

# THE INTERNATIONAL JOURNAL OF BUSINESS & MANAGEMENT

## A Structured Review of e-Commerce Research: Theories, Trust, Antecedents of e-Service Adoption and Current Market Trends

**Philip Kofi Alimo**

Masters Student, School of Traffic and Transportation,  
Lanzhou Jiaotong University, Lanzhou, China

### **Abstract:**

*Security and trust have been identified as critical to the development and growth of e-commerce transactions considering the prevalence of cybercrime. To solve this challenge, this paper aims to review the literature on e-commerce research, from the perspective of electronic service adoption, consumer-trust and security, diffusion of new technologies, curbing the prevalence of cyber-crime and current market trends. It also discusses the solutions presented by the extant literature, the current market trends and gives recommendations for future research. This study reviews 96 peer-reviewed publications on this subject matter, sampled from a combination of comprehensive and niche e-commerce journals as well as other related journals listed in the Web of Science Core and Scopus databases within a year-based periodic scope of 2008 to 2019. The authors recommend more simulation and viability tests of the Financial Transaction Application (FTA), a seller-focused research into building trust, setting of standards for the design of e-payment and mobile technologies to reduce learning costs and more exploratory research into internet penetration and e-retailing growth.*

**Keywords:** e-commerce theories, security and trust in e-commerce, consumer adoption of technology, e-retailing market trends, internet penetration

### **1. Introduction**

The continuous advancement in information technology and information systems have led to many innovations in commerce, with companies increasingly adopting these technologies to survive in the market (Choshin & Ghaffari, 2017; Dai et al., 2015). To survive in the modern business environment, companies must adopt new technologies. As a result, there have been interventions by governments across the globe to improve internet infrastructure and policies to make it easier for businesses to adopt innovations (Rahayu & Day, 2015). According to Pappas et al. (2017), there have been conscious efforts by retailers to adopt strategies that can increase their customer base and one of such is online sales. Significant among these is e-commerce which reduces costs, cycle time of products and enables easy access to suppliers (Gupta & Sharma, 2018).

This new revolution in business has been identified in the extant literature under the following themes: antecedents of electronic service adoption (Anic et al., 2019; Mainardes et al., 2019, Yang et al., 2019), building consumer-trust and security (Cui et al., 2018; Liu et al., 2015; Zhao et al., 2018), diffusion of new technologies (Thakur & Srivastava, 2015; Wirtz & Göttel, 2016) and curbing the prevalence of cyber-crime (Khattari & Singh, 2019). Establishing trust and security between a seller and a purchaser is more difficult in an online transaction than the normal face-to-face transaction (Riazati et al., 2018). Dai et al. (2018) in the study of risk assessment in e-commerce identified the following variables for consumer trust: reputation of the seller, the pictures of the product and the essence of the transaction. These findings are consistent with earlier findings of (Kim & Byramjee, 2014). According to Bente et al. (2014) in the study on building e-commerce satisfaction and sales, e-vendors can use services such as monitoring traffic on their platforms with personnel to address concerns of consumers, distribute coupons to their main customers, and take high-quality reviews from their consumers periodically. Privacy of consumer data is also closely related to the consumer's perception of how secured and genuine the transaction ends. There have been previous researches in this area since the emergence of online retail. A company's competitiveness is dependent on how well it manages the private data of consumers (Anic et al., 2019). Gerber et al. (2018) alluded that consumers, although have interest in what happens to their private data; make little efforts on their own to protect it.

In an attempt to address these research gaps, this review takes a relook at the various theories relevant to solving the problems, the solutions presented by the extant literature, the current market trends and gives recommendations for future research. According to Kitchenham (2004), a Systematic Literature Review (SLR) is a methodology that rigorously reviews previous research results, and develops evidence-based implementation guidance for professionals in the subject area. This review therefore gives important theoretical and professional guides for e-commerce research, electronic

marketing, financial transaction research, electronic transaction policy making and other quasi professionals. It makes recommendations for future research and policy guidance.

## 2. Methodology of the Review

According to Levy & Ellis (2006), a review should address the state-of-the-art in the context of research questions. The author therefore developed the following research questions:

RQ1. What are the major problems the extant e-commerce literature has investigated in relation to trust, e-service adoption and curbing cyber-crime?

RQ2. What are the solutions identified in the current literature in building consumer-trust and high security of electronic transactions?

RQ3. What are the relevant theories identified in the literature and their significance?

RQ4. What are the current market trends and their implications to future research?

RQ5. What are the research gaps that need further investigation?

### 2.1. Sampling Process

For the purpose of making the review current and comprehensive, the authors sampled peer-reviewed articles published between 2008 and 2019: from Web of Science Core and Scopus database (7 comprehensive e-commerce journals). Some articles were however selected outside this periodic scope because of their theoretical importance to the adoption of online marketing and electronic payment systems. Figure 1 shows the publication identification, selection and coding flow chart. The sampled papers were coded into 8 themes for easy analyses and reference.

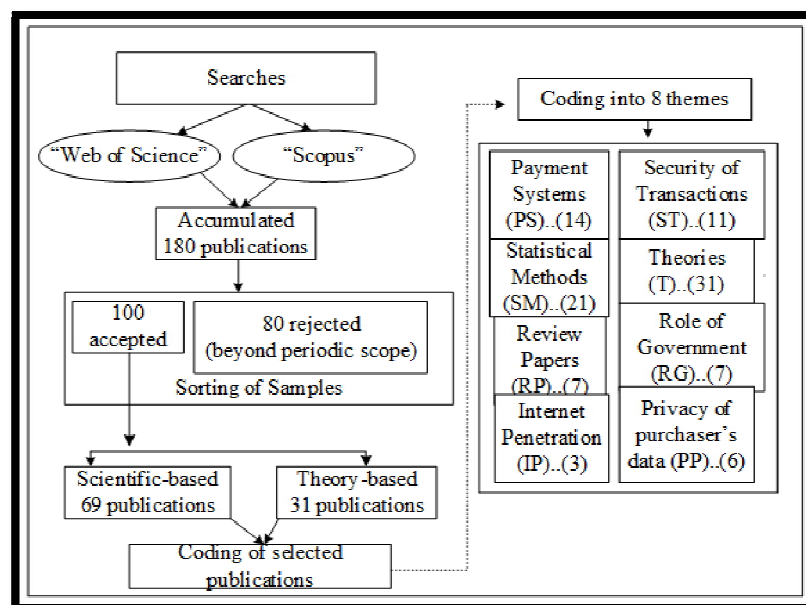


Figure 1: Sample Identification, Selection and Coding Flow Chart

## 3. Syntheses of the Literature

### 3.1. Theoretical Development of e-Commerce

This section examines the common theories developed through e-commerce research and how they underline customer intentions and adoption of technologies and innovations. Six theories are chronologically reviewed below namely: Innovation Diffusion Theory (IDT), Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), Technology-Organization-Environment Framework (TOE) and Process Virtualization Theory.

