.

3.1. Trust transfer theory

Contextually, various studies have established that this theory is an efficient mechanism to institute and improve trust in an online transaction. Trust transfer theory comprises source-target relationship, trust

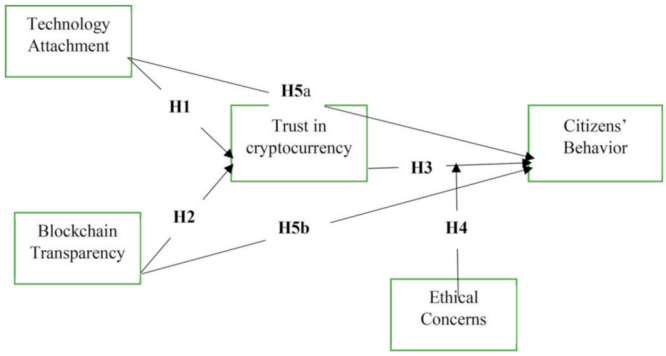

Fig. 1. Conceptual framework of the study.

in target, and trust in source as the key mechanism determining the trust transfer procedure [35]. Meanwhile, users' trust in a trusted medium could be transferred to a linked medium. Thus, proponents projected trust transfer to be the underlying and efficient mechanism for technology adoption [36]. Trust transfer guides intermediary operators and merchants in E-commerce to modify their trust-building approach [37]. Trust in internet providers, medium and transaction-based evidence are the antecedents of trust transfer [38]. Based on Zhang et., al [39]; trust transfer is a classified method of enhancing preliminary trust. Their study views consumers as trustors while enterprises the trustee. Therefore Zhang et al. [39], argue that the trust transferred process encompasses several sources and various procedures.

Thus, it comprises communication and cognitive processes. The trustor assesses whether to trust others or not. On the other hand, trustworthiness is evaluated by the trustor and a third party as the broker. Which is a typical example of the cognitive process of trust transfer [40]. Han et al., [41]; argue that trust influences the establishment of attitudes, loyalty, relationships, purchase intention, decreasing privacy and security concerns. Hence trust transfer could be found in the sharing economy platform. Al-hussaini et al. [31], concluded that users' trust in adopting disruptive technology like blockchain cryptocurrency would derive from their trust in the intermediary platform. When consumers are convinced that the intermediary platform is reliable and obtain positive electronic words of mouths about such technology, that would automatically influence their trust.

Technology Attachment has been described as the significant feature of Blockchain and brings forth innovation [42]. However, the specialized attachment involves managing privacy, data, implementation, development, and security issues. However, the underlying designed system is coupled with its potential impact on new technologies. Such as; machine-to-machine (M2M) communication, artificial intelligence (AI), cloud computing, big data analytics, and the Internet of Things [43]. For instance, traceability accessibility of data has formerly been branded as the pivotal and successive driver for e-commerce[44]. Technology Attachment has triggered a wide range of assumptions about the collection and integration internet of things, enabling smart contracts insurance merge industry to enhance payments without burdensome clerical processes [45]. Scholars emphasize that novel use cases require an advanced consideration of supply conditions for blockchain new processes and design patterns and the development of specific implementation frameworks [46]. Nonetheless, the introduction of consistent programmable interfaces for smart contracts like Ethereum has increasingly adopted standardized programmable interfaces and data exchange designs [47]. Thus, transactions conducted via Blockchain are vividly facilitated in an ordered and immutable manner [48].

H1. Technology Attachment is positively related to Trust in Cryptocurrency

Blockchain Transparency refers to a platform that allows the maintenance of a common database for consumers devoid of a trusted central controller. Hence, it permits consumers to enter and leave the system at their own time [43]. As a result, it established the chronological order of cryptographically time-stamped entries which link individual transaction sets blocks to each other through cryptographic hashes [49]. Therefore, it necessitates instituting transparency and integrity across the chain of blocks. By so doing, each block is connected to its portent [50]. Blockchain introductory execution was done in a distributed online transaction, mainly distributed ledger [51]. It comprises complete details of a transaction and the allocation of existing Bitcoins cryptographic features. Its compatibilities which include, data immutability and shared access, ought to be decisively included (Kethineni et al., 2019). Hence, transparency can be vividly figured out in transactions conducted on a blockchain [52]. Antagonists argue that public blockchain transactions are linked with fake identities. They, therefore, highlight critical observations on transparency and novel security ranging from fair execution and secure implementation [53].

H2. Blockchain Transparency is positively related to Trust in Cryptocurrency.

Users' trust is the most predominant word used in E-commerce. It has been labeled as the positive expectations that stimulate the intention to accept vulnerability [48]. Therefore, Trust is an essential variant in terms of blochain cryptocurrency adoption, as suggested by Can, [54]. It represents one of the promises of Blockchain. The early work of (2018) states that scholars habitually distinguished amongst trusting beliefs and intentions and trust-related behavior towards the disposition of trust and institution-based trust. Likewise, Paliwal et al. [43], delineate related ideas and recommend the necessity of smart contracts usage to record past interactions. Contrarily, Al-hussaini et al. [31], showcase that consumers always seek a secure reputation against attackers from users with trustworthy experience of a trust network authentication. Subsequently, its immutability and its distributed nature deter the following innumerable attacks ([55]. Consequently, consumers' trust in blockchain cryptocurrency is influenced by the integration of robust public disclosure, immutability, consensual agreement of the transactional data record, and the ability of smart contracts to automate services [56]. So far, Sharma et al., [57]; conclude that ecommerce ought to enhance the intrinsic and extrinsic determinants towards its service delivery inorder to influence citizens'positive behaviours.

H3. *Trust in Cryptocurrency mediate both Blockchain Transparency and Consumers' Behaviour*

Ethical Concerns comprise of regulations on the conduct of transactions which include; legal implications of smart contracts, personal data, investing money through virtual assets, and the advent of disruptive technology [58]. In recent years, the rapid growth of blockchain technologies like crypto has attracted new issues that ethical practitioners ought to be understood before suitable ethical behavior changes can be determined. The evolution of e-commerce encountered crucial ethical concerns, especially at the adoption stage of many countries [42]. However, Cryptography entails virtual data asset transactions and smart case contacts to execute legal transactions and agreements [59]. Although the cryptographic identities of participants of most existing public blockchain systems are pseudonymous, it is possible to identify participants using additional information under certain circumstances [46]. The smart contract is one of the features of blockchain cryptocurrency. Szabo first used this in 1997 to describe algorithmic, self-executing, and self-enforcing computer programs that provide interactive capabilities and can be used to automate many types of transactions [60]. Hence, the formation mechanisms of the general principles of ethics can be applied to the new technological framework of smart contracts and in which cases smart contracts can create an ethically binding practice of their parties and deter doubt on existing barriers is yet to be discovered [61]. Thus, Sætra [62], found that privacy and security are the driving forces of ethical issues towards the policy formation and adoption of innovative technology like blochain cryptocurrency.

