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Unearthing Antecedents of e-commerce Adoption in a Developing Country: Towards a Conceptual Model

DOCTORAL DISSERTATION

(Summary)

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Abstract

E-commerce over time has been a strategy for rapid business development, especially in developed economies. The recent proliferation of the internet in developing economies has made e-commerce an exciting subject to address. Though e-commerce is touted as a game-changer in commerce, its wide acceptance and use remains limited in developing countries. In the current literature, factors that influence consumers' behaviour towards e-commerce adoption are not fully understood. This research extended the Unified Theory of Acceptance and Use of Technology model by enriching it with external variables (website quality and familiarity with an online vendor) to propose a new conceptual model. The research aims to enrich our understanding of the antecedents to the actual use of e-commerce in a developing country's context, focusing on Ghana. This research also investigated the moderating influence of online trust and online security on the relationship between behavioural intention and the actual usage of e-commerce. With a survey of 540 respondents, the study applied the partial least square structural equation technique to examine the hypothesized relationships. The findings suggest that performance expectancy, effort expectancy, facilitating conditions, website quality, and familiarity with an online vendor significantly affect the behavioural intention to adopt e-commerce.

Consequently, the findings suggest a significant association between behavioural intention and actual use of e-commerce. The findings also revealed that online trust and online security have a significant direct relationship with the actual use of e-commerce. The findings indicate that online security has a significant effect on online trust. Furthermore, the results indicate that online trust significantly moderates the relationship between behavioural intention and the actual use of e-commerce. On the other hand, online security had an insignificant moderating effect on the relationship between behavioural intention and actual use of e-commerce. This research makes significant theoretical contributions and outlines practical implications for increasing e-commerce adoption in Ghana.

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1. Introduction

1.1 Research background

The covid-19 global pandemic has changed consumers' behaviour towards online channels, as more consumers now resort to online purchases, and this new paradigm shift is likely to linger post-pandemic. By far, Europe is the most prepared region for e-commerce, according to UNCTAD's Business-to-Consumer (B2C) E-commerce Index. According to the UNCTAD Business-to-Customer (B2C) E-commerce Index (2019), European countries dominate the top 10 countries' readiness to engage in e-commerce. Whereas developing countries, especially in Africa, are predominantly ranked low. Countries like the Netherlands, Switzerland, Finland, United Kingdom, Denmark, Norway, Ireland, and Germany have an e-commerce index of 96.4%, 95.5%, 94.4%, 94.4%, 94.2%, 93.4%, 93.3%, and 92.5%, respectively. Studies have shown that inadequate national policies for e-commerce development, inadequate investment in telecommunication infrastructure, high cost of internet data, and lack of legal and economic regulatory climate, as well as unreliable postal service, are responsible for the low e-commerce adoption in developing economies (Agwu and Emeti 2014; Eraslan et al. 2016; Heang and Khan 2015).

Investigating e-commerce adoption in a developing country like Ghana, where its adoption is relatively low, is essential if we have to draw a framework and policy to increase e-commerce presence in developing countries. Moreover, social media handles such as Twitter, Instagram, and Facebook have made it easier to reach e-vendors and consumers. Second, e-commerce facilitates 24 hours a day and seven days a week service. E-commerce enhances trade anytime and anywhere without geographical and physical barriers. E-commerce has a strong presence in developed countries, whereas its presence in developing countries is low. Research by Esselar & Miller (2002) showed that unstable and unreliable political, social, economic, and technological conditions are at the fulcrum of the slowness of e-commerce adoption in many developing countries. However, Esselar & Millar's finding is about two decades old, and the context from which they drew their conclusion might have changed. Economic progress, political shifts, demographic trends, and technological advances are reshaping emerging markets, and these factors may also

influence e-commerce adoption in these regions. Therefore, a new study to investigate the adoption of e-commerce in developing countries cannot be overemphasized. This current study extends the classical UTAUT model by enriching it with two external variables, i.e., familiarity with an online vendor and website quality, to investigate the adoption of e-commerce in Ghana. Furthermore, this study assesses the moderating effect of trust and online security on the relationship between behavioural intention and the actual use of e-commerce, by so doing, developing a conceptual model that encapsulates factors influencing e-commerce adoption.

1.2 The motivation for the research

Tarhini et al. (2016) applied the UTAUT model to understand the customers' acceptance and use of internet banking in Lebanon. Lestari (2019) measured e-commerce adoption behaviour among gen-z in Jarkata and revealed a more substantial relationship among self-efficacy, perceived usefulness, attitude, intention, and e-commerce adoption. Lestari (2019) suggested that future research consider other variables that might directly or indirectly affect e-commerce adoption. In filling this gap, this study explores website quality and familiarity with online vendors as variables that might impact consumers' e-commerce adoption in addition to the classic variables of the UTAUT model. The classic UTAUT model and its variables have been applied directly to many technology adoption studies with little or no refinement. Therefore, there is the need to extend and enrich the model by considering other external variables that can augment the original variables of the UTAUT to predict individual behavioural intention to adopt a technology.

Consequently, this study incorporates familiarity with an online vendor and website quality as variables to the UTAUT model. Furthermore, the study assessed the moderating effect of trust and online security on the relationship between behavioural intention and the actual use of e-commerce to adopt e-commerce. To date, no research, arguably, has investigated the moderating impact of trust and online security on the relationship between behavioural intention and actual use of e-commerce. This research fills this gap in the literature.