#### 3.1.1. Innovation Diffusion Theory

Innovations are important in solving the needs of people. Rogers (1962) propounded this theory in the quest to know the medium, reasons and velocity at which new innovations spread. Innovations take conscious communication and publicity to diffuse into social settings (Fichman, 2000). To make this easier, Rogers (1995, 2003) further categorized the population into five classes on the matrix of willingness to accept and make new technology or innovations. The categorization states that 2.5% of the population are risk-takers (innovators), 13.5% are early adopters who use the technology for the first time and may either recommend it to others or discourage future users, 34% do scrutinize the technology before accepting it followed by another 34% who are more skeptical and adopt the technology only after almost half of the population have done so. The last 16% do adopt an innovation/technology when it is obvious that it has only few disadvantages (Kaasinen, 2005; Wani et al., 2015).

An innovation's acceptance is based on its advantage over others, compatibility with people's beliefs and ethics, its simplicity to use, how its results are communicated to the users and convenience in testing it before adoption (Rogers et al., 1971). Nor et al. (2009) tested these attributes empirically in relation to intention to do internet banking and the study realized that relative advantage, compatibility, and trial results are the determinants. Agarwal and Prasad (1998) also tested the theory empirically and the results showed that relative advantage, compatibility and complexity are determinants of innovation in ICT. The accessibility of an innovation to an individual influences the time duration it takes for that individual to adopt it (Straub, 2009). A recent study by Shao et al. (2018) further revealed that: mobility, reputation, security and customization do encourage trust and purchase intentions of customers.

### 3.1.2. Theory of Reasoned Action

The TRA was propounded by Fishbein & Ajzen (1975) and it states that a person's behavior is a consequence of his attitude and peer influence, culminating into an intention. By inference, the decision to patronize an online market is influenced by trust in the system and the recommendations made by others. Ozkan et al. (2010) hypothesized trust as a determinant of intention to do e-payment and the test showed that indeed, customers care about the trustworthiness of the seller. Peslak & Ceccucci (2010) also did an empirical study on the factors that influence user-intentions and attitude towards the service and subjective opinion of friends are seen as the key factors. Hansen et al. (2004) studied intention to buy online and the findings supported the proponents of TRA. Past purchase experience has an influence on future intentions to purchase (Weisberg et al., 2011). From the existing literature, it can be deduced that for any sales platform to make good returns and gain acceptance, it must gain trust and confidence from the customers through customer reviews and effective communication.

### 3.1.3. Theory of Reasoned Action

Ajzen (1985) introduced TPB into the behavioral literature to cater for the individual's inability to control his behavior due to some situations and challenges beyond personal control, which were silent in the construct of TRA. For instance, there are circumstances where an individual wishes to buy a product but lacks the financial resources. Crespo & Bosque (2008) studied the influence of business innovation on customer adoption and the study realized that user's perception of the entity is very important. The study suggested that e-commerce platforms must make efforts to create good perception about their services since it's the only way to expand their businesses.

### 3.1.4. Technology Acceptance Model

TAM is probably the most influential of all theories under review because it concentrates more on the antecedents of technology acceptance. Davis (1986) postulated that people accept or reject computer and new innovations based on its perceived usefulness and perceived ease of use. Thus, this theory rejects the influence of peer pressure in decision making as a strong determinant of intention-making. The model is shown in Figure 2 as described in Davis et al. (1989). The external variables are the beliefs, situational constraints and all other factors that indirectly influence behavior.

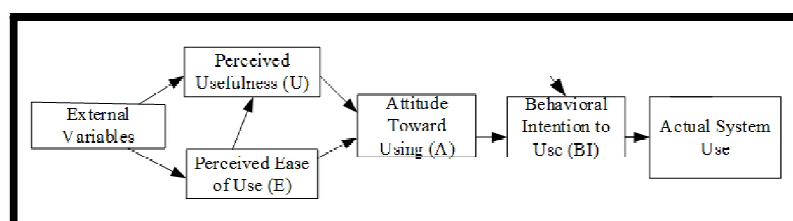


Figure 2: Technology Acceptance Model

Davis (1986) further explains perceived usefulness as, the probability that adoption of a particular technology will enhance job and organizational performance. The study also defined perceived ease of use as the degree to which the system or technology can be applied with less difficulty. These factors form an attitude of the prospective user toward the system which ultimately leads to either an acceptance or a rejection. Wu & Wang (2005) studied the wheels of mobile commerce and hypothesized risk, cost, compatibility, perceived usefulness and perceived ease of use as direct determinants of user adoption. The results of the study showed that all the variables directly influence the behavior of the prospective users except ease of use which did not have much influence, rather indirectly influenced the user through how useful the technology is perceived to be. It went further to say that prospective users of mobile commerce technology have compatibility with their beliefs and business as the main motivation to use it. This presupposes that an online market or express delivery firm must reduce the business risk in transactions by providing services in a way that will give a high level of trust at a reasonable price. They must also be mindful of comparative advantage to provide logistics that other competitors give to their customers.

### 3.1.5. Technology-Organization-Environment Framework

The theories reviewed earlier, focused on the user/customer intentions but the TOE focuses on the business entity. According to Tornatzky & Fleischer (1990) in their composition of this theory, a firm's effort at adopting and implementing a technological innovation into their organization, depends on the internal and external technologies relevant to the firm, the business organization and the environment within which the firm operates. Thus, the scope, size,

market structure, organogram and regulatory schemes, human and capital resource, competition, trending technologies among others play a significant role as to which technologies best suit the business (Chatterjee et al., 2002; Kauffman & Walden, 2001; Kowtha & Choon, 2001). Technology adoption in an organization is influenced by the external environment (Pan & Jang, 2008).

TOE framework is an important model in electronic commerce adoption, implementation and usage (Salwani et al., 2009; Zhu et al., 2003; Zhu, 2004). TOE provides a unified understanding of internal and external factors, technologies, financial and technical inputs needed for IT adoption in SMEs (Li et al., 2010). Firms that adopt new technologies have a better perception of their internal competence than non-adopters (Kuan & Chau, 2001). Zhu et al. (2003) studied European companies to know the factors that drive them to adopt electronic business and those that inhibit them. The findings of the study were as follows:

- A firm's competence in a technology, its scope and size, readiness of consumers to adopt new technology, and pressure from competitors affect adoption tendency but this could also be delayed if the business partner is not ready to also adopt that technology;
- In countries where electronic business is very popular, readiness of the consumer and trading partner to adopt new innovations is not as critical as adoption by competitors;
- Electronic business is not a repository of only large firms but the environment attracts smaller firms to also adopt it;
- Even though firms know the importance of adopting electronic business they are very cautious and take risk into consideration before adopting it. This is common in electronic business-intensity countries.