H4. Ethical issue moderates Trust in Cryptocurrency and Consumer Behaviour.

4. Methods

4.1. Research design and data collection setting

This study employed a quantitative method based on the construct's adaptations and data collected across the Mano River Union States. A diverse group of Africans in the diaspora were recruited in China, mainly from West Africa. Detailed instruments were used for measurement, and SPSS and Smart PLS were combined for the structural equation model (SEM) [63,64]. Again, SPSS v.24 was used to ascertain the averages of control variables on the reliability and validity of constructs [65]. Bentahar & Cameron [66], stated that the quantitative method also

assumes a mathematical or scientific dimension [67]. The integrated conditions were meant to balance software, designs, and application for analysis. The quantitative method has been applied in management science especially, compared to the tendency of social sciences in blockchain communication [67]. Undoubtedly, this method has proved applicable in various studies to justify this study.

4.2. Measures and procedures

The items adopted from previous studies, also applied with validation, hence trust uncertainty in the technology emergence of cryptocurrency in African. All the various constructs were measured using a 5-points Likert scale (1) strongly agree to (5) strongly disagree [68]. All the measures were modified from the previous to fit well to the current dimensions.

Citizens' Behaviour (Bhattacherjee 2001): A 7-items questions were used to measure the outcome variables and specifically asked the following: "I will use Cryptocurrency for e-commerce in the future," "I will use Cryptocurrency when I need swift e-commerce transaction," "I intend to continue using Cryptocurrency as e-commerce compared with other alternative means (traditional commerce)," "I am pleased with Cryptocurrency as a means of e-commerce," "most of my expectations from Cryptocurrency are confirmed," "I am content with cryptocurrency and e-commerce."

Technology Attachment (Kasahara and Kawahara, 2019; Stix, 2021): A 7-items questions were adopted with questions focusing on: "impact accessibility and traceability in e-commerce," "I am satisfied with the privacy and security in e-commerce," "novel technologies (IoT, data analytics, cloud computing, AI, M2M) have to affect e-commerce," "E-commerce systems have developed and designed on the technical characteristics of blockchain," "technology Attachment platform provides users individual attention." The overall score ranged from participants' agreement and disagreement.

Blockchain Transparency (Dorri et al., 2017): we adopted 6-items for the measures exemplified: "proliferation of blockchain transparency attracts consumers' payment intention," "blockchain applications alter citizens' intention," "blockchain impact the collection of consumer-related data," "blockchain effect segmentation, personalization, and customization in e-commerce," "blockchain influence e-commerce adoption", Blockchain bridge the digital gap." It was score using a 5-point Likert scale from (1) strongly agree to (5) strongly disagree.

Trust in Cryptocurrency (Morton, 2018): A 6-items questions were used in this scenario of the variable was adopted and applied as mediating test as follows: "I find cryptocurrency trusted in my daily life," "Cryptocurrency helps my e-commerce transaction more convenient," "Cryptocurrency improves the quality of my trip," "My experience about Cryptocurrency in e-commerce is better than expected," "I am satisfied with using the Cryptocurrency as e-commerce," "Cryptocurrency provided by the e-commerce platform is better than what I expect overall."

Ethical Issues (Lim et al., 2019; Rejeb et al., 2020; Travizano et al., 2018): 5-items were used for the moderation role in this study and measured as follows: "Ethical Issue is the premise Blockchain is built-in handling sensitive data in e-commerce," "Ethics impact knowledge requirements regarding customers adoption of crypto e-commerce," "Ethical issues pertaining Cryptocurrency and e-commerce are widely visible," "How does blockchain impact capital market access and the formation of new e-commerce markets," "Crypto e-commerce systems have Ethically designed and considered."

Hair et al. (2010) contended that research of non-parametric approach is employed with either large or small sample size. The sample size of (N = 421) of tested zero-correlation, and fitness showed *df/4*, mean square of *57.235 F (144.798)* and *df/6*, mean square *41.696 F (120.629)* of the dependent (citizens' behavior) and predictors (technology attachment - TA and blockchain transparency - BT) and (mediated by trust in cryptocurrency - TC) and moderated by ethical concerns (EC) in the study. All constructs of zero correlation showed a significant exhibition of consumer's behaviour to give a robust outcome against the predictors**.** Table 1 description of all the demographics indicated males were high than females per the recruited participants (52%, 48%) respectively. Most of the respondents were at the university level (73.4%) with age ranges (20–30years) are 35%.

5. Data analysis and results

In this study, the partial least-squares (PLS) approach of the non-parametric analysis was employed to test the conceptualized framework Fig. 1. PLS is a widely used statistical package for testing and confirmation [69]. We employed a statistical test on three-parameter: significance criterion, reliability, and effect size [70]. This method supports determining Cronbach alpha, composite reliability, loadings of items, variance index, and the average variance extracts (Table 2); for further testing, discriminant validity and Heterotrait-Monotrait Ratio were calculated (HTMT) [71]. Considering this, the level of the current study is exploratory and conducted in a technology innovation context, Smart PLS 3.0 [71,72] was used to analyze the measurements and structural models.

5.1. Measurement model

Overall, the study tested the items of measures to get the reliability and validity. Tables 2 and 3 show the zero-correlation and CFA. Each item's reliability was assessed by examining their factor loadings to ascertain its corresponding construct. The square root of the correlation calculated the AVE to justify the discriminant validity [73]. Ab Hamid et al. [74], suggested that items with more explanatory power than the error variance can be accepted. Based on the confirmatory factor analysis (CFA) outcome, some loadings, though, were higher than the threshold of 0.70, while others below (0.068) were deleted. However, some of the variance inflation factors (VIF) $>$ 10 were above the benchmark; therefore, possible cause of multicollinearity [75]. These results indicated overall reliability and the constructs were generally robust. Table 3 shows that Cronbach's α is from 0.687 to 0.897, while the composite reliability ranges from 0.809 to 0.925. Cohen [70], study specified effect size (ES), in the specification of the nonzero value of the population. ES is index-specific and qualitatively defined as small (r = 0.1), medium (r = 0.3) and large/high (r = 0.5) [76].

Discriminant validity and Heterotrait-Monotrait Ratio (HTMT) are assessed for each construct that shares more variance with its items than any other construct in the model (Ab Hamid et al., 2017b; [73]. The square root of the AVE of a construct should be greater than the construct's correlation with that of any other construct in the model. Table 2 shows the square roots of the AVEs for all constructs were greater than the correlations between constructs, confirming the discriminant validity of the measurement. While Table 4 indicated HTMT of each construct below 0.85 as an indication of multiple-collinearity.