In the area of the research methodology used to study e-commerce adoption, Duncombe & Boateng (2009) classified eighty-four (84)

research articles, and their finding revealed forty-two (42) articles were analyzed at the macro-level (national level), whereas thirty-four (34) at the meso-level (organizational level), leaving just eight (8) at the micro-level (individual level). Dahbi & Benmoussa (2019) studied the factors that inhibit SMEs from adopting e-commerce in Morocco. The study revealed that financial and technological factors are the critical inhibitors of e-commerce adoption, followed by cultural and organizational factors. One limitation of their study that serves as an avenue for future research is the level of analysis. Dahbi & Benmoussa (2019) analyzed their study at the meso-level focusing on SMEs. Dahbi & Benmoussa (2019) corroborate Duncombe & Boateng (2009) findings that show that meso-level studies on e-commerce adoption exceed micro-level studies. There is, therefore, a level of analysis gap that needs to be filled. This current study investigates e-commerce adoption at the micro-level (consumer level) to enhance our knowledge of the critical factors influencing e-commerce adoption by consumers in developing countries. Following the literature classification of methodological approaches to e-commerce adoption studies, Duncombe & Boateng (2009) revealed that twelve (12) of the studies adopted the quantitative approach, twenty-five (25) adopted the mixed-method approach, and thirty-six (36) adopted the qualitative approach. A decade after the published work of Duncombe & Boateng (2009), Dahbi & Benmoussa (2019) suggested that future research embark on a large-scale survey to triangulate their qualitative findings. The findings of Duncombe & Boateng (2009) show evidence of a method gap in e-commerce literature. Perhaps, most technology adoption researchers ascribe to the constructivist/interpretive paradigm and its philosophical assumptions (ontology, epistemology, methodology). These world views of qualitative researchers may skew their research findings because their perception of reality and how it can be measured is different from that of other paradigms. With the diminutive quantitative research, more substantial quantitative claims cannot be made about the adoption of e-commerce in developing countries until further research using the quantitative approach has been done. As a result, this current study adopts a positivist and a quantitative approach to investigate e-commerce adoption in Ghana.

The novelty of this study lies in the gaps that exist in previous studies. First, this study enriched the classical UTAUT model by extending it

with two external variables, i.e., website quality and familiarity with an online vendor, hence proposing a conceptual model. Second, this study explores the moderating effect of online trust and online security on the relationship between behavioural intention and actual use of e-commerce, a phenomenon that previous researches have overlooked. Third, the survey of literature revealed diminutive quantitative research on e-commerce adoption in developing countries. This study steps in to apply a quantitative approach to investigating e-commerce adoption in Ghana.

1.3 Research objectives

1. To investigate the determining factors of e-commerce adoption in Ghana.
2. To investigate the moderating effect of trust and online security on the relationship between behavioural intention and actual use of e-commerce.
3. To assess whether online security has a direct influence on the trust of Ghanaians to adopt e-commerce.

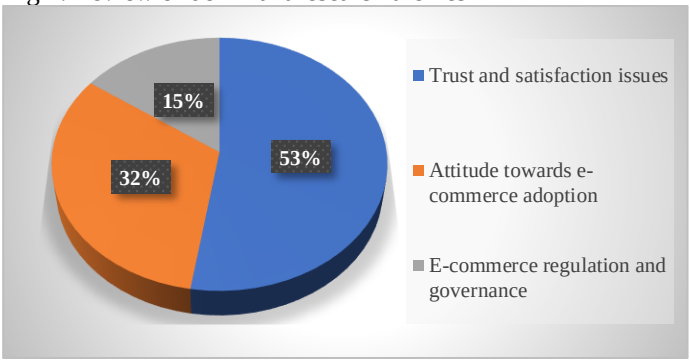
1.4 Research Questions

1. What are the determining factors of e-commerce adoption in Ghana?
2. What is the moderating effect of trust and online security on the relationship between behavioural intention and actual use of e-commerce?
3. Does online security directly influence the trust of Ghanaians to adopt e-commerce?

2. Literature review

2.1 Distribution of articles by research themes

Fig 1. Review of dominant research themes



Source: Author's construct

2.2 Methodological Approaches to e-commerce research in developing countries

Table 1. Distribution of articles by research methods

Research method	Number of articles	Selected references
Survey	29(19%)	Fang et al. (2014); Awiagah et al. (2015); Peng et al. (2017); Kang et al. (2015); Kim et al. (2016)
Case study	61(40%)	Thompson et al. (2019); Kabanga & Brown (2017); Ong & Teh (2016); Kwak et al. (2019);
Mixed methods	15(10%)	Zhu et al. (2019); Aguerre (2019)
Simulation/experimental studies	1(1%)	Hinz et al. (2011)

Content analysis	19(13%)	Huang & Benyoucef (2013); Yang (2011); Kabango & Asa (2015)

Source: Author's construction

2.3 Theoretical Framework used in the study of e-commerce adoption in developing countries

Table 2. Distribution of articles by research frameworks

Theoretical framework	Constructs	Number of articles
Group 1 – Trust and satisfaction		
Theory of organizational trust (Mayer et al., 1995)	Ability, Benevolence, Integrity, Trust	5
Resource-Based View (RBV) Barney (1991)	Resources, Capability, Competitive advantage	7
Diffusion of Innovation Theory (DoI) (Rogers, 2003)	Relative advantage, Compatibility, Complexity, Trialability, Observability	8
Technology Organization Environment framework (TOE) (Tornatzky et al., 1990)	Technological context, Organizational context, Environmental context	16
Group 2 – Attitude towards e-commerce adoption		
Technology Acceptance Model (TAM) (Davis, 1985)	Perceived usefulness, perceived ease of use, Behavioral intention	12
Social Influence Theory (Kelman, 1958)	Compliance, identification, and internalization	1
Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980)/ Theory of Planned Behavior (TPB) (Ajzen, 1991)	Attitude, subjective norm	8