### 3.1.6. Process Virtualization Theory

This theory, proposed by Overby (2008), is the most recent of all the theories under review in this study. The author defined process virtualization as the change from physical interactions between people and objects to a computerized process. The theory has three components: main constructs, IT moderating constructs and process virtualizability. The main constructs are requirements that can either make a process easy to make virtual or not. They are inversely related to virtualization; thus, the greater these requirements, the more difficult it is to virtualize. The ability of IT to reduce the effect of the main constructs and make it easier to virtualize is also eminent in the theory. Figure 3 shows the Process Virtualization Theory as adopted from Overby (2008). This proposition was of the view that users of a virtualized process must still have the excitement and experience of all the five senses: taste, hear, see, smell and touch however at lower expectations (sensory requirements). The users must also be able to interact among themselves in either a social or professional way (relationship requirements). These are aided by IT representation (simulation of objects) and reach (ability to provide same services provided by humans within same time and space). The theory also states that a virtualized process is required to provide faster services (synchronism requirements), which is also aided by IT reach. Finally, a virtualized process is required to be able to identify all users and control their behaviors (identification and control requirements). This is also aided by monitoring capability (ability to authenticate users and track activity).

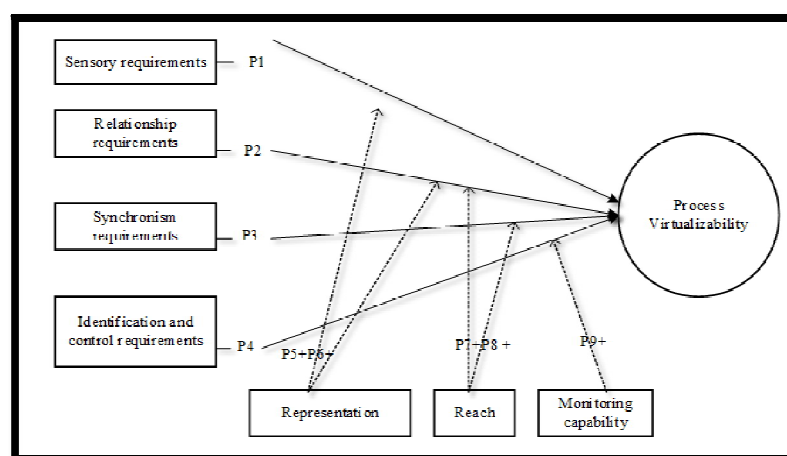


Figure 3: Process Virtualization Theory

In applying this theory to electronic commerce, Liu et al. (2008) studied the factors that influence intent of B2B companies to virtualize and realized that organizations virtualize their business only after examining benefits, their own capabilities and competition. Graupner & Maedche (2015) studied the limitations to the use of electronic banking and realized that although greater relationship requirements, control requirements and sensory requirements are limitations for digitization, synchronism requirements and identification requirements are motivation-factors for digitization among users. It simply supposes that customers will easily adopt a system that makes transactions faster, gives enough information and proof of the seller and keeps track of purchase data. Ofoeda et al. (2018) studied the amenability of government virtualizing their services in Ghana and realized that all the constructs of the virtualization theory were supported by the hypotheses. The study recommended that government should first test the amenability of digitizing specific services before doing so since the sensory and relationship requirements are still high among citizens.

### 3.2. Commonly Used Research Methodologies

Table 1 presents sampled publications within the scope of this review, chosen from the top comprehensive and niche e-commerce journals. It shows surveys, modeling and experiments as the commonly used research methods. Security/Trust and Adoption problems are also popular in the extant literature.

Publication	Layer				Methodology				
	Security and Trust	Adoption	e/m-Payment	Privacy	Survey	Case study	Modeling	Experiment	Review
Hawlichschek et al., 2018	x								x
Jocevski et al., 2019			x			x			
Lee, 2009		x	x		x				
Schierz et al., 2010		x	x		x				
Shao et al., 2018	x		x		x				
Smink et al., 2019	x							x	
Lee & Hong, 2019	x						x	x	
Pan et al., 2017				x				x	
Hong et al., 2020	x					x	x		
Alhouti et al., 2016		x		x	x				
Li et al., 2016		x					x		
Wirtz & Göttel, 2016		x					x		x
Turban et al., 2011	x	x							x
Khattari& Singh, 2019	x	x						x	
Molina-Castillo et al., 2020		x	x		x				
Raman & Pramod, 2017	x	x			x				
Mou et al., 2017	x	x	x	x			x	x	
Mou et al., 2016	x	x	x				x	x	
Wingreen et al., 2019	x							x	
Yang et al., 2019	x	x					x	x	
Gimpel et al., 2018		x		x			x		
Gimpel et al., 2018				x	x				
Leong et al., 2020	x						x		

Table 1: Summary of Methodologies and Research Areas

## 4. Literature Classification and Review

This section presents the notable findings from the extant literature, as classified within the scope of this review.

### 4.1. Achieving Transaction Security and Trust

Hawlichschek et al. (2018) classified trust in the sharing economy into three categories: trust in peers, trust in platforms and trust in products. The study supported the pivotal role trust plays in the online business as presented in (Aufmann, 2016; Cheng, 2016; Ert et al., 2016; Ert& Fleischer, 2017; terHuurne et al., 2017; Xu, 2013) and the fact that it is a pressing issue currently considered by IS scholars. Mainardes et al. (2019) realized from their hypothesis test in Brazil that lack of consumer trust in e-commerce influences purchase intention negatively.

There have been many experiments and modeling into trust in electronic marketing in the context of profile photos and reputations of sellers. The results in (Ert et al. 2016; Ert& Fleischer, 2017) revealed that the appearance of the product at stake, the appearance of the seller and even the demographic characteristics of the seller forms the matrix for the level of trust a consumer imposes in the seller. terHuurne et al. (2017) reviewed the extant literature on trust in e-commerce and revealed that, unlike previous findings that the reputation of a seller is the engine of trust (Thierer et al., 2015), it actually surpasses that to include more importantly, the interaction experience of the platform on which the

seller sells. It further recommended that future research should examine trust from the seller's perspective unlike the current focus on the consumer's perspective.

#### 4.2. Antecedent of Digital Services Adoption

The extant literature on adoption of digital services has its foundations in the six technology acceptance theories reviewed earlier. Wirtz & Göttel (2016) did a comprehensive review of 35 articles on technology acceptance in social media and realized that TAM and its constructs (perceived ease of use, perceived usefulness and subjective norm) dominated the literature. In their study on consumer-adoption intentions, Thakur & Srivastava (2015) identified perceived usefulness, perceived ease of use and social influence as significant determinants of technology adoption. Shaikh & Karjaluoto (2015) also identified perceived usefulness and attitude as key determinants in developing countries. From these studies, it can be deduced that consumer attraction to digital services is premised on how useful they find the service, its ease of usage, user-recommendations and the general attitude towards it. In a society where there is a craze for manual systems, digital services experience a slow rate of adoption and vice versa.

In a recent study, Molina-Castillo et al. (2020) observed that technology acceptance is currently being impeded by high learning costs incurred by users due to the increasing diversity in mobile payment technologies and electronic platforms. The study identified the cause to be the lack of standards for designing these technologies which make users uncertain as to when they need to switch to a new system. It therefore recommended for standards to be set in the designing of digitized services so that users could easily switch between platforms at a low learning cost.