All the indicated zero-correlation of citizens' behaviours were offered a second-order reflective construct. Based on these assumptions, all first-order dimensions reflected the second-order construct, as

Table 1
Descriptive sample of the demographics.

Control variables		Frequency	Percent
AGE	18–20	87	20.7
	20–30	147	34.9
	30–40	132	31.4
	40–50	52	12.4
	above 50	1	0.2
Gender	male	219	52.0
	female	201	47.7
Education	High School	44	10.5
	College	2	0.5
	University	309	73.4

Table 2
Zero-Correlation matrix.

Correlations					
Constructs	Mean	1	2	3	4
CB		**.793**			
TC		.518**	**.879**		
BT		.449**	.668**	**.843**	
EC		.612**	.616**	.552**	**.717**

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

Table 3
Results of CFA.

Items measures	Factor Loadings	VIF	Cronbach Alpha	CR	AVE
BT1	0.773	1.574	0.803	0.871	0.629
BT2	0.816	1.717			
BT3	0.781	1.593			
BT4	0.801	1.649			
CB1	0.800	7.004	0.881	0.913	0.679
CB2	0.868	9.089			
CB3	0.820	7.384			
CB4	0.885	9.726			
CB5	0.739	1.567			
EC1	0.706	1.463	0.897	0.925	0.712
EC2	0.888	73.629			
EC3	0.871	15.882			
EC4	0.884	72.573			
EC5	0.856	15.076			
TC1	0.779	1.544	0.819	0.881	0.649
TC2	0.827	1.871			
TC3	0.840	2.022			
TC4	0.774	1.605			
TA1	0.758	1.364	0.687	0.809	0.515
TA2	0.683	1.305			
TA3	0.758	1.418			
TA4	0.667	1.274			

Note: TA = technology attachment, BT = blockchain transparency, TC = trust of consumers, EI = ethical concerns, CB = citizens' behaviour.

Table 4
Discriminant validity using HTMT ratio assessment.

Constructs	BT	CB	EI	TA	TC
BT					
CB	0.606				
EC	0.600	0.651			
Moderating 1	0.134	0.184	0.220		
TA	0.777	0.649	0.727	0.202	
TC	0.745	0.577	0.585	0.113	0.744

treated as a second-order CFA by using first-order dimensions. The criterion and effect size based on the study population is interpreted. The path coefficients from CB indicated first-order factors of TA, BT, and TC shown in the loadings in Table 3 were 0.78**, 0.80**, and 0.89**, (93%, 96% and 97%) respectively [76]; pp, 111). All loading values were significant at the 0.001 level. In addition, the first-order factors showed moderately high levels of correlation with each other, ranging from 0.59** to 0.66** (86% and 92%). The positive zero-correlations for all the first-order factors indicated statistical significant converged at a common underlying construct of citizens' behavior. This indication shows that the correlation value of d = 0.2 is a small difference of a distributed population. Conventionally, $r^2 = 0.010$ is 57.9% of sample size, while medium effect size of $r^2 = 0.5$ is 0.059 thus 59.9% as well as large/higher effect size of $r^2 = 0.8$ is 65.5% quantitatively accounted according to the sample population (Cohen, 2013b pp, 29).

5.2. Structural model

Fig. 2 of the output shows the conceptual model results retrieved directly from the Smart PLS. the study treated citizens' behaviour as a second-order construct, which took into account all other predictors of technology attachment, blockchain transparency, and trust in cryptocurrency. We found direct effects of citizen's behaviour 43% of the variance in the explanatory power of the construct (Fig. 2). Trust's mediating role in cryptocurrency also explains 45% of the variance.

The conceptual Fig. 2 path coefficient indicated medium effects size except for H1 and H2. The results positively affected citizens' behaviors, which eventually recognized the need for trust in cryptocurrency as a construct H3. However, the ethical issues negatively affect trust in cryptocurrency and citizens' behaviors, which did not support H4. We also found a positive indirect effects of both technology attachment ($\beta = 0.224$, $p < .003$**, $r^2 = 38\%$) and blockchain transparency ($\beta = 0.377$, $p < 005$***, $r^2 = 68\%$) on trust of cryptocurrency (Tables 5 and 6). In addition, hypothesized effects of ethical issues and citizen's behaviour is positively related ($\beta = 0.37$, $p < .01$*, $r^2 = 68\%$). Furthermore, hypotheses 5a and 5 b justified the mediation role of trust in cryptocurrency from Table 7.

Based on the hypotheses from Fig. 2, the mediation Table 7 expanded, apart from ethical issues at moderation role was negligible. However, the ethical issues show a high recognition effect on citizens' behavior path coefficient. As proposed, all the path coefficients are indicated in Table 6.

On the premise of using multiple regression to complement the analysis of the mediation between Technology Attachment and Blockchain Transparency; Table 7 assumption justifies a statistically significance to citizen's behaviours ($CB = \beta_0 + \beta_1$ BTTA + e) ($\beta = 0.458$, $t = 11.035$, $p < .005$***) and ($\beta = 0.356$, $t = 8.590$, $p < .005$***). Further, the second model used the relationship on same Table 7 multiple regression Trust in Cryptocurrency, Blockchain Transparency on trust in Crypto ($TC = \beta_0 + \beta_2$ BTTA + e) ($\beta = 0.489$, $t = 11.561$, $p < .005$***)($\beta = 0.307$, $t = 7.268$, $p < .005$***). Table 7 shows again, model 3 of BT and TA mediating role of Trust in cryptocurrency ($CB = \beta_0 + \beta_4$ BTTA + β_3 TC + e), ($\beta = 0.310$ and 0.263, $t = 6.836$ and 6.271 $p < .005$***) and ($\beta = 0.302$, $t = 6.608$, $p < .005$**) verily significant predictors on all bases but smaller than the previous effects on CB. In the same vein, the indirect effect of H5a and H5b still existed but in a smaller magnitude. Therefore, partial mediation established on targeted Citizen's Behaviour. Therefore, the mediating role from Table 7 is justifiable, it confirms the hypothesis that; H5a and H5b *Trust in Cryptocurrency mediate both Blockchain Transparency, Technology Attachment and Citizen's' Behaviour*.