Self-determination Theory (Deci & Ryan, 1985)	Autonomy, Competence, connection/relatedness, motivation	1
Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003)	Performance expectancy, effort expectancy, social influence, Behavioral intention, Actual behaviour	4
Perceived e-readiness Model (Molla & Licker, 2005a)	Perceived organizational e-readiness, Perceived external e-readiness	5
Perceived Characteristics of Innovation (PCI) model (Plouffe et al., 2001)	Relative advantage, compatibility, ease of use, results demonstrability, image, visibility, trialability, voluntariness, adoption.	4
Group 3 – E-commerce regulation and governance		
Transaction Cost Theory (TCT) (reviewed in Pare, 2003)	Bounded rationality, Opportunity, frequency, Uncertainty, Asset specificity.	4
Economic theory in online shopping (Mahmood et al., 2004)	Economic condition, Technological savvy, Trust, online hopping	1
DeLone & McLean IS Success Model (DeLone & McLean, 2003)	Information quality, Service quality, system quality, System use, user satisfaction, Net system benefit	3

Source: Author's construction

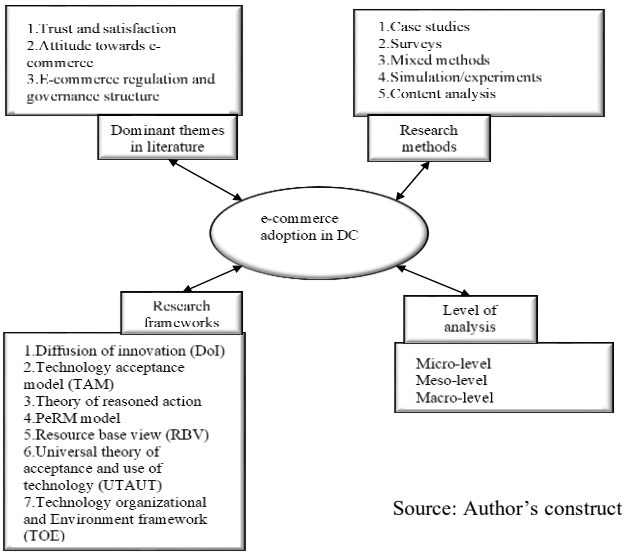
2.4 Distribution of articles according to the level of analysis

Table 3. Distribution of articles according to the level of analysis

Level of analysis	Number of articles	Selected references
Micro-level studies	16	Fang et al. (2014); Sullivan & Kim (2018); Hallikainen & Laukkanen (2018)
Meso-level studies	28	Choshin & Ghaffari (2017); Liu et al. (2013); Kabanda & Brown (2017); Awiagah et al. (2015)
Macro-level studies	39	Kurnia et al. (2015); Alyoubi (2015); Zhu et al. (2019); Kwak et al. (2019), Alsaad & Taamneh (2019)

Source: Author's construction

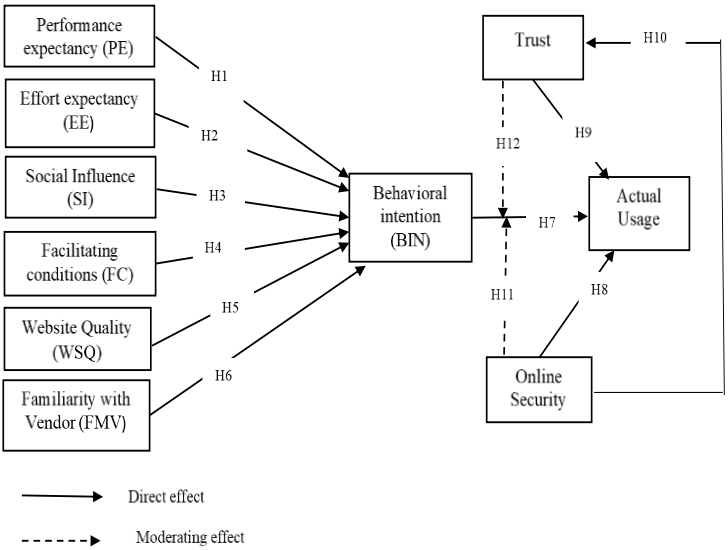
Fig. 2 Articles classification framework



Source: Author's construct

3.Research framework

Fig. 3 Conceptual model



Author's proposed model

3.1 Developed hypotheses

H1: *Performance expectancy will significantly influence consumers' behavioural intention to adopt e-commerce in Ghana.*

H2: *Effort expectancy will significantly influence consumers' behavioural intention to adopt e-commerce in Ghana.*

H3: *Social influence will positively and significantly influence consumers' behavioural intention to adopt e-commerce in Ghana.*

H4: *Facilitating conditions will significantly influence consumers' behavioural intention to adopt e-commerce in Ghana.*

H5: *Website quality will significantly influence consumers' behavioural intention to adopt e-commerce in Ghana.*

H6: *Familiarity with an online vendor will significantly influence consumers' behavioural intention to adopt e-commerce in Ghana.*