#### 4.3. Curbing Cybercrime

Social situations and past purchase experience have a significant impact on the continuance usage of online payment platforms (Li et al., 2016). The past experience of a consumer affects the future purchase decision especially in situations where there was a breach in privacy resulting in a cybercrime (Alhouthi et al., 2016) which ultimately affects trust and intention to use (Wirtz & Göttel 2016). Khattri & Singh (2019) observed from their experiment and previous studies that although the rate of digitized services (e-services) adoption keeps increasing due to efforts of governments to reduce the fraud associated with physical transactions, there is a concurrent increase in cybercrimes. Cybercrime has been divided into: (a) Account takeover fraud, (b) stolen card fraud, (c) counterfeit (Carneiro et al., 2015; Vardhani et al., 2019), (d) ATM Fraud (Kaur et al., 2018) and (e) phone fraud (Khattri & Singh 2018). These present a challenge to online sellers, online market researchers and managers of e-financial services. Their study presented an additional mode of transaction authentication known as Financial Transaction Application (FTA) which uses global positioning system (GPS). This is an addition to the popular authentications (PIN and password). The innovation of the new technology is that, it links the FTA to the mobile device of the user (account holder) to show the distance between them at the time of the transaction. This prevents a second-party from authenticating a transaction from a device which neither belongs to the User nor is in the possession of the user at the time of transaction. It thus, limits the authentication to the location of the user as well as an electronic device owned by the user.

#### 4.4. The Role of Government

It is notable that governments are leveraging the innovations in technology to provide online services to citizens. In effect, there have been a plethora of researches into how to get citizens interested in online services (Verkijika & Wet, 2018). Existing literature lays emphasis on the attitudinal change from the traditional way of doing business to the online system. The literature suggests that governments must provide solutions to change the attitude of their citizens towards information communication and technology. Some of these measures are: holding training programs on modern technologies (Bhuasiri, 2016; Dwivedi et al., 2017; Mukhongo, 2015) and encouraging the use of social media (Oliveira et al., 2016).

However, before attitudinal change, computer literacy and interest can be achieved, some basic functions must also be played by the government. Turban et al. (2015) in studying the managerial and social network of e-commerce listed five (5) types of infrastructure needed: common business service infrastructure, messaging and information distribution infrastructure, multimedia content and network publishing infrastructure, interfacing infrastructure and network infrastructure (internet facilities). Asare et al. (2012) through the study of the challenges facing small and medium enterprises in Ghana and Botswana, identified the following as the main challenges the SMEs were facing: high internet cost, poor telecommunication infrastructure, low ICT knowledge and trust. The authors recommended that government invests in ICT infrastructure so that there can be easy access which could increase interest, provide credit facilities for businesses, stricter regulations, and more training in ICT. Gupta and Sharma (2018) stated that in the bid to expand internet connectivity and technology usage in agriculture, the India government through its Digital India project invested US\$19.8 billion to extend internet to 260,000 villages. This according to the authors caused a massive expansion of agri-business in the country. It is evident that important areas of government focus are internet expansion, financial investments, ICT training, stricter regulations and road infrastructure for the courier services.

### 5. Global Market Trends

Existing global market trends are shown in Table 2 and Figure 4. These present the impact of e-commerce on the global economy in the top-ranked e-retailing countries. The figures are retail e-commerce statistics compiled by (www.emarketer.com). China is the highest retail e-commerce earner in 2018 and 2019 with a whopping 27.3% annual growth rate. This shows an outstanding patronage of online retailing and an evidence of businesses making good use of the internet. Among the 10 countries, India is the fastest-growing with 31.9% growth in 2019.

Position	Countries	2018 (billion \$)	2019(billion \$)	% Change
1	China	1,520.10	1934.78	27.3
2	United States	514.84	586.92	14.0
3	United Kingdom	127.98	141.93	10.9
4	Japan	110.96	115.40	4.0
5	South Korea	87.60	103.48	18.1
6	Germany	75.93	81.85	7.8
7	France	62.27	69.43	11.5
8	Canada	41.12	49.80	21.1
9	India	34.91	46.05	31.9
10	Russia	22.68	26.92	18.7

Table 2: Top 10 countries ranked by global e-commerce, 2018 and 2019

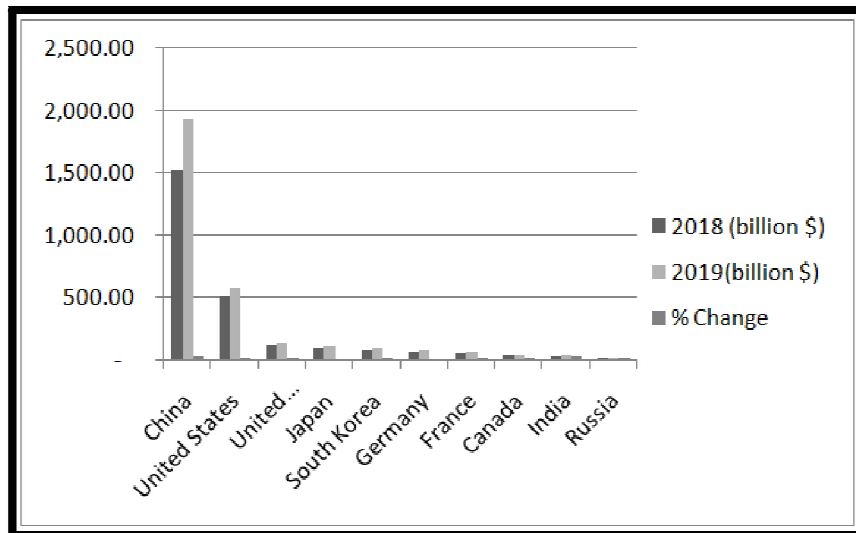


Figure 4: Top 10 Countries Ranked by Global E-Commerce, 2018 and 2019 (Adapted From [Emarketer.Com])

Table 3 and Figure 5 also present the global growth rate of e-retailing. It can be identified that although some countries are not among the top 10 retail e-commerce earners, they are making high growth in their online retailing: Mexico, Philippines, Malaysia, Indonesia and Argentina. It is significant to note that Mexico has the highest growth rate in 2019 followed by India and Philippines, higher than China that has the highest revenue in the globe. The e-retailing growth rate also stands at 20.7% worldwide.