The study further employed Hayes's Conditional Process model 1 established Fig. 3 delineating EI negate the relationship between TC and

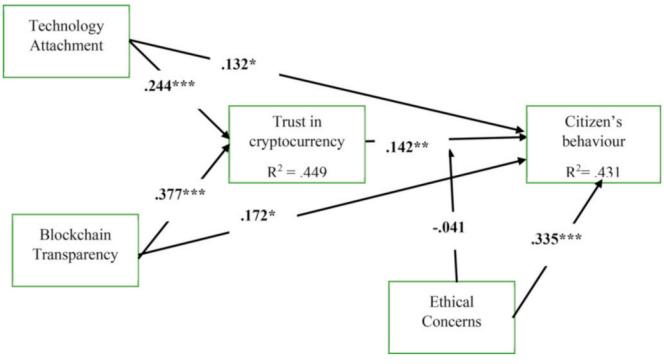

Fig. 2. Path coefficient structural model.

Table 5
Direct and indirect effects of the conceptual model.

	Total Indirect Effects		Total Effects
Constructs	CB	CB	TC
BT	0.054	0.229	0.377
CB			
EC	0.024	0.359	0.168
interaction		−0.041	
TA	0.035	0.167	0.244
TC		0.142	

***p < .05, **p < 005, *p < 01.

CB. The supported hypothesis is that; *Ethical issues moderates Trust in Cryptocurrency and Citizens' Behaviour.*

6. Discussions

This research study expanded empirical evidence on the e-commence in Mano River Union States based on citizens' trust in blockchain Cryptocurrency, the significant potential for improvement, and increasing Africa's crypto market. Objectively, the study reveals the level of trust factors on citizens' behavior and decision-making in cryptocurrency.

The study proposed *Technology Attachment is positively related to Trust in Cryptocurrency;* this is confirmed based on the analysis of Smart PLS and multiple regression statistics. Trust transfer is often a stumbling block, primarily when consumers are confronted with a new technology, guided by several factors. This exertion is consistent with intermediary operators and merchants in E-commerce to modify their trust-building approach [37]. Any disruptive technology most faced trust issues, relatively consumers' trust toward interaction with AI robots in service delivery, and development of technology in the automobile worldwide [77,78]. Consequently, Alzahrani et al. [79], work indicated that the reliability of service provider can be a prime influence towards the willingness to use innovative technology. Likewise, the zero correlation shows a positively high relationship between technology attachment and trust in cryptocurrency. This phenomenon has established a high frequency of pronouncers of Blockchain cryptocurrency to educate the masses to build confidence within the technology innovation in response to the usage of the African-Cryptocurrency in the Mano River Union States (MRU).

The study proposed that *Blockchain Transparency is positively related to Trust in Cryptocurrency.* Transparency ignites trust in cryptocurrency usability/adoptability to resolve irregularity issues by allowing other

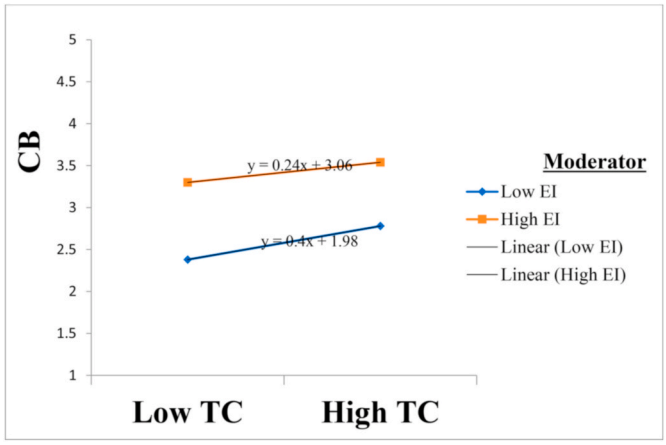

Fig. 3. *Moderation Effects of Ethical Issues on Trust in Cryptocurrency and Citizens' Behaviour.*

Table 6
Path coefficient.

Hypotheses	β	Mean	Standard Deviation	T value	P values	inference
BT - > CB	0.176	0.173	0.057	3.084	**0.002**	supported
BT - > TC	0.377	0.381	0.047	7.964	**0.005**	supported
EC- > CB	0.335	0.338	0.051	6.561	**0.005**	supported
EC - > TC	0.168	0.168	0.048	3.48	**0.001**	supported
Interaction	−0.041	−0.038	0.042	0.972	**0.332**	unsupported
TA - > CB	0.132	0.134	0.063	2.112	**0.035**	supported
TA - > TC	0.244	0.246	0.054	4.509	**0.005**	supported
TC - > CB	0.142	0.14	0.058	2.464	**0.014**	supported

Note: TA = technology attachment, BT = blockchain transparency, TC = trust of consumers, EI = ethical issues, CB = citizens' behaviour.

Table 7
Mediation Effects of Trust of cryptocurrency using multiple regression model.

Model 1		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	**(Constant)**	0.419	0.127		3.290	0.001	0.169	0.669
	BT	0.486	0.044	0.458	11.034	0.000	0.399	0.572
	TA	0.411	0.048	0.356	8.590	0.000	0.317	0.505
Model 2								
1	**(Constant)**	0.627	0.125		5.024	0.000	0.381	0.872
	BT	0.500	0.043	0.489	11.561	0.000	0.415	0.585
	TA	0.340	0.047	0.307	7.268	0.000	0.248	0.432
Model 3								
1	**(Constant)**	0.412	0.128		3.222	0.001	0.160	0.663
	BT	0.489	0.044	0.458	11.048	0.000	0.402	0.576
	TA	0.411	0.048	0.356	8.580	0.000	0.317	0.505
2	**(Constant)**	0.214	0.125		1.706	0.089	−0.033	0.460
	BT	0.331	0.048	0.310	6.839	0.000	0.236	0.427
	TA	0.304	0.048	0.263	6.271	0.000	0.208	0.399
	TC	0.316	0.048	0.302	6.608	0.000	0.222	0.410

Note: ***p < .005, **p < 05 and *p < .01. *TA = technology attachment, BT = blockchain transparency, TC = trust of consumers, CB = citizen's behaviour.*

users to quantify the level of trust they have in it [50]. Numerous studies illustrated the functionality and effectiveness of the use of cryptocurrency in building a decentralized E-commerce network, where direct and indirect trust is expressed through monetary pledges. Researchers, therefore, resolved to allow digital currency to prevail. Hence, Blockchain technology benefits cannot be undermined in the robust decentralized and transparent (confidentiality, integrity, and availability) [80–82]. Essentially, Blockchain transparency is computer networked and smart digital contracts of previous and present transactions based on agreement. For instance, the sender, the receiver, the amount, and the category of digital agreed currency, well stipulated. All contractual processes are recorded in blocks without any hidden ledger, to be viewed and witnessed globally, making users trust cryptocurrency (Africa-crypto) and transparent blockchain transactions.