H7: *Behavioral intention will significantly influence the actual use of e-commerce in Ghana.*

H8: *Online security will significantly influence the actual use of e-commerce in Ghana.*

H9: *Online Trust will significantly influence the actual use of e-commerce in Ghana.*

H10: *Online security will significantly influence trust in e-commerce in Ghana.*

H11: *Online security significantly moderates the relationship between behavioural intention and actual use of e-commerce.*

H12: *Online trust significantly moderates the relationship between behavioural intention and actual use of e-commerce.*

4. Research Methodology

Guba & Lincoln (1994) described the research paradigm as the entire belief system or worldviews that guide the investigator in methods and ontological and epistemologically fundamental ways. Kuhn (1970) also described a paradigm as a set of beliefs, values, and techniques which is shared by members of a scientific community and which acts as a guide or map, dictating the kind of problems scientists or researchers should address and the type of explanation that are acceptable to them. The author of this study ascribes to the positivist paradigm.

Table 4. The positivist paradigm and related philosophical assumptions

Paradigm	Positivist view
Ontology (what is reality)	Reality is objective, single, and factual. Reality can be measured and known.
Epistemology (how do you know)	Knowledge acquisition is not related to moral content and values
Methodology (how do you find it out)	Mainly quantitative
	Cause-effect
	Statistical analysis

Source: Author's construct

4.1 Survey as a research method

According to Sarantakos (1998), research methods refer to the mode of inquiry and data collection and analysis tools. In this study, the survey research method was adopted. A survey is a quantitative approach to data collection. The type of research questions answered by this study required the testing of suggested hypotheses using the partial least square – structural equation modelling technique. Creswell (2009) advanced that if providing answers to research questions necessitates testing hypotheses, the survey is the most appropriate research method. Furthermore, Creswell (2009) suggested that the survey research method be adopted when the study establishes the relationship among variables in a model. The suggested hypotheses of this research and the quest to establish the relationship among the variables make the survey the appropriate research method to adopt.

4.2 Survey design

Designing a survey involves developing questions (items) to measure the latent constructs of a model. According to Gay et al. (2012), survey studies come in two forms; cross-sectional and longitudinal. This

study employed a cross-sectional survey. The survey was designed to collect data from Ghanaian adults who have experience with online purchases at a specific time. The primary source of data for this research was obtained through a close-ended survey questionnaire. The survey was in section A, and section B. Section A collected demographic information from respondents such as gender, age, nationality, educational level, product purchased, number of purchases a year, and years of experience with an online purchase. In section B, respondents were asked to indicate their level of agreement or disagreement with items on a 5-point Likert Scale ranging from 1 "strongly disagree" to 5 "strongly agree". These items were used as a measure for the variables in the conceptual model.

4.3 Selecting of Survey participants

For this study, the target population was adult online shoppers in Ghana who have a valid method of online payment (i.e., bank accounts and debit cards). Ghana was selected because, first, it is a middle-income country in Sub-Saharan Africa (a developing country). Moreover, as this study investigates the adoption of e-commerce in developing countries, Ghana is a good fit. Second, ITU (2017) stated that eight out of ten Ghanaians are mobile and internet users. According to Mattern (2018), Ghana is one of the fast-growing technology adopters in Sub-Saharan Africa. Therefore, it is reasonable to investigate how the increase in internet usage and technology adoption in Ghana impacts online purchases

4.4 Data collection method

The researcher resorted to an online collection of data for both pilot and primary data collection. The survey instruments/measurement scales were developed with the LimeSurvey software. After the survey items were set and activated online, the software generated https://exam.ktk.pte.hu/demosurvey/index.php/348187?lang=en. The link was sent to respondents via e-mails, Facebook, and WhatsApp social media platforms. The respondents' selection criteria were that, first, they must be Ghanaian adults, and second, they should have a personal experience with an online purchase. The questionnaire was piloted with 20 respondents from January 14, 2020, to February 20,

2020. The primary data collection took place from March 2, 2020, to August 13, 2020. In all, 1,036 respondents were contacted cross-sectionally, out of which 540 filled questionnaires were handed in for analysis.

5. Findings and analysis

Table 5. Demographic variables

Variables	Frequency (N=540)	Percentage (%)
Gender:		
Male	318	59
Female	222	41
Age:		
18-24	146	27
25-29	178	33
30-40	162	30
>40	54	10
Educational level:		
Senior high	189	35
Tertiary	270	50
Professional	81	15
Products purchased:		
Books/Magazines	92	17
Clothes/Shoes	124	23
Computer accessories	140	26
Home appliances	130	24
Travel itinerary (airline tickets/reservations)	54	10
The number of purchases in a year:		
1 - 5	200	37
6 – 10	157	29
11 – 15	108	20
>15	75	14
Years of experience with e-commerce:		

1 – 5	365	68
>5	173	32

5.1 Measurement model assessment

5.1.1 Internal Consistency of the constructs

The test for the internal consistency (reliability) of the ten (10) constructs was performed using Cronbach's Alpha (**α**). According to Hair et al. (2020), a given variable's internal consistency should equal or exceed the threshold value of 0.7. The constructs' internal consistency values were seen above the recommended threshold in this study, which shows an excellent internal consistency. The sampling adequacy was measured with Kaiser–Meyer–Olkin (KMO) and Bartlett's Test of Sphericity.

