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Research paper

Trustworthy E-Commerce Model for Small Medium Enterprises (SMEs)

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Abstract

This paper presents a trustworthy model for an e-commerce website consisting of technologically-driven factors that influence the e-commerce usage and by employing the Theory of Planned Behaviour as the basis of developing the model. For this paper, self-administered survey questionnaires were distributed to 600 respondents at small medium enterprises (SMEs) in Libya, the structural equation modeling (SEM) was utilized to test the factor analysis. Based on 296 of 600 respondents of the administered questionnaires, the results showed that the perceived ease of usage and perceived ease of trust are highly significant when it comes to the usage of ecommerce. Both parameters recorded a preference score of 52% and 36% respectively. As a result, these two factors are considered to be the main factors that influence the e-commerce usage by SMEs in Libya.

Keywords: *Behavioral intention; E-commerce; Perceived trust; Perceived use; SME; Trustworthy model.*

1. Introduction

E-commerce usage is one of the key knowhows of the 21st covenant which has a main possibility to alteration the form of service platform association. E-commerce is a process whereby an organization shares and exchanges information on business transactions using internet technologies [1]. It is an emerging trend and creates new opportunities for consumers and organizations [2]. From the organization's perspective, online shopping plays an important role in the distribution channel of a product or service. However, consumers' intentions and satisfactions when making online transactions are the main concerns which influences the success of an e-commerce considering it is a matter of decision making [3]. The Existing work of Sullivan and Kim which proposes the integration of a product evaluation model and a technology acceptance model argues that, perceived value and online trust to perceived usefulness have got increased influence to the consumers' behavioral intention [4] In order to secure economy, majority of the developing nations are prioritizing online security as a major challenge together with SME's sustainability [5]. Most of the organizations all over the world have been focusing on developing their product innovation for customer usage [6]. Online transaction via e-commerce web application is confronted by a vulnerability that exposes confidential information of users to unauthorized parties. Apart from the trust, privacy and security, which have also been major obstacles to the development of e-commerce usage [7]. In [8] states that security and information privacy would be the main barrier towards the development of consumer-related e-commerce Evaluation of e-commerce appropriateness, prior to its usage, has often been focused as agents of trust to the acceptance of the technology in facilitating a transaction at all levels [9]. Thus, this research presents a trustworthy model for an e-commerce web application consisting of technologically-driven factors that influence the e-commerce usage and by employing the Theory of Planned Behaviour as the basis of developing the model. These factors investigate the relationship between reliability, privacy, online transaction, perceived trust, perceived usefulness, perceived ease of use and behavioral intention towards the usage of e-commerce networking. This paper is established as follows: part 2 displays related work on perceived usefulness, ease of use, trust, reliability, privacy and online transaction of an e-commerce. Part 3 to characterize the methodology that used in this research while part 4 presents the results of an experiment carried out in this research. Section 5 contains the summary and possibility future work in this paper.

2. Literature Review

Technology plays an important role in driving communication and data transfer leading the industry to a greater computational speed. According to [10], the usage of technology in business started to occur in early 1970s where it was used to facilitate electronic commerce transactions. In [11] scrutinized the comparative significance while buying merchandise and assistance through the network of four combined-trust signs of third party privacy seals, privacy notification, third party security seals, and security characteristic. The consequence of their research specified the majority of the consumers prices security features significantly more than the other three trust signs. In [12], argued that trust is focal to any commercial transaction. As with conventional commerce, e-commerce requires trust across the whole spectrum of users and providers of services and merchandise.

The present study is grounded in the technology acceptance model (TAM) and Theory of Planned Behaviour (TPB) postulated by [13-14]. These models have been modified by each scholar to suit different research needs. As technical obstacles disappear, a pivotal factor in harnessing this expanding power leads to the abilities

to create the technology that people are willing to use. Technological acceptance models were introduced by [15], whose research attempted to investigate the relationship between the acceptance of consumers of electronic commerce and the dual antecedent factors of the perceived ease of use (PEOU), as well as the perceived utility (PU). The purpose was to determine whether earlier findings can still remain valid after newer advances in systems and technologies affected system utilization. Technology acceptance models offer a theoretical base for probing the aspects that lead to technological acceptance among organizations.