Furthermore, *Trust in Cryptocurrency mediate both Blockchain Transparency, and Citizens' Behaviour* is confirmed from the analysis. The application of hierarchical multiple regression showed significant mediation between trust in cryptocurrency technology and blockchain transparency to citizens' behaviors. The technology has expanded globally due to its transparency and trust, low transaction fees associated, and instant payment accessibility. Their must be the consistency of transparency among organizations, citizens' satisfaction, and no bribery and corruption. This is because transparency and trust have a close relationship to corruption and citizens' satisfaction in using public services [83]. Typically, the Blockchain stands to improve the carbon asset transactions system. Evidence is in the Energy Blockchain Lab and IBM in the carbon assets in China, hence "allows high-emission organizations to monitor their carbon footprints and meet quotas by buying carbon credits from low emitters."

In addition, the moderation of *Ethical issues moderates Trust in Cryptocurrency and Citizens' Behaviour* is also confirmed from Hayes's process condition. The study also employed the process conditions of Hayes's, which negate the relationship of ethical issues between trust in cryptocurrency and consumer's behaviors. Bae, S., [84], study of interaction effects and shipping logistics empirically found the interaction effect of the information systems and managers' support for blockchain technology on the cooperation, which can be explained as a resource-based view. Therefore, the philosophical resource-based viewed under the virtues of good relationship of consumers trust in the blockchain technology and cryptocurrency is essential. This study involved ethical concerns because, like any other technological revolution and professionalism, ethical dilemmas require some decisive actions and judgments. Ethical concerns during the execution of technology and data are practically approached with codes, to ensure elimination of fundamental ethical dilemma. These codes of ethics are part of building trust by consumers and a necessity to educate and inspire Technology adoption for the larger society as in the case of Mano River Union States.

7. Implications and limitations of the study

The study of ethics and trust in the paper has practical and theoretical value. It proffers thorough insight into the nature of trust construct as observed in the current and potential users of blockchain cryptocurrency. The study providing an advanced understanding of the mediating role of trust and moderating ethical issues contributes to the overall body of e-commerce, trust, and the reign of philosophical research. This research essentially outspreads our understanding of the phenomena and its dimensions. Thus, it is the first comprehensive empirical study in the Mano River Union states.

Consequently, it provides an understanding of the antecedent of trust in blockchain cryptocurrency from an African perspective. This study extricates between ethical issues and trust antecedents; thus, it is a topic that has overwhelmed trust research in contemporary times. It physiques the philosophical understanding of trust accepted by researchers and applied a validated measurement instrument in other regions. Hence, the results were used to modify the existing model and improve our understanding of the influence that foretells blockchain cryptocurrency users' trust behavior. Nevertheless, numerous limitations are integral to the study's design that proposes further research prospects.

First, though the model improves our knowledge of the features that predict MRU users' trust behavior concerning blockchain cryptocurrency E-commerce, future investigation about the mediating role of the ethical issue is robust in West Africa to establish the role of resource-based view in blockchain cryptocurrency transparency. Future research is also needed to advance an absolute comprehension of the factors that influence blockchain cryptocurrency on e-commerce at a large scale. Understanding the features that affect trust in blockchain cryptocurrency is of enormous importance for the researcher and experts. The study sought to advance that knowledge by enhancing specific understanding factors that influence trust in blockchain cryptocurrency. Such insights will enhance the philosophical understanding about the expectation of users to trust and willingness to use blockchain cryptocurrency as a means of commerce. Other scholars will like to use this framework as a premise for exploring the factor that predicts user trust in blockchain cryptocurrency.

8. Conclusion

The study's empirical results have established citizens' satisfaction with blockchain cryptocurrency, fostering decentralized transactions and transparency with trust. This will enable consistent and transparent e-commerce transactions in the Mano River Union and Sierra Leone to facilitate citizens' adaptation of blockchain cryptocurrency without fear. In light of this, technology attachment promotes blockchain transparency of citizens' trust in cryptocurrency, hence finding new knowledge and understanding. The development of blockchain technology is "as ubiquitous as the internet," The Mano River Union must not be left behind. "The internet is central to data transfer, but the blockchain is central to value transfer," thus, the ethical issues and trust in crypto-enabler will ensure easy adaptability across the globe.

Author statement

Jonathan Koroma: Conceptualization, Methodology, data collection and analysis; Zhou Rongting: supervision of data collection and proofreading; Sayibu Muhideen: exploration, investigation and editing; Tosin Yinka Akintunde: reviewing of data and coding, Tunde Simeon Amosun: proofreading; Sahr James Dauda and Ibrahim Abdulai Sawaneh validation and editing.

References

[1] K. Siau, F. Nah, Development of a framework for trust in mobile commerce. *Proceedings of the second annual Workshop on HCI research*, February (2003) 85–89.
[2] T.S.H. Teo, J. Liu, Consumer trust in e-commerce in the United States, Singapore and China, Omega 35 (1) (2007) 22–38, https://doi.org/10.1016/j.omega.2005.02.001.
[3] Kesa, O., & Mahoro, V. (n.d.). Rwandacoin : Prospects and Challenges of Developing a Cryptocurrency for Transactions in Rwanda.
[4] B.A. Tama, B.J. Kweka, Y. Park, K. Rhee, A Critical Review of Blockchain and its Current Applications, 2017, pp. 109–113.
[5] S.J. Hughes, S.T. Middlebrook, Advancing a framework for regulating cryptocurrency payments intermediaries, Yale J. Regul. 32 (2) (2015) 495–559. http://login.library.sheridanc.on.ca/login?url=https://search.proquest.com/docview/1749961488?accountid=3455%0Ahttp://qg3yr4sv8z.search.serialssolutions.com?ctx_ver=Z39.88-2004&ctx_enc=info:ofi/enc:UTF-8&rfr_id=info:sid/ProQ%3Aaccountingtaxbanking&rft_val.
[6] J.T. Gathii, Agreement establishing the african continental free trade area, Int. Leg. Mater. 58 (5) (2019) 1028–1083, https://doi.org/10.1017/ilm.2019.41.
[7] G. Söderberg, What Is Money and what Type of Money Would an E-Krona Be, 2018, pp. 17–28.
[8] M.A. Ismail, N.S. Safa, Trust, satisfaction, and loyalty formation in electronic commerce, Journal of Industrial and Intelligent Information 2 (3) (2014) 228–232, https://doi.org/10.12720/jiii.2.3.228-232.
[9] M. Nilashi, O. Ibrahim, V. Reza Mirabi, L. Ebrahimi, M. Zare, The role of Security, Design and Content factors on customer trust in mobile commerce, J. Retailing Consum. Serv. 26 (2015) 57–69, https://doi.org/10.1016/j.jretconser.2015.05.002.

[10] T. Oliveira, M. Alhinho, P. Rita, G. Dhillon, Modelling and testing consumer trust dimensions in e-commerce, Comput. Hum. Behav. 71 (2017) 153–164, https://doi.org/10.1016/j.chb.2017.01.050.