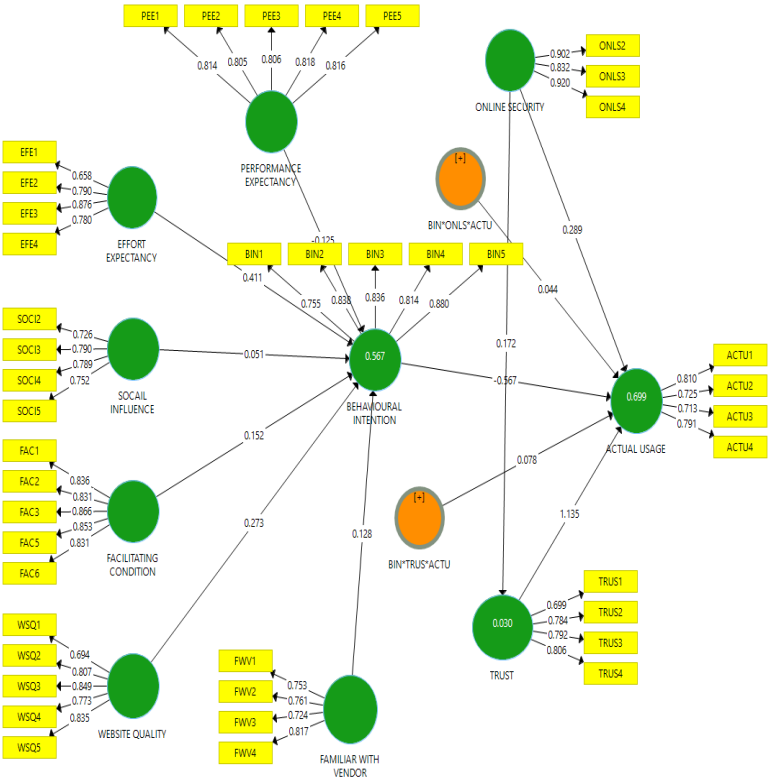
Table 6 KMO and Barlett's test of sphericity

Kaiser- Meyer- Olkin measure of sampling adequacy		0.915
Barlett's test of sphericity: Approx. Chi-square		27155.55
	Df	972
	Sig	.000

5.1.2 Convergent validity

The composite reliability (C.R.), factor loadings (λ), and Average Variance Extracted (AVE) were tested to measure the convergent validity of constructs. According to Hair et al. (2012), AVE value greater than 0.5, factor loadings greater than 0.6, and C.R. values greater than 0.7 are acceptable for convergent validity. AVE values ranged from 0.518 to 0.711, CR from 0.841 to 0.925. Also, the factor loadings exceeded the recommended value threshold of 0.6. The factor loadings and path coefficients from the structural equation modelling output are presented in Figure 4.

Figure 4. Factor loadings and path coefficients



Source: Data analysis (SMART PLS output)

5.1.3 Discriminant Validity

Discriminant validity is achieved when the Average Variance Extracted (AVE) square root for an individual construct is higher than the inter-factor correlation between the construct in the model (Kurfali et al., 2017).

Table 7. Correlation matrix of constructs

Construct	AVE	ACTU	BINT	EFE	FAC	FWV	ONLS	PEE	SOC	TRUS	WSQ
ACTU	0.577	***0.760***									
BINT	0.682	0.474	***0.826***								
EFE	0.608	0.536	0.672	***0.780***							
FAC	0.711	0.476	0.533	0.566	***0.843***						
FWV	0.584	0.684	0.549	0.606	0.510	***0.764***					
ONLS	0.613	0.426	0.196	0.429	0.370	0.421	***0.783***				
PEE	0.659	0.563	0.425	0.621	0.486	0.621	0.739	***0.812***			
SOC	0.518	0.595	0.528	0.599	0.508	0.630	0.434	0.623	***0.720***		
TRUS	0.594	0.725	0.526	0.651	0.542	0.651	0.196	0.429	0.644	***0.771***	
WSQ	0.630	0.573	0.605	0.536	0.440	0.517	0.262	0.413	0.597	0.734	***0.794***

Diagonal elements (italics) in the matrix represent the square root of AVE.

5.1.4 Multicollinearity diagnosis

Collinearity occurs when variables are highly correlated to the extent that it is difficult to obtain a reliable coefficient estimate. Collinearity was assessed using the Variance Inflation Factor (VIF). As a rule of thumb, VIF values less than three (3) indicate that the data has no problem with collinearity (Benitez et al., 2020). The VIF values of the variables were less than 3.0, indicating an absence of multicollinearity.

5.2 The structural model assessment

Model Predictive Power (R^2) and predictive accuracy (Q^2)

Table 8. The model predictive power and predictive quality

Constructs	**Coefficient of determination (R^2)**	**Constructed validated redundancy (Q^2)**
Behavioural Intention (R^2_b)	0.567	0.380
Actual Usage (R^2_a)	0.699	0.355
Trust (R^2_T)	0.030	0.120