Position	Countries	% Growth
1	Mexico	35.0
2	India	31.9
3	Philippines	31
4	China	27.3
5	Malaysia	22.4
6	Canada	21.1
7	Indonesia	20.6
8	Argentina	18.8
9	Russia	18.7
10	South Korea	18.1

Table 3: Global Top 10 Countries in Retail E-Commerce Growth

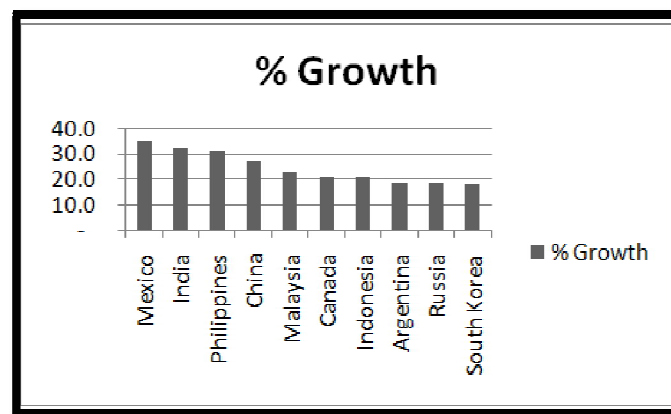


Figure 5: Global Top 10 Countries in Retail E-Commerce Growth (Adapted from [Emarketer.Com])

### 5.1. Internet Penetration

The existing literature has divergent viewpoints on the implications of internet penetration. Some studies, with sustainability-oriented scope, argue that the continuous rise in internet penetration, concurrently leads to environmental effects in terms of energy consumption and emission of greenhouse gases (Belkhir & Elmeligi, 2018; Malmudin et al., 2010; Gossart, 2015; Rivera et al., 2014). The e-commerce literature has however focused on the importance of the internet in the modern business (Wang & Hao, 2018; Gonel & Akinci, 2017; Bilgihan et al., 2016). Pradhan et al. (2015) in their study of the relationship between internet penetration and the economy, accepted the null hypothesis that internet penetration rate has a direct impact on economic growth. It is therefore imperative to note that countries or regions with high internet penetration are more likely to grow faster than those with low internet penetration. In essence, the e-commerce literature must also consider new techniques and strategies to make the internet more accessible worldwide. Table 4 shows the regional and worldwide internet penetration rates as of June 2019 (Internet World Stats, 2019). The current worldwide internet penetration rate is 58.80% of the total world population. The significance of this to the industry is that there is a large untapped market for e-commerce.

World Regions	Internet Users	Penetration Rate (%)
Asia	2,300,469,859	54.20
Europe	727,559,682	87.70
Africa	522,809,480	39.60
Latin America/Caribbean	453,702,292	68.90
North America	327,568,628	89.40
Middle East	175,502,589	67.90
Oceania/Australia	28,636,278	68.40
Worldwide	4,536,248,808	58.80

Table 4: Worldwide Internet Penetration Rates

## 6. Discussion and Conclusion

This study makes contributions to the extant literature on electronic commerce in four ways as discussed below. Although e-commerce research begun in 1991 (Ku et al., 2018), this study reviews the theoretical evolution beginning with Innovation Diffusion Theory to Process Virtualization Theory. The review encapsulates some important antecedents for adoption such as ease of use, learning cost of switching to a new device or transaction-based system, customer reviews, user experience, market competitive advantage, efficiency of the system or technology and the readiness of the business environment to accept new innovations. The TAM, Davis (1986), which is the most popular of all the theories reviewed, emphasized usefulness, ease of use and subjective norm. The findings of (Ert et al. 2016; Ert& Fleischer, 2017, terHuurne et al., 2017, Thierer et al., 2015) also prove the significance of seller's reputation, the appearance of profile photos and the quality of images used in product marketing. In essence, the proponents of the diverse theories are all important to achieving online seller-consumer trust as they concurrently cover the demands of sellers and the consumers as well as the post-consumption reviews and remarks of the consumers or Users. The theories also echo the dichotomy in demand and decision-making preferences of consumers. There is the need for varied consumer-protection and consumer-attraction strategies through information flow and transaction-proof mechanisms (use of IT) and even third-party guarantee towards achieving trust (Cui et al., 2018; Han & Kim, 2019; Shao et al., 2018; Yoo& Jang, 2018; Zhao et al., 2018). Future studies can identify new innovations into consumer protection including third party guarantees and honest online information review systems. These are research gaps which if investigated, can help to strengthen the pillars of trust in e-commerce.

Next, the study on reducing cybercrime has in the past 5 years seen an increase because of its prevalence. The FTA (Khattri& Singh, 2019) gives solutions to cybercrime to an extent (account takeover fraud), but needs more simulation tests and viability tests to know how many people can afford it and how it will be supplied to the large e-transaction



market. The other cyber issues such as stolen card fraud, counterfeit, ATM fraud and phone fraud can be the focus of future research since these problems still exist and do affect consumer intentions and trust.

Also, the research on technology adoption and diffusion in addition to the widely known antecedents of perceived usefulness, ease of use and social influence, has seen a new phenomenon (attitude) as shown in (Shaikh & Karjaluo, 2015). Social influence and attitude can be influenced by government policies and infrastructural investment (Bhuasiri, 2016; Dwivedi et al., 2017; Mukhongo, 2015). Past research in this area, generally sought to use surveys to solicit information on customer perceptions and expectation. There exist however research gaps in finding solutions tested with market case studies. Future research can apply case studies to discover innovative techniques and online-friendly motivations for adopters of electronic services especially from the perspective of government policies.

The market outlook in e-retail, shown in Table 3 and Figure 5, indicates a 20.7% growth rate worldwide in 2019 (eMarketer, 2019) and 35% growth rate in Mexico (highest on a country by country basis). This has the propensity to increase concurrently with an increase in internet penetration. Future research must investigate measures to improve on internet access especially in emerging economies. In Africa for instance, the internet penetration is just 39.6% of the population which is below average. More studies in that region will certainly great benefits to e-commerce at large because it is a populous region.

Overall, this review presents an overview of the extant literature within the scope of trust, adoption, curbing cyber-crime and market trends which are all beneficial to the theory and industry. It also presents the future direction of e-commerce research into solving these key issues towards market expansion through building of trust systems.

## 7. Limitation and Future Research

The e-commerce literature, as briefly shown in Table 1 is voluminous but for the purpose of this review, it was compressed to 96 publications to meet the scope of the review and for better analyses. This involved mainly publications in the Web of Science Score and Scopus as well as a further stratification to comprehensive and niche e-commerce journals. This presupposes that other quality publications in Google scholar and other non-e-commerce-focus journals may have been excluded. The authors however, did a comprehensive cover of the extant literature to avoid a high rate of bias.

From the review, the following research areas were identified for future research:

- More simulation and viability tests of the FTA in developed economies and popularly used e-payment ecosystems;
- A new era of research into seller-focused trust antecedents for e-commerce;
- Research into setting standards for new e-payment and mobile technologies to reduce learning costs;
- Exploratory research into internet penetration to leverage on the continuous advancements in technology.