[11] E. Prasad, I. Agarwal, R. Shinde, K. Wang, E. Wu, E. Zhang, Y. Zhang, Central Banking in a Digital Age: Stock-Taking and Preliminary Thoughts C e n t r a l B a n k i n g i n a D i g i t a l A g e : S t o c k - T a k i n g a n d P r e l i m i n a r y T h o u g h t s C e n t r a l B a n k i n g i n a D i g i t a l A g e : S t, 2018, pp. 1–52.

[12] M.-N. Muhayiddin, E. Ahmed, H. Ismail, Consumer acceptance of an electronic dinar payment system in Malaysia, J. Electron. Bank. Syst. (2011) 1–13, https://doi.org/10.5171/2011.463185, 2011.

[13] K. Mothokoa, Regulating Crypto-Currencies in South Africa : the Need for an Effective Legal Framework to Mitigate the Associated Risks, 2017.

[14] Sveriges Riksbank, Sveriges Riksbank Economic Review: Special Issue on the E-Krona, 2018.

[15] S. Kethineni, Y. Cao, The rise in popularity of cryptocurrency and associated criminal activity, Int. Crim. Justice Rev. 30 (3) (2020) 325–344, https://doi.org/10.1177/1057567719827051.

[16] L.C. Schaupp, M. Festa, Cryptocurrency adoption and the road to regulation, ACM International Conference Proceeding Series (2018) 1–9, https://doi.org/10.1145/3209281.3209336.

[17] S. Bibi, Student research abstract: cryptocurrency world identification and public concerns detection via social media, Proceedings of the ACM Symposium on Applied Computing, Part F1477 (2019) 550–552, https://doi.org/10.1145/3297280.3297644.

[18] H.M. Gazali, C.M.H.B.C. Ismail, T. Amboala, Exploring the intention to invest in cryptocurrency: the case of bitcoin, in: Proceedings - International Conference on Information and Communication Technology for the Muslim World 2018, ICT4M, 2018, pp. 64–68, https://doi.org/10.1109/ICT4M.2018.00021, 2018.

[19] J. Liang, L. Li, D. Zeng, Y. Zhao, Correlation-based dynamics and systemic risk measures in the cryptocurrency market, in: 2018 IEEE International Conference on Intelligence and Security Informatics, ISI, 2018, pp. 43–48, https://doi.org/10.1109/ISI.2018.8587395, 2018, April.

[20] S. Shalini, H. Santhi, A survey on various attacks in bitcoin and cryptocurrency, in: Proceedings of the 2019 IEEE International Conference on Communication and Signal Processing, ICCSP, 2019, pp. 220–224, https://doi.org/10.1109/ICCSP.2019.8697996, 2019.

[21] M. Wimalagunaratne, G. Poravi, A predictive model for the global cryptocurrency market: a holistic approach to predicting cryptocurrency prices, in: Proceedings - International Conference on Intelligent Systems, Modelling and Simulation, ISMS, 2018-May, 2018, pp. 78–83, https://doi.org/10.1109/ISMS.2018.00024.

[22] A. Gasc, A.N. B, S.S. B, T. Fr, D. Steven, S.D.S.L.S. Moreira, A.C. França, W. W. Rocha, E.S.R. Tibães, E.N. Júnior, S.C.V.C.V. Martins, W.L. Araújo, T. Tohge, A. R. Fernie, F.M. DaMatta, J.M. Hibberd, A.P.M. Weber, M. Tokumura, A. Ohta, R. Suleria, No 主観的健康感を中心とした在宅高齢者における 健康関連指標に関する共分散構造分析Title, F. F. M. F. M. F. M. F. M. Photosynthetica 2 (1) (2018) 1–13, https://doi.org/10.1007/978-3-319-76887-8%0A. http://link.springer.com/10.1007/978-3-319-93594-2%0Ahttps://doi.org/10.1016/B978-0-12-409517-5.00007-3%0Ahttps://doi.org/10.1016/j.jff.2015.06.018%0Ahttps://doi.org/10.1038/s41559-019-0877-3%0Aht

[23] D. Difranzo, S.H. Taylor, F. Kazerooni, O.D. Wherry, N.N. Bazarova, Upstanding by design: bystander intervention in cyberbullying, in: Conference on Human Factors in Computing Systems - Proceedings, 2018-April, 2018, pp. 1–12, https://doi.org/10.1145/3173574.3173785.

[24] P. Greenberg, D. Bugden, Energy consumption boomtowns in the United States: community responses to a cryptocurrency boom, Energy Res. Social Sci. 50 (December 2018) (2019) 162–167, https://doi.org/10.1016/j.erss.2018.12.005.

[25] M. Hudson, Raising the Stakes : the Use and Future Adoption of Cryptocurrency within Online Gambling in Ireland Master of Science in Finance Dissertation, 2020 (August).

[26] K.E. Calhoun, L.A. Yale, M.E. Whipple, S. Allen, D.E. Wood, R. Tatum, The impact of COVID-19 on medical student surgical education: implementing extreme pandemic response measures in a widely distributed surgical clerkship experience, Am. J. Surg. (2020), https://doi.org/10.1016/j.amjsurg.2020.04.024.

[27] R. Al-Amri, N.H. Zakaria, A. Habbal, S. Hassan, Cryptocurrency adoption: current stage, opportunities, and open challenges, Int. J. Adv. Comput. Res. 9 (44) (2019) 293–307, https://doi.org/10.19101/ijacr.pid43.

[28] C. Nolasco Braaten, M.S. Vaughn, Convenience theory of cryptocurrency crime: a content analysis of U.S. Federal court decisions, Deviant Behav. (2019) 1–21, https://doi.org/10.1080/01639625.2019.1706706, 00(00).

[29] S. Bibi, S. Hussain, M.I. Faisal, Public perception based recommendation system for cryptocurrency, in: Proceedings of 2019 16th International Bhurban Conference on Applied Sciences and Technology, IBCAST, 2019, pp. 661–665, https://doi.org/10.1109/IBCAST.2019.8667123. *2019, July*.

[30] S. Corbet, C.J. Larkin, B.M. Lucey, A. Meegan, L. Yarovaya, The volatility generating effects of macroeconomic news on cryptocurrency returns, SSRN Electron. J. (2018), https://doi.org/10.2139/ssrn.3141986.

[31] A.I.S. Al-hussaini, A.A. Ibrahim, M. Fauzan, H.M. Mohadis, Users perception of cryptocurrency system Application from the islamic views, International Journal on Islamic Applications in Computer Science And Technology 7 (1) (2019) 13–25. https://www.academia.edu/download/61158809/Users_Perception_of_Cryptocurrency_System_Application_from_the_Islamic_Views20191107-107826-1shgnol.pdf.