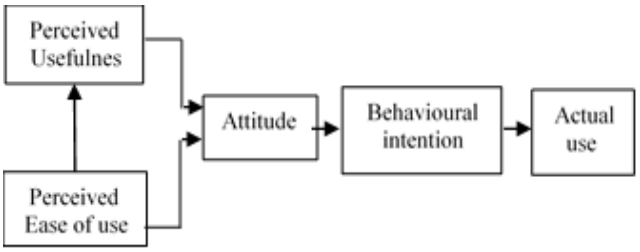

Fig. 1: Technology Acceptance Model

Because of their customers' varying intentions, organizations need to adopt new technology even when doing so is against their best interests. This conducted research takes the technology acceptance model as previously done, with the intention of utilizing e-commerce usage as the dependent variables, and using perceived usefulness, perceived trust and perceived ease of use as independent variables that have been taken from the original Technology Acceptance Model (TAM). Though numerous advantages are attached to e-commerce, the introduction of this type of business transaction routes has widely opened up the risk of lack-of-trust in online activities. Various responses to online risk have focused on increasing users' trust perceptions which are not practical in the real sense. Alternatively, a trustworthy model appears to circumvent the barriers to e-commerce transaction, and by this, the trade volume and risk of the business online transactions, trust, and reliability can be controlled while at the same time maintaining the user's ability to make decisions for acceptance.

2.1. Perceived Usefulness (PU)

Perceived usefulness (PU) is termed as "the extent to which a person believes that using a system will enhance his or her job performance" [13]. According to several experimental checking of (Technology Accepted Model), perceived usefulness has constantly been a sturdy determinant of utilizing intentions together with integrated regression coefficients ideally roughly 0.6. According to [16], "Since perceived usefulness is such a fundamental driver of usage intentions, it is crucial to recognize the determinants of this construct and how their influence changes over time with increasing experience using the system". Additionally, in [17] mentioned that: "Perceived ease of use as one of the determinants of intention has displayed a less persistent effect on intention across studies". Moreover, in [18] deliberated which "computer systems cannot improve organizational performance" whether they are not utilized efficiently. According to [19], perceived usefulness is a crucial factor in determining the use of a system. Thus, it is hypothesized that:

H1: Conducting (PU) could possess an appropriate impact on behavioral intention towards utilize e-commerce networks.

2.2 Perceived Ease of Use (PEOU)

PEOU is termed as "the user's assessment that the system requires less effort and is easy to use". According to [17], perceived ease of use refers to "the extent to which a person believes that using this system will be free of efforts". The TAM model has been broadly-researched and empirically-established across various domains. However, usefulness has been shown to predict intent, and ease of use is associated with usefulness. In their research, Ma and Liu [20], concludes that the "TAM model can be accustomed to predicting IT usage but that ease of use is not a strong predictor of intent". From previous research, perceived ease of use has been instituted to be a crucial variable affecting employer's acceptance and usage behaviors of information technologies. In [17] mentions in their research that "perceived ease of use describes the individual's perception of how easy the innovation is to learn and to use." successfully users commonly believe in the achievement of outweighed by giving a huge effort even though the technology a bit complicated to use, Thus, it is hypothesized that:

H2: Perceived ease of use would have a favourable impact on behavioral intention towards using e-commerce websites.

2.3. Perceived Trust

Trust has been well-defined as "a feeling of security and willingness to depend on something or someone" [21]. The basis of trust comes from human subjective assessments that are affected by factors like self-confidence, personal experiences, and perceptions of risk. In further work by Gambetta, together with [22] said that trust is defined as "a particular belief, which arises in games with a certain payoff structure", while the sociologist [23] sees trust as: "the confidence in the reliability of a person or system regarding a given set of outcomes or events, where that confidence expresses faith in the probity or love of another, or in the correctness of abstract principles" [24]. It is challenging to create and maintain trustworthy online services since trust is a concept that is often mentioned when designing ICT technologies [25]. Purchaser confidence is a substantial manifestation of e-commerce and comprehending its antecedents and the outcome is an elementary variable. At the same time, trust enables us to educate the nearer significance of factors influencing trust, and consumers' trust has an appropriate relation through behaviours and an unfavourable relationship with perceived risk [26]. Thus, it is expected that:

H3: Perceived trust will have a positive impact on behavioural intention towards using e-commerce websites.