## 8. References

- i. Agarwal, R., & Prasad, J. A. (1998). Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology. *Information Systems Research*, 9(2), 204-215.
- ii. Ajzen, I. (1985). From intention to action: a theory of planned behavior. In Kuhl, J., & Beckman, J. (Eds.), *Action control: from cognitions to behaviors*. New York, NY: Springer.
- iii. Alhouti, S., Johnson, C.M., & D'Souza, G. (2016). The Complex Web of Values: The Impact on Online Privacy Concerns and Purchase Behavior. *Journal of Electronic Commerce Research*, 17(1), 22-35.
- iv. Anic, I., Skare, V., & Milakovic, I.K. (2019). The determinants and effects of online privacy concerns in the context of e-Commerce. *Electronic Commerce Research and Applications*, 36, 1-10.
- v. Asare, S.D., Gopolang, B., & Mogotlhwane, O. (2012). Challenges facing SMEs in the adoption of ICT in B2B and B2C E-commerce: A comparative case study of Botswana and Ghana. *International Journal of Commerce and Management*, 22(4), 272-285.
- vi. Belkhir, L., & Elmeligi, A. (2018). Assessing ICT global emissions footprint: Trends to 2040 & recommendations. *Journal of Cleaner Production*, 177, 448-463.
- vii. Bente, G., Dratsch, T., Rehbach, S., Reyl, M., & Lushaj, B. (2014). *Do You Trust My Avatar? Effects of Photo-Realistic Seller Avatars and Reputation Scores on Trust in Online Transactions*. Springer International Publishing Switzerland, 461-470.
- viii. Bhuasiri, W., Zo, H., Lee, H., & Ciganek, A.P. (2016). User Acceptance of e-government Services: Examining an e-tax Filing and Payment System in Thailand. *Information Technology for Development*, 22, 672- 695.
- ix. Bilgihan, A., Kandampully, J., & Zhang, T.C. (2016). Towards a unified customer experience in online shopping environments: Antecedents and outcomes. *International Journal of Quality and Service Sciences*, 8(1), 102-119.
- x. Chatterjee, D., Grewal, R., & Sambamurthy, V. (2002). Shaping up for ecommerce: institutional enablers of the organizational assimilation of web technologies. *MIS Quarterly*, 26(2), 65-89.
- xi. Cheng, M. (2016). Sharing economy: a review and agenda for future research. *Int. J. Hosp. Manage*, 57, 60-70.
- xii. Choshin, M., & Ghaffari, A. (2017). An investigation of the impact of effective factors on the success of e-commerce in small- and medium-sized companies. *Computers in Human Behavior*, 66, 67-74.
- xiii. Crespo, A.H., & Bosque, I.R. (2008). The effect of innovativeness on the adoption of B2C e-commerce: A model based on the Theory of Planned Behavior. *Computers in Human Behavior*, 24, 2830-2847.
- xiv. Cui, Y., Zhang, X., Peng, X., & Chu, J. (2018). How to use apology and compensation to repair competence-versus integrity-based trust violations in e-commerce. *Electronic Commerce Research and Applications*, 32, 37-48.

- xv. Dai, Y. N., Viken, G., Joo, E., & Bente, G. (2018). Risk assessment in e-commerce: How sellers' photos, reputation scores, and the stake of a transaction influence buyers' purchase behavior and information processing. *Computers in Human Behavior*, 84, 342-351.
- xvi. Davis, F.D. (1986). *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. Ph.D. dissertation, Massachusetts Institute of Technology.
- xvii. Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, 35(8), 982-1003.
- xviii. Dwivedi, Y.K.; Rana, N.P.; Janssen, M.; Lal, B.; Williams, M., & Clement M. (2017). An empirical validation of a unified model of electronic government adoption. *Govern. Info. Qtrly.*, 34 (2), 211-230.
- xix. eMarketer (2019). Global e-commerce 2019. Retrieved September 14, 2019, from <https://www.emarketer.com/content/global-ecommerce-2019>
- xx. Ert, E., Fleischer, A., & Magen, N. (2016). Trust and reputation in the sharing economy: the role of personal photos in Airbnb. *Tourism Management*, 55, 62-73.
- xxi. Fichman, R.G. (2000). The Diffusion and Assimilation of Information Technology Innovations, in: Framing the Domains of IT Management: Projecting the Future Through the Past, R.W. Zmud (ed.). Pinnaflex Educational Resources, Cincinnati, OH.
- xxii. Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention, and behavior: An introduction to theory and research. Reading, MA: Addison -Wesley, United Kingdom.
- xxiii. Gerber, N., Gerber, P., & Volkamer, M. (2018). Explaining the Privacy Paradox - A systematic review of literature investigating privacy attitude and behavior. *Computers & Security* 77, 226-261.
- xxiv. Gimpel, H., Kleindienst, D., Nüske, N., Rau, D., & Schmied F. (2018). The upside of data privacy - delighting customers by implementing data privacy measures. *Electronic Markets* 28, 437-452.
- xxv. Gimpel, H., Kleindienst, D., & Waldmann D. (2018). The disclosure of private data: measuring the privacy paradox in digital services. *Electronic Markets*, 28, 475-490.
- xxvi. Gonel, F., & Akinci, A. (2017). How does ICT-use improve the environment? The case of Turkey. *World Journal of Science, Technology and Sustainable Development*, 15(1), 2-12.
- xxvii. Gossart, C. (2015). Rebound Effects and ICT: A Review of the Literature. In L. M. Hilty & B. Aebischer (Eds.), *ICT Innovations for Sustainability* (pp. 435-448). Springer.
- xxviii. Graupner, E., & Maedche, A. (2015). Process digitization in retail banking: an empirical examination of process virtualization theory. *International Journal of Electronic Business*, 12(4), 364-379.
- xxix. Gupta, R., & Sharma, P.K. (2018). Scope of E-Commerce in Agri-Business in India: An Overview. *International Journal of Advanced Scientific Research and Management*, Special Issue I.
- xxx. Han, J.H., & Kim, H.M. (2019). The role of information technology use for increasing consumer informedness in cross-border electronic commerce: An empirical study. *Electronic Commerce Research and Applications*, 34, 100826.
- xxxi. Hansen, T., Jensen, J.M., & Solgaard, H.S. (2004). Predicting online grocery buying intention: a comparison of the theory of reasoned action and the theory of planned behavior. *International Journal of Information Management*, 24, 539-550.
- xxxii. Hawlitschek, F., Notheisen B., & Teubner T. (2018). The limits of trust-free systems: A literature review on blockchain technology and trust in the sharing economy. *Electronic Commerce Research and Applications*, 29, 50-63.
- xxxiii. Hong, Z., Zhu, H., & Dong, K. (2020). Buyer-Side Institution-Based Trust-Building Mechanisms: A 3S Framework with Evidence from Online Labor Markets. *International Journal of Electronic Commerce*, 24(1), 14-52.
- xxxiv. Internet World Stats (2019). World Internet Users and 2019 Population Stats. Retrieved January 10, 2020, from <https://www.internetworldstats.com/stats.htm>
- xxxv. Kaasinen, E. (2005). User acceptance of mobile services-value, ease of use, trust and ease of adoption. Retrieved September 12, 2019, from <http://www.vtt.fi/inf/pdf/publications/2005/P566.pdf>
- xxxvi. Kauffman, R., & Walden, E. (2001). Economics and electronic commerce: survey and directions for research. *International Journal of Electronic Commerce*, 5(4), 5-116.
- xxxvii. Khattri, V., & Singh, D.K. (2019). Implementation of an Additional Factor for Secure Authentication in Online Transactions. *Journal of Organizational Computing and Electronic Commerce*, 1-16.
- xxxviii. Kim, C., Tao, W., Shin, N., & Kim, K. (2010). An empirical study of customers' perceptions of security and trust in e-payment systems. *Electronic Commerce Research and Applications*, 9, 84-95.
- xxxix. Kim, S.H., & Byramjee, F. (2014). Effects of Risks on Online Consumers' Purchasing Behavior: Are They Risk-Averse or Risk-Taking?. *The Journal of Applied Business Research*, 30 (1), 161-172.
- xl. Kitchenham, B. (2004). *Procedures for performing systematic reviews*. Keele Univ., Keele, UK, pp. 28.
- xli. Kowtha, N., & Choon, T. (2001). Determinants of website development: a study of electronic commerce in Singapore. *Information & Management*, 39 (3), 227-242.
- xlii. Kuan, K.K.Y., & Chau, P.Y.K. (2001). A perception-based model for EDI adoption in small businesses using technology-organization-environment framework. *Information and Management*, 38, 507-521.
- xliiii. Ku, Y., Liu, C., & Liang T. (2018). Academic Perceptions of Electronic Commerce Journals: Rankings and Regional Differences. *Journal of Electronic Commerce Research*, 19(1), 1-15.
- xliv. Lee, J., & Hong, I.B. (2019). Consumer's Electronic Word-of-Mouth Adoption: The Trust Transfer Perspective. *International Journal of Electronic Commerce*, 23(4), 595-627