[32] R.M. Baron, D.A. Kenny, The moderator–mediator vari- able distinction in social psychological research: conceptual, strategic, and statistical considerations, J. Pers. Soc. Psychol. 51 (1986) 1173–1182.

[33] S. Abu-Bader, T.V. Jones, Statistical mediation analysis using the sobel test and and hayes SPSS process macro, International Journal of Quantitative and Qualitative Research Methods 9 (1) (2021) 42–61.

[34] X. Li, P. Jiang, T. Chen, X. Luo, Q. Wen, A survey on the security of blockchain systems, Future Generat. Comput. Syst. 107 (2020) 841–853, https://doi.org/10.1016/j.future.2017.08.020.

[35] N. Wang, X.L. Shen, Y. Sun, Transition of electronic word-of-mouth services from web to mobile context: a trust transfer perspective, Decis. Support Syst. 54 (3) (2013) 1394–1403, https://doi.org/10.1016/j.dss.2012.12.015.

[36] K.J. Stewart, Trust transfer on the world wide web, Organ. Sci. 14 (1) (2003) 5–17, https://doi.org/10.1287/orsc.14.1.5.12810.

[37] L. Xiao, Y. Zhang, B. Fu, Exploring the moderators and causal process of trust transfer in online-to-offline commerce, J. Bus. Res. 98 (February) (2019) 214–226, https://doi.org/10.1016/j.jbusres.2019.01.069.

[38] D. Belanche, L.V. Casaló, C. Flavián, J. Schepers, Trust transfer in the continued usage of public e-services, Inf. Manag. 51 (6) (2014) 627–640, https://doi.org/10.1016/j.im.2014.05.016.

[39] Y. Zhang, X. Chen, X. Liu, N. Zhu, Exploring trust transfer between internet enterprises and their affiliated internet-only banks: an adoption study of internet-only banks in China, Chin. Manag. Stud. 12 (1) (2018) 56–78, https://doi.org/10.1108/CMS-06-2017-0148.

[40] X. Cao, L. Yu, Z. Liu, M. Gong, L. Adeel, Understanding mobile payment users' continuance intention: a trust transfer perspective, Internet Res. 28 (2) (2018) 456–476, https://doi.org/10.1108/IntR-11-2016-0359.

[41] H. Han, C. Koo, N. Chung, Implication of the fit between Airbnb and host characteristics: a trust-transfer perspective, in: ACM International Conference Proceeding Series, 17-19-Augu, 2016, https://doi.org/10.1145/2971603.2971613.

[42] H. Treiblmaier, H. Treiblmaier, C. Sillaber, The impact of blockchain on e-commerce : a framework for salient research topics Electronic Commerce Research and Applications the impact of blockchain on e-commerce : a framework for salient research topics, Electron. Commer. Res. Appl. 48 (June) (2021) 101054, https://doi.org/10.1016/j.elerap.2021.101054.

[43] V. Paliwal, S. Chandra, S. Sharma, Blockchain Technology for Sustainable Supply Chain Management : A Blockchain Technology for Sustainable Supply Chain Management : A Systematic Literature Review and a Classification Framework, 2020, https://doi.org/10.3390/su12187638. September.

[44] N. Biddle, Tax and Transfer Policy Institute October 2019, 2019 (October).

[45] H. Hu, D. Zhang, C. Wang, Impact of social media influencers' endorsement on application adoption: a trust transfer perspective, SBP (Soc. Behav. Pers.) 47 (11) (2019), https://doi.org/10.2224/sbp.8518.

[46] C. Sillaber, B. Waltl, H. Treiblmaier, U. Gallersdörfer, Laying the Foundation for Smart Contract Development : an Integrated Engineering Process Model, Information Systems and E-Business Management, 2020, 0123456789, https://doi.org/10.1007/s10257-020-00465-5.

[47] J. Pre-proof, L. Peng, W. Feng, Z. Yan, Y. Li, X. Zhou, S. Shimizu, Privacy Preservation in Permissionless Blockchain : a Survey. *Digital Communications And Networks*, 2020, https://doi.org/10.1016/j.dcan.2020.05.008.

[48] Z. Shao, X. Li, Y. Guo, L. Zhang, Electronic Commerce Research and Applications Influence of service quality in sharing economy : understanding customers ' continuance intention of bicycle sharing, Electron. Commer. Res. Appl. 40 (October 2019) (2020) 100944, https://doi.org/10.1016/j.elerap.2020.100944.

[49] C. Mueller-bloch, C. Müller-bloch, Governance in the blockchain economy : a framework and research agenda governance in the blockchain economy : a framework and research agenda, March, https://doi.org/10.17705/1jais.00518, 2018.

[50] F. Hawlitschek, B. Notheisen, T. Teubner, Electronic Commerce Research and Applications the limits of trust-free systems : a literature review on blockchain technology and trust in the sharing economy, Electron. Commer. Res. Appl. 29 (2018) 50–63, https://doi.org/10.1016/j.elerap.2018.03.005.

[51] G. Söderberg, Are Bitcoin and other crypto-assets money? Sveriges Riksbank: Economic Commentaries 5 (2018) 1–14.

[52] S. Lee, C. Ahn, K.M. Song, H. Ahn, Trust and Distrust in E-Commerce, 2018, https://doi.org/10.3390/su10041015. October 2017.

[53] T.K. Tsang, P. Wu, Y. Lin, E.H.Y. Lau, G.M. Leung, B.J. Cowling, Effect of changing case definitions for COVID-19 on the epidemic curve and transmission parameters in mainland China: a modelling study, Lancet Public Health 2667 (20) (2020) 1–8, https://doi.org/10.1016/S2468-2667(20)30089-X.

[54] C. Can, Technology in Society Examination of trust and sustainability concerns in autonomous vehicle adoption 63 (2020), https://doi.org/10.1016/j.techsoc.2020.101361. February.

[55] L. Zavolokina, G. Schwabe, Blockchain Technologies from the Consumers ' Perspective : what Is There and Why Should Who Care ? Blockchain Technologies from the Consumers ' Perspective : what Is There, 2018, https://doi.org/10.24251/HICSS.2018.441. January.

[56] M. Ahmad, K. Salah, IoT security : review , blockchain solutions , and open challenges, Future Generat. Comput. Syst. 82 (2018) 395–411, https://doi.org/10.1016/j.future.2017.11.022.

[57] M. Sharma, R. Antony, R. Sehrawat, A. Contreras, T.U. Daim, Technology in Society Exploring post-adoption behaviors of e-service users : evidence from the hospitality sector/online travel services, Technol. Soc. 68 (2022) 101781, https://doi.org/10.1016/j.techsoc.2021.101781. July 2021.