$Q^2 > 0$ were obtained

5.2.1 Model Fit Test

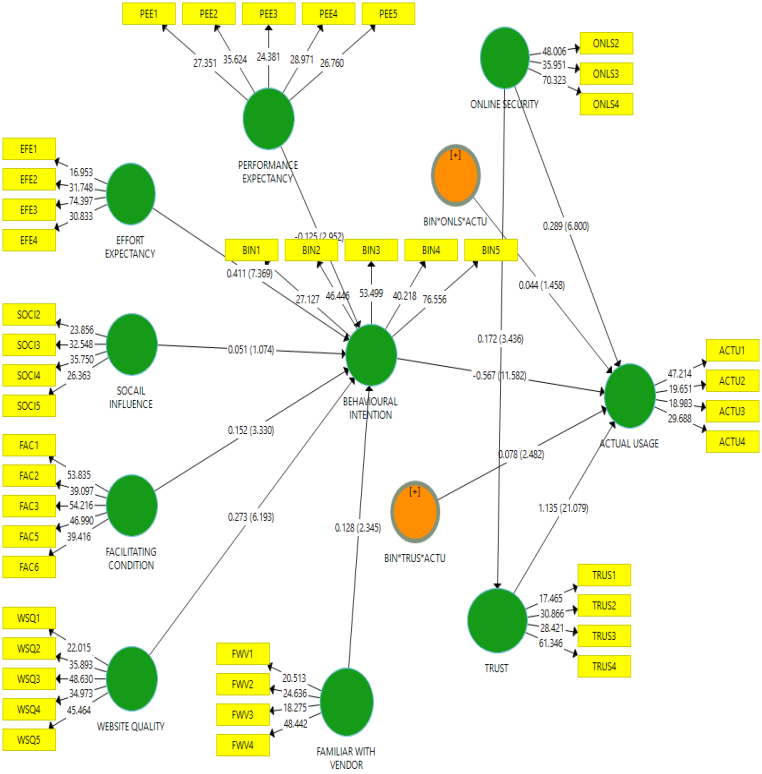
Table 9. The model fit indices

Fit index	**Recommended threshold**	**SEM value**	**Remark**
Adjusted Goodness of Fit Index (AGFI)	≥ 0.80	0.921	Good fit
Chi-Square/Degree of Freedom (x^2/d.f.)	≤ 3.00	2.432	Good fit
Comparative Fit Index (CFI)	≥ 0.90	0.953	Good fit
P-Value	< 0.05	0.045	Good fit
Root Mean Square Error of Approximation (RMSEA)	≤ 0.08	0.062	Good fit
Standardized Root Mean Square Residual (SRMR)	≤ 0.05	0.031	Good fit

The goodness-of-fit index (GFI)	≥ 0.80	0.902	Good fit
Normed Fit Index (NFI)	≥ 0.90	0.954	Good fit

5.2.2 Structural model estimation

Fig. 5. Structural model estimation showing the T-statistics (t-values)



Source: Data analysis (SMART PLS output)

Figure 6.1 The Conceptual research model estimation

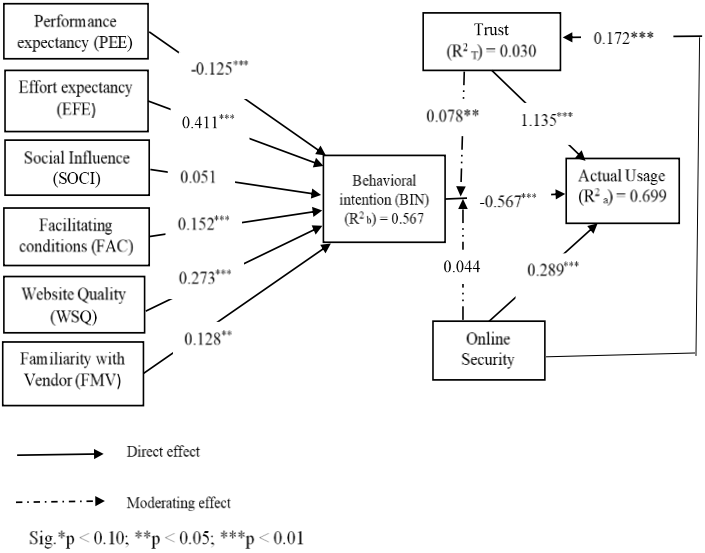


Table 10 Summary of model path analysis

Structural relationship	**H**	**Beta**	**T-stat**	**P- values**	**Decision**
PEE → BIN	H1	-0.125	2.952	**< 0.01*** **	**Accepted**
EFE → BIN	H2	0.411	7.369	**< 0.01*** **	**Accepted**
SOCI → BIN	H3	0.051	1.074	**> 0.10**	**Rejected**
FAC → BIN	H4	0.152	3.330	**< 0.01*** **	**Accepted**
WSQ → BIN	H5	0.273	6.193	**< 0.01*** **	**Accepted**
FMV → BIN	H6	0.128	2.345	**< 0.05** **	**Accepted**
BIN → ACTU	H7	-0.567	11.583	**< 0.01*** **	**Accepted**
ONLS → ACTU	H8	0.289	6.800	**< 0.01*** **	**Accepted**
TRUS → ACTU	H9	1.135	21.079	**< 0.01*** **	**Accepted**
ONLS → TRUS	H10	0.172	3.436	**< 0.01*** **	**Accepted**
BIN*ONLS*ACTU → ACTU	H11	0.044	1.458	**> 0.10**	**Rejected**
BIN*TRUS*ACTU → ACTU	H12	0.078	2.482	**< 0.05** **	**Accepted**

Sig.*p < 0.10; **p < 0.05; ***p < 0.01, *t*-Value > 1.99
BIN = Behavioral Intention ACTU = Actual Usage FAC = Facilitating Condition SOCI= social Influence; PEE = Performance Expectancy EFE = Effort Expectancy; ONLS = Online security; TRUS = Trust, WSQ = website Quality, FWV = familiarity with Vendor
BIN × ONLS × ACTU → ACTU (moderating effect of online security on the relationship between behavioural intention and actual usage)
BIN × TRUS × ACTU → ACTU (moderating effect of trust on the relationship between behavioural intention and actual usage)
H = Hypothesis