- xliv. Lee, M. (2009). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electronic Commerce Research and Applications*, 8, 130-141.
- xlvi. Leong, L., Hew T., Ooi K., & Chong A.Y. (2020). Predicting the antecedents of trust in social commerce – A hybrid structural equation modeling with neural network approach. *Journal of Business Research*, 110, 24-40.
- xlvii. Levy, Y., & Ellis, T. J. (2006). A systems approach to conduct an effective literature review in support of information systems research. *Informing Science*, 9, 181-211.
- xlviii. Li, D., Lai, F., & Wang, J. (2010). e-Business assimilation in China's international trade firms: the technology-organization-environment framework. *Journal of Global Information Technology*, 18(1), 39-65.
- xliv. Li, H., Lai, V.S., & Luo, X. (2016). Understanding the Role of Social Situations on Continuance Participation Intention in Online Communities: An Empirical Perspective. *Journal of Electronic Commerce Research*, 17(4), 358-380.
- i. Liu J., Kauffman, R.J., & Ma, D. (2015). Competition, cooperation and regulation: Understanding the evolution of the mobile payments technology ecosystem. *Electronic Commerce Research and Applications*, 14(5), 372-391.
  - ii. Malmodin, J., Moberg, Å., Lundén, D., Finnveden, G., & Lövehagen, N. (2010). Greenhouse Gas Emissions and Operational Electricity Use in the ICT and Entertainment & Media Sectors. *Journal of Industrial Ecology*, 14(5), 770-790.
  - iii. Mainardes, E. W., de Almeida, C. M., & de-Oliveira, M. (2019). e-Commerce: an analysis of the factors that antecede purchase intentions in an emerging market. *Journal of International Consumer Marketing*, 1-22.
  - liii. Molina-Castillo, F., Lopez-Nicolas, C., & Reuver, M. (2020). Mobile Payment: The Hiding Impact of Learning Costs on User Intentions. *Journal of Theoretical and Applied Electronic Commerce Research*, 15(1), 1-12.
  - liv. Mou, J., Shin, D.H., & Cohen, J.F. (2017). Trust and risk in consumer acceptance of e-services. *Electronic Commerce Research*, 17, 255-288.
  - lv. Mukhongo, L. (2015). Online political activism among young people in sub-saharan Africa. In: Khosrows-Pour, M. (Ed.), *Encyclopedia of Information Science and Technology, third ed. Information Science Reference, New York, NY*, 6419-6426.
  - lvi. Nor, K.M.D., Pearson, J.M., & Ahmad A. (2010). Adoption of Internet Banking: Theory of the Diffusion of Innovation. *International Journal of Management Studies*, 17 (1), 69-85.
  - lvii. Ofoeda, J.K. (2015). *Virtualization of Government-to-citizen Engagement Processes: evidence from Ghana Driver and Vehicle Licensing Authority*. University of Ghana MPHIL Thesis.
  - lviii. Oliveira, T., Thomas, M., Baptista, G., & Campos, F. (2016). Mobile payment: understanding the determinants of customer adoption and intention to recommend the technology. *Computers in Human Behavior*, 61, 404-414.
  - lix. Overby, E. (2008). Process Virtualization Theory and the Impact of Information Technology. *Organization Science*, 19(2), 277-291.
  - lx. Ozkan, S., Bindusara, G., & Hackney, R. (2010). Facilitating the adoption of e-payment systems: theoretical constructs and empirical analysis. *Journal of Enterprise Information Management*, 23(3), 305-325.
  - lxi. Pan, M.J., & Jang, W.Y. (2008). Determinants of the Adoption of Enterprise Resource Planning within the Technology-Organization-Environment Framework: Taiwan's Communications Industry. *Journal of Computer Information Systems*, 48(3), 94-102.
  - lxii. Pan, Y., Wan, Y., Fan, J., Liu, B., & Archer, N. (2017). Raising the Cohesion and Vitality of Online Communities by Reducing Privacy Concerns. *International Journal of Electronic Commerce*, 21(2), 151-183.
  - lxiii. Pappas, I.O., Kourouthanassis, P.E., Giannakos, M.N., & Lekakos, G. (2017). The interplay of online shopping motivations and experiential factors on personalized e-commerce: A complexity theory approach. *Telematics and Informatics*, 34, 730-742.
  - lxiv. Pradhan, R.P., Arvin, M.B., Norman N.R., & Bennett S.E. (2015). Financial depth, internet penetration rates and economic growth: country-panel evidence. *Applied Economics*, 48, 331-343.
  - lxv. Rahayu, R., & Day, J. (2015). Determinant Factors of E-commerce Adoption by SMEs in Developing Country: Evidence from Indonesia. *Procedia - Social and Behavioral Sciences*, 195, 142-150. doi:10.1016/j.sbspro.2015.06.423
  - lxvi. Raman, R., & Pramod, D. (2017). A Strategic Approach Using Governance, Risk and Compliance Model to Deal with Online Counterfeit Market. *Journal of Theoretical and Applied Electronic Commerce Research*, 12 (3), 13-26.
  - lxvii. Riazati, M., Shajari, M., & Khorsandi, S. (2018). *An incentive mechanism to promote honesty among seller agents in electronic marketplaces*. Springer Science+Business Media, LLC, part of Springer Nature.
  - lxviii. Rivera, M.B., Håkansson, C., Svenfelt, Å., & Finnveden, G. (2014). Including second order effects in environmental assessments of ICT. *Environmental Modelling & Software*, 56, 105-115.
  - lxix. Rogers, E., Shoemaker M., & Floyd F. (Ed.). (1971). *Communication of Innovations*, New York: The Free Press, 1971.
  - lxx. Rogers, E.M. (Ed.). (1995). *Diffusion of innovations* Fourth edition. New York: Free Press, 1995.
  - lxxi. Salwani, M.I., Marthandan, G., Norzaidi, M.D., & Chong, S.C. (2009). E-commerce usage and business performance in the Malaysian tourism sector: empirical analysis. *Information Management & Computer Security*, 17(2), 166-185.
  - lxxii. Schierz, P.G., Schilke, O., & Wirtz, B.W. (2010). Understanding consumer acceptance of mobile payment services: An empirical analysis. *Electronic Commerce Research and Applications*, 9, 209-216. doi:10.1016/j.elepar.2009.07.005