[58] C. Dierksmeier, P. Seele, Cryptocurrencies and business ethics, J. Bus. Ethics 152 (1) (2018), https://doi.org/10.1007/s10551-016-3298-0.

[59] F. Shahzad, G.Y. Xiu, J. Wang, M. Shahbaz, An empirical investigation on the adoption of cryptocurrencies among the people of mainland China, Technol. Soc. 55 (June) (2018) 33–40, https://doi.org/10.1016/j.techsoc.2018.05.006.
[60] N. Isaeva, K. Gruenewald, M.N.K. Saunders, Trust theory and customer services research : theoretical review and synthesis, Serv. Ind. J. (2020) 1–33, https://doi.org/10.1080/02642069.2020.1779225, 0(0).
[61] N. Antonakakis, I. Chatziantoniou, D. Gabauer, Cryptocurrency market contagion: market uncertainty, market complexity, and dynamic portfolios, J. Int. Financ. Mark. Inst. Money 61 (2019) 37–51, https://doi.org/10.1016/j.intfin.2019.02.003.
[62] H.S. Sætra, Technology in Society the ethics of trading privacy for security : the multifaceted effects of privacy on liberty and security, Technol. Soc. 68 (January) (2022) 101854, https://doi.org/10.1016/j.techsoc.2021.101854.
[63] A. Leguina, A primer on partial least squares structural equation modeling (PLS-SEM), Int. J. Res. Method Educ. 38 (2) (2015) 220–221, https://doi.org/10.1080/1743727X.2015.1005806.
[64] Z. Awang, A. Afthanorhan, M. Mamat, N. Aimran, Modeling structural model for higher order constructs (HOC) using marketing model, World Appl. Sci. J. 35 (8) (2017) 1434–1444, https://doi.org/10.5829/idosi.wasj.2017.1434.1444.
[65] Cohen & Cohen, Applied Multiple Regression/Correlation Analyses for the Behavioral Sciences, third ed., Routledge, 1983. August 1, 2002, https://www.amazon.com/Jacob-Cohen/e/B001HORDKS/ref=dp_byline_cont_book_1%20(ed.).
[66] O. Bentahar, R. Cameron, Design and implementation of a mixed method research study in project management, Electron. J. Bus. Res. Methods 13 (1) (2015) 3–15.
[67] M.B. Miles, A.M. Huberman, J. Saldana, Qualitative Data Analysis: A Methods Sourcebook, in: The SAGE Handbook of Applied Social Research Methods, third ed., 2014.
[68] Zainudin Awang, Asyraf Afthanorhan, Mustafa Mamat, The Likert scale analysis using parametric based Structural Equation Modeling (SEM), Comput. Methods Soc. Sci. 4 (1) (2016) 13–21, https://doi.org/10.5539/mas.v9n9p58.
[69] J.F. Hair, C.M. Ringle, M. Sarstedt, Partial least squares structural equation modeling: rigorous applications, better results and higher acceptance, Long. Range Plan. 46 (1–2) (2013) 1–12, https://doi.org/10.1016/j.lrp.2013.01.001.
[70] J. Cohen, Statistical Power Analysis for the Behavioral Sciences Second Edition, STATISTICAL POWER ANALYSIS for the BEHAVIORAL SCIENCES, second ed., vol. 148, Jacob Cohen Department of Psychology New York University, New York, New York, 2013 (LAWRENCE ERLBAUM ASSOCIATES, PUBLISHERS).
[71] J. Henseler, *Discriminant Validity : Check Out How to Use the New HTMT Criterion !* A Primer on Partial Least Squares Structural Equation Modeling, , PLS-SEM), 2015.
[72] M. Sarstedt, C.M. Ringle, J.F. Hair, Handbook of market research, in: *Handbook Of Market Research* (Issue September), 2020, https://doi.org/10.1007/978-3-319-05542-8.
[73] C.M. Voorhees, M.K. Brady, R. Calantone, E. Ramirez, Discriminant validity testing in marketing: an analysis, causes for concern, and proposed remedies, J. Acad. Market. Sci. 44 (1) (2016) 119–134, https://doi.org/10.1007/s11747-015-0455-4.
[74] M.R. Ab Hamid, W. Sami, M.H. Mohmad Sidek, Discriminant validity assessment: use of fornell & larcker criterion versus HTMT criterion, J. Phys. Conf. 890 (1) (2017), 012163, https://doi.org/10.1088/1742-6596/890/1/012163.
[75] S. Jung, J.H. Park, Consistent partial least squares path modeling via regularization, Front. Psychol. 9 (FEB) (2018), https://doi.org/10.3389/fpsyg.2018.00174.
[76] J. Cohen, A power primer, Psychol. Bull. 112 (1) (1992) 155, https://doi.org/10.1037/0033-2909.112.1.155.
[77] D. Barijan, E.P. Ariningsih, F. Rahmawati, The influence of brand trust, brand familiarity, and brand experience on brand attachments, Journal of Digital Marketing and Halal Industry (2021), https://doi.org/10.21580/jdmhi.2021.3.1.7440.
[78] O.H. Chi, S. Jia, Y. Li, D. Gursoy, Developing a formative scale to measure consumers' trust toward interaction with artificially intelligent (AI) social robots in service delivery, Comput. Hum. Behav. (2021), https://doi.org/10.1016/j.chb.2021.106700.
[79] A.I. Alzahrani, H. Al-samarraie, A. Eldenfria, J.E. Dodoo, Jo Ur Na L P Re of, Technology in Society, 2022, p. 101862, https://doi.org/10.1016/j.techsoc.2022.101862.
[80] F. Sartipi, Publicizing construction firms by cryptocurrency, Journal of Construction Materials 2 (3) (2021) 1–8, https://doi.org/10.36756/jcm.v2.3.1.
[81] P. Xu, J. Lee, J.R. Barth, R.G. Richey, Blockchain as supply chain technology: considering transparency and security, Int. J. Phys. Distrib. Logist. Manag. (2021), https://doi.org/10.1108/IJPDLM-08-2019-0234.
[82] X. Yang, M. Li, H. Yu, M. Wang, D. Xu, C. Sun, A Trusted Blockchain-Based Traceability System for Fruit and Vegetable Agricultural Products, IEEE Access, 2021, https://doi.org/10.1109/ACCESS.2021.3062845.
[83] N. Kshetri, Blockchain technology for improving transparency and citizen's trust, Advances in Intelligent Systems and Computing (2021), https://doi.org/10.1007/978-3-030-73100-7_52.
[84] H.S. Bae, The interaction effect of information systems of shipping and logistics firms and managers' support for blockchain technology on cooperation with shippers for sustainable value creation, Sustainability (2021), https://doi.org/10.3390/su13084493.