2.4. Reliability

Reliability is a fundamental factor in the success of any company that aims to sell products online through provision of reliable services and information. An additional expertise and essential e-commerce corporations have begun to recognize which the crucial determinants of victory or failure are not only rooted on network appearance or low cost, but on transferring an authoritative website that provides goodness information and well- managed systems. An effective e-commerce web design should assure reliability in order to construct a long-lasting and trustworthy relationship with customers [25]. The integration of ICT infrastructure in e-commerce identifies the ability of important sectors and organizations to drive its competitiveness. The integration of technology-mediated e-commerce innovation provides the utmost efficient path to regulate, achieve, finance and transmit good-quality services such as electronic data transfer, information systems, and automation marketing, which can be used to reduce business transaction errors and to improve reliability. Therefore, it is posited that:

H4: Reliability will have a positive effect on behavioral intention towards using e-commerce websites.

2.5. Privacy

Privacy increases or decreases the perception and awareness of buyers online. It is associated with the control of personal data and the attempts to access personal and financial information by unau-

thorized persons. Privacy is a critical challenge for e-commerce consumers and should be protected to enhance consumers' perception and convince them to buy with full trustfulness.it is worth noting that, privacy and security concerns have been treated as a single construct in previous literature [27, 28], while security has been consistently used as a dimension of privacy. A study by Bharat [29] emphasized that e-commerce usage differs from one organization to another and its acceptance is solely dependent on privacy, security, and reliability factors. Furthermore, e-commerce will require a clear framework to sustain its economic advantage. This view has been supported by other studies that stresses that privacy and security concerns are important determinants of trust in e-commerce usage [30, 31]. Therefore, it is posited that:

H5: Privacy will have a positive effect on behavioral intention towards using e-commerce websites.

2.6. Online Transaction

Online transactions taking place within a given e-commerce is of major concern to both the service provider and the consumers. Customers fear the absence of their monetary particulars and e-commerce websites panic the pecuniary wastes regarding with break-ins and any results worse fame. Not merely should e-commerce sites and consumer's magistrate security vulnerabilities and estimate possibility technical solutions, however they should likewise, evaluate and settle the hazard implicated [32, 33]. If the overall security of the website and the security of payment procedure is low, then the online usage intentions of the customers will be low. Therefore, there is a direct relationship between payment security and buying intention. Therefore, it was hypothesized that:

H6: Online transactions will have a positive impact on behavioral intention towards using e-commerce websites.

2.7. Behavioral Intention

Behavioral Intention is used to measure the likelihood of the users to use or adopt to a given system. It has been reported by TAM that the actual usage of a system is represented by self-measure of time [13]. In addition, it is not practical to achieve such measurement of an individual intention to engage in the behavior. Many studies have investigated both theoretical and empirical support that engage a high correlation between intention and actual behavior of individual users [34-36]. To maintain instrument brevity, it is important to adopt behavioral intention as an individual's intention to use e-commerce services. As shown in Figure 2, reliability, privacy, online transaction, and perceived trust are directly connected to behavioral intention to use an e-commerce and indirectly related to perceived usefulness and perceived ease of use. If the consumer behavioral intention is negative, then the output will be lack-of-trust on an e-commerce and consumers will refuse to make the purchases and stop purchasing through e-commerce altogether. However, if consumer perception is positive, then the buying intention will also be positive. This in return will increase the usage of an e-commerce since the consumer will be comfortable to make purchases from the site.
Thus, based on such direct or indirect relationship, it is hypothesized that consumers will find the e-commerce usage reliable and trustworthy, and therefore this will increase their behavioral intention. Such reliability, privacy, online transaction, and perceived trust can be overcome through the TAM model that identifies the attitude and behavior of the consumers when it comes to technological acceptance.

3. Methodology

This study uses a quantitative method with a self-administered questionnaire that includes measurement items for the constructs. All the measurement items are adapted with slight modification from the literature [13, 37]. The questionnaires were initially developed in English and later on, a professional translator translated the final version into Arabic independently.