- lxxiii. Shao, Z., Zhang, L., Li, X., & Guo, Y. (2018). Antecedents of Trust and Continuance Intention in Mobile Payment Platforms: The Moderating Effect of Gender. *Electronic Commerce Research and Applications*, 33, 100823. doi: <https://doi.org/10.1016/j.elerap.2018.100823>
- lxxiv. Smink A.R., Frowijn, S., van Reijmersdal E.A., van Noort, G., & Neijens, P.C. (2019). Try online before you buy: How does shopping with augmented reality affect brand responses and personal data disclosure. *Electronic Commerce Research and Applications*, 35, 100854. <https://doi.org/10.1016/j.elerap.2019.100854>
- lxxv. Straub, E.T. (2009). Understanding Technology Adoption: Theory and Future Directions for Informal Learning. *Review of Educational Research*, 79(2), 625-649.
- lxxvi. terHuurne, M., Ronteltap, A., Rense, C., & Buskens, V. (2017). Antecedents of trust in the sharing economy: A systematic review. *J. Consum. Behav.* 16(6), 485-498.
- lxxvii. Thakur, R., & Srivastava, M. (2015). A Study on the Impact of Consumer Risk Perception and Innovations on Online Shopping in India. *International Journal of Retail and Distribution Management*, 43, 148-166.
- lxxviii. Thierer, A., Koopman, C., Hobson, A., & Kuiper, C. (2015). How the internet, the sharing economy, and reputational feedback mechanisms solve the 'lemons problem'. *University of Miami Law Review*, 70(3), 2016.
- lxxix. Tomatzky, L.G., Fleischer, M. (Ed.). (1990). *The Processes of Technological Innovation*. Lexington, MA: Lexington Books.
- lxxx. Turban, E., King, D., Lee, J.K., Liang, T., & Turban, D. (Ed.). (2015). *Electronic Commerce: A Managerial and Social Networks Perspective*, Eighth Edition. Springer Cham Heidelberg New York Dordrecht London.
- lxxxi. Turban, E., Bolloju, N., & Liang, T. (2011). Enterprise Social Networking: Opportunities, Adoption, and Risk Mitigation. *Journal of Organizational Computing and Electronic Commerce*, 21(3), 202-220. doi: 10.1080/10919392.2011.590109
- lxxxii. Vardhani, P. R., Priyadarshini, Y. I., & Narasimhulu Y. (2019). CNN data mining algorithm for detecting credit card fraud, In *Soft computing and medical bioinformatics. Springer briefs in applied sciences and technology, Singapore: Springer*, 85-93. doi:10.1007/978-981-13-0059-2\_10.
- lxxxiii. Verkijika, S.F., & Wet, L. (2018). E-government adoption in sub-Saharan Africa. *Electronic Commerce Research and Applications*, 30, 83-93. doi: 10.1016/j.elerap.2018.05.012
- lxxxiv. Wadhwa, T., Dabas, R., & Malhotra, P. (2017). Adoption of M-Wallet: A way Ahead. *International Journal of Engineering and Management Research*, 7(4), 1-7.
- lxxxv. Wang, Y., Hao, F. (2018). Does Internet penetration encourage sustainable consumption? A cross-national analysis. *Sustainable Production and Consumption*, 16, 237-248.
- lxxxvi. Wani, T.A, Ali, S.W. (2015). Innovation Diffusion Theory: Review & Scope in the Study of Adoption of Smartphones in India. *Journal of General Management Research*, 3(2), 101-118.
- lxxxvii. Weisberg, J., Te'eni, D., & Arman, L. (2011). Past purchase and intention to purchase in e-commerce, the mediation of social presence and trust. *Internet Research*, 21 (1), 82-96.
- lxxxviii. Wingreen, S.C., Mazey, N.C.H.L., Baglione, S.L., & Storholm, G.R. (2019). Transfer of electronic commerce trust between physical and virtual environments: experimental effects of structural assurance and situational normality. *Electronic Commerce Research*, 19, 339-371. doi:10.1007/s10660-018-9305-z
- lxxxix. Wirtz, B.W., & Göttel, V. (2016). Technology Acceptance in Social Media: Review, Synthesis and Directions for Future Empirical Research. *Journal of Electronic Commerce Research*, 17(2), 97-115.
- xc. Wu, J.H., & Wang, S.C. (2005). What drives mobile commerce? An empirical evaluation of the revised technology acceptance model. *Information & Management*, 42, 719-729.
- xc. Xu, H. (2013). The Effect of Perceived Security on Consumers' Intent to Use: Satisfaction and Loyalty to M-Commerce in China. *Journal of Electronic Commerce in Organizations*, 11(4), 37-51.
- xcii. Yang, G., Yang, Q., & Jin, H. (2019). A novel trust recommendation model for mobile social network based on user motivation. *Electronic Commerce Research*, 1-22.
- xciii. Yoo, B., & Jang, M. (2018). A bibliographic survey of business models, service relationships, and technology in electronic commerce. *Electronic Commerce Research and Applications*, 33, 100818, 1-8. doi:10.1016/j.elerap.2018.11.005
- xciv. Zhao, Y., Zhao, Y., Yuan, X., & Zhou, R. (2018). How knowledge contributor characteristics and reputation affect user payment decision in paid Q&A? An empirical analysis from the perspective of trust theory. *Electronic Commerce Research and Applications*, 31, 1-11. doi:10.1016/j.elerap.2018.07.001
- xcv. Zhu, K. (2004). The Complementarity of Information Technology Infrastructure and E-Commerce Capability: A Resource-Based Assessment of Their Business Value. *Journal of Management Information Systems*, 21(1), 167-202. doi:10.1080/07421222.2004.11045794
- xcvi. Zhu, K., Kraemer, K., & Xu, S. (2003). Electronic business adoption by European firms: a cross-country assessment of the facilitators and inhibitors. *European Journal of Information Systems*, 12, 251-268. doi:10.1057/palgrave.ejis.3000475.