6. Discussion

This study reported that performance expectancy has a significant negative effect on behavioural intention. This result suggests that although online consumers perceive a significant effect of performance expectancy on behavioural intention in the Ghanaian context, performance expectancy does not positively influence behavioural intention. This phenomenon is unlikely in most situations but not unexpected, as previous studies have reported the same effect (Izuagbe, 2021; Tanaka et al., 2006). The significant effect of performance expectancy on behavioural intention suggested in this study is consistent with Marinkovic et al. (2020), Netshirando et al. (2020), Joen et al. (2018), Soni et al. (2019), and Dewi et al. (2020).

The structural path coefficient (0.411) and the p-value < 0.01 indicated that effort expectancy was the strongest predictor of consumers' behavioural intention to adopt e-commerce in Ghana. In other words, the perceived physical and mental freedom associated with e-commerce has a significant effect on online consumers' behavioural intention in Ghana. This finding corroborates Kim and Lee (2020), Soni et al. (2019), Netshirando et al. (2020), and Joen et al. (2018).

Contrary to the hypothesized relationship, the structural path analysis reported an insignificant relationship between social influence and behavioural intention to adopt e-commerce. P-value of 0.284 shown in Table 10 indicates that social influence is not a significant predictor of consumers' behavioural intention to adopt e-commerce in Ghana. This finding is in line with Soni et al. (2019), Sultana (2020), Raza et al. (2019), and Tarhini et al. (2019). Therefore, we can deduce that the opinions of others do not influence the use of e-commerce services. Given that online shopping has monetary implications, it is likely that

a decision to use e-commerce systems will be driven by personal necessity and not by social influence.

This research also showed a significant relationship between facilitating conditions and consumers' behavioural intention to adopt e-commerce. The availability of organizational and technological infrastructure (computers, Wi-Fi, help-line, and support service) that assist users during the actual use of e-commerce applications and the post-adoption support will significantly influence behavioural intention to adopt e-commerce. This finding supports Yoo and Roh (2019), Soni et al. (2019), Lawson-Body et al. (2018), Zhang et al. (2020). It could be interpreted that consumers with adequate support systems that assist them anytime during the online purchase process will feel confident about using the system, and as a result, it increases their intention to use e-commerce applications and systems.

The findings showed a significant effect of website quality on consumers' behavioural intention to adopt e-commerce. This finding suggests that the greater the website quality, the greater the consumer intention to use the site for online purchase. This finding corroborates the findings of Liu et al. (2017), Sharma and Aggarwal (2019), Akram et al. (2018), and Giao et al. (2020). It is important to note that the perceived ease of use of the e-commerce website, the visual appeal of the e-commerce website, and the timeliness of the website's information significantly influence consumers' intention to adopt e-commerce in Ghana.

The results revealed that familiarity with an online vendor significantly affects consumers' behavioural intention to adopt e-commerce. This finding implies that familiarity with an online vendor is a significant predictor of behavioural intention to adopt e-commerce in Ghana. As this study sought to improve and enrich the UTAUT model, familiarity with an online vendor was added as an external variable, and results from the structural path analysis proved it has a significant impact on consumers' behavioural intention. This finding is in line with the findings of Kaya et al. (2019), Azam and Aldehayyat (2018), and Amir and Rizvi (2017).

The findings also revealed that the subjective probability that consumers would like to use e-commerce applications significantly

influences the application's actual use. This result suggests that online consumers' readiness in Ghana to engage in an online shopping platform is significant but negatively influences its actual use. The significant effect of behavioural intention on user behaviour is supported by previous studies (Hossain et al., 2019; Wrycza et al., 2017; Shiferaw and Mehari, 2019).

The research found that consumers' perception of online security significantly influences the actual online purchase behaviour. The online shopping website perceived security as a secure means consumers can send sensitive information such as bank name, bank account number, and CVV (card verification value), significantly affect their actual purchase behaviour. This finding corroborates Patel and Patel (2018), Dwivedi et al. (2017), and Xu et al. (2012).

The result indicates that online trust is a positive and significant determinant of the actual use of e-commerce in Ghana. This finding Implies that consumers perception of an e-commerce site as trustworthy significantly influences their online purchase behaviour. This finding is similar to Stouthuysen (2020), Tarhini et al. (2019), Cui et al. (2020), Sakar et al. (2020). This finding filled a literature gap by empirically investigating the direct relationship between perceived online trust and the actual online purchase behaviour among online consumers in Ghana.

The findings further showed that online security directly and significantly affects online trust among online consumers in Ghana. This result implies that the web's perceived security as a secure means for consumers to send sensitive information such as bank name, bank account number, and CVV (card verification value) positively and significantly affect online trust perception. This finding is consistent with Riquelme and Roman (2014), Rouibah et al. (2016), and McCole et al. (2010).

6.1 Moderating effect of online security

Contrary to the author's suggested hypothesis, the results showed an insignificant moderating effect of online security on the relationship between behavioural intention and the actual use of e-commerce. This result may imply that online security as a moderator does not interact significantly with the relationship between behavioural intention and

actual use. The strength of the relationship between behavioural intention and actual use is unaffected by online security perception.

6.2 The moderating effect of perceived online trust

The results showed that online trust significantly moderates the relationship between behavioural intention and actual use. The relationship between behavioural intention and actual use of e-commerce increases when consumers have higher perceived online trust. This finding means that when consumers trust the web and e-commerce platforms, it significantly increases behavioural intention to use e-commerce platforms. This finding is consistent with Hsu et al. (2014) and Phua et al. (2016).

7. CONCLUSION

7.1 Synopsis of the research

The rapid diffusion of information technology and information systems in many aspects of our lives has brought about a paradigm shift in many business operations worldwide. An area of business and marketing that has seen significant strides with the advent of the internet and technology is e-commerce. A conceptual framework was proposed to verify the hypothesized effect of the factors influencing Ghana's e-commerce adoption. The author concluded that the proposed model's predictive/explanatory power is good based on these results. In essence, the proposed model's structural model estimation indicates that performance expectancy, effort expectancy, facilitating conditions, website quality, and familiarity with the online vendor are the significant predictors of behavioural intention to adopt e-commerce in Ghana (supporting H1, H2, H4, H5, and H6).

Contrary to the hypothesized relationship, the results showed an insignificant effect of social influence on behavioural intention (H3 was rejected). However, behavioural intention showed a significant negative influence on actual use (supporting H7). Moreover, as hypothesized, online security and online trust significantly impact the actual use of e-commerce in Ghana (supporting H8 and H9). The findings also revealed that online security significantly impacts online trust (supports H10). The model further assessed the moderating impact of online security and online trust on the relationship between

behavioural intention and the actual use of e-commerce. The study found an insignificant moderating impact of online security on the relationship between behavioural intention and actual use (H11 was rejected). On the other hand, this study's findings supported the hypothesized significant moderating impact of online trust on the relationship between behavioural intention and actual use of e-commerce (H12 was accepted).

7.2 Theoretical implications

Literature on e-commerce has been silent on the moderating effect of perceived online security and perceived online trust on the relationship between behavioural intention and the actual use of e-commerce. This study has filled these research gaps, and its findings have opened more opportunities to advance future research. Furthermore, this study is one of the few works to propose a conceptual framework that provides unique insights and a better understanding of e-commerce adoption (Figure 6).

7.3 Practical implications

the managers of e-commerce platforms must identify the advantages of using their online shopping platforms, such as reduced cost, time-saving during transactions, and increase productivity. Managers must communicate these advantages to their stakeholders through promotional programs and incentives. The e-commerce system developers should design the e-commerce website/application to make navigating the e-commerce website easier for consumers. Website business designers must capture the interest of consumers with good website content since most website visitors make their judgment whether to continue browsing the website based on just a few seconds on the web page. E-vendors and website designers must know their incumbent consumers and provide tailored content and products used by this category of consumers. Good and appealing content (pictures, words, and videos of products) should be made available and easily accessible to secondary (potential) consumers who might need the products in the future. E-vendors should let third party processors like Mastercard, Visa, and PayPal handle customer credit and debit card information. These providers have the technical and security strength to handle customers' data better than e-vendors. E-vendors must also educate their consumers on how to safeguard

their data. E-vendors should teach consumers how to spot suspicious behaviour from attackers who try to sniff consumers' web traffic to steal their data and inform them if something goes wrong.

7.4 Contributions to the research

Table 11 Summary of contributions to the study

Theoretical contributions	Extending the UTAUT model to suggest a new model that can be used as a theoretical lens to investigate e-commerce adoption is the chief contribution of this research. To the best of the author's knowledge, this research is the first of its kind to use the constructs it suggested to investigate e-commerce adoption in a developing country.
Contextual contributions	This research advanced the literature of e-commerce adoption by augmenting it with a developing country perspective with data from Ghana. E-commerce adoption research in developing countries has received very little attention in the international business literature with inconsistent and inconclusive findings. Therefore, this research supplements the plethora of advanced country-based studies on e-commerce.

7.5 Limitations and future research directions

First, data were collected in a single country, Ghana; therefore, the research findings can only be directly implied in Ghana. Due to social idiosyncrasies, it is unknown how well the data and the model can be extrapolated to other countries, especially in other developing countries. Therefore, there is a need for support of findings by future researchers with data from other countries. Furthermore, it could be interesting from an interpretative/constructivist standpoint (applying the methodological toolkit available) to better understand why the moderating effect in the case of online security showed an insignificant effect and why it was significant in the case of trust. Future research could conduct qualitative research (e.g., in-depth interview/ focus group discussion) to understand what the coefficients could not show. Second, the data analyzed in this study were collected only from users of e-commerce applications; thus, Ghanaians who have bought products from an online shopping website rather than

non-users. Therefore, the sample might not have provided a holistic understanding of e-commerce adoption in Ghana. Therefore, it would be necessary for future research to collect data from non-users of e-commerce to investigate their perception of e-commerce and the factors that may account for adopting e-commerce by non-adopters.

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Pobee, F. (*In press*). Preliminary insight into electronic commerce adoption in a developing country: Evidence from Ghana. *International Journal of Electronic Business.*

Pobee, F., Ansong, E. (*In press*). Examining Fintech Adoption in the Banking Sector of a developing country: Implication for Managers. In Boateng, R. (Eds), *Delivering Distinctive Value in Emerging Economies: Efficient and Sustainably Responsible Perspectives from Management Researchers and Practitioners.* Taylor & Francis.