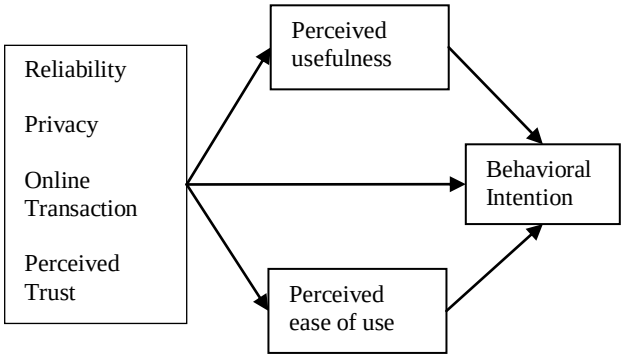

Fig. 2: Research Framework

Measurement items were measured using a five-point Likert scale, ranging from (1) as totally disagree to (5) as totally agree. Initially, a pilot study with 50 answers was conducted in order to get additional comments on the structure and content of the measurement items. After minor modifications in the survey instrument, there was a total of 600 online shoppers from Tripoli, Libya, as at January 2018. From this number, 296 responses were validated. The data collection in this study found missing data of 3% and finally, 296 questionnaires were considered as the sample for the study with the response rate being 49.33%. In this study, the response rate is considered to be suitable as it falls within the range of 21% to 50% [38, 39]. The sample distribution was compared using Kolmogorov-Smirnov (K-S) to detect nonresponse bias.

4. Results and Discussion

4.1. Demographic Profile

A sample of customers having experience of using e-commerce were invited to complete a 51-item survey that consisted of 5 points along the Likert scale index, comprising of demographic as well as descriptive questions about their views on the perception of customers as well as reliability, online transaction, and privacy issues towards their behavioral intention to use e-commerce technology provided by the Libyan SMEs.

Table 1: Demographic profile

Age	Frequency	Gender	Frequency	E-Commerce Website Rating	Frequency
21 to 30	52.40%	Male	79.70%	10% to 20%	60.10%
31 to 40	13.50%	Female	20.30%	21% to 40%	29.40%
41 to 50	9.80%			41% to 60%	5.40%
51 to 60	16.60%			61% to 80%	1.40%
Above 60	7.80%			Above 80%	3.70%

To explore participants' insights on the knowledge about e-commerce practices, this study sought to understand how familiar the participants were with various practices by responding to publication about e-commerce, media through which e-commerce is advertised, use of e-commerce for online transaction, duration of using e-commerce, rate of e-commerce website usage in Libya by percentage, e-commerce users type, type of organization using e-

commerce, and key benefits of e-commerce, as well as the main challenges to e-commerce usage in Libya. From the demographic and technological information on e-commerce usage, it can be noted that a majority of the people have not used e-commerce

4.2. Reliability and Validity Test

With measurement models (CFA), every construct was jointly considered so as to verify reliability and validity. The factor loadings for these measures were all above 0.60 indicating that standardized estimates for these measures were deemed to be statistically significant at $P < 0.001$. Reliability is estimated using composite reliability (CR) and average variance extracted (AVE), whilst for validity using construct, convergent and discriminate validity analysis. After carrying out measurements for the goodness of fit and construct in the research models, the reliability and also the discriminate and convergent validity were to be re-examined again. This approach followed the recommendation of Hair [40], which supports re-examining construct validity via converging and discriminating validities.

Table 2: Reliability and Validity test

Variables	Cronbach Alpha	CR	AVE
Reliability	0.828	0.835	0.503
Privacy	0.799	0.803	0.502
Online transaction	0.831	0.837	0.506
Perceived usefulness	0.847	0.857	0.501
Perceived ease of use	0.855	0.862	0.555
Perceived trust	0.801	0.803	0.506
Behavioral intention	0.829	0.838	0.509

Table 2 indicates that composite reliability for every construct meets the benchmark score of 0.70 [40, 41]. As reported by [42], reliability represents sets of latent construct indicators that demonstrate consistency in measurement. Reliability denotes the extent to which at least two indicators agree on a construct measurement. Composite reliability exceeded 0.70 in value, as advised by [43]. This helps to support the reliability of the construct. The construct validity of instrumental variables is measured in factor analyses. Furthermore, it was noted that the Average Variance Extracted for all the variables was more than the necessitated level of 0.50. Thus, it is ensured the standard of Average Variance Extracted were reasonable. The consequence of Average Variance Extracted as well as supplied an extra assistant for approximate validity. In addition, it was possible to extend the discriminating validity amidst the components due to the favorable specific the matter of the matrix.

4.3. Structural Model

So as to emphasize the model structural fits the model data was assessed in the shape of goodness-of-fit indices. Based on [44], an appropriate good fit to the data sampling which equips assistants for the hypothesized model. The purposes of testing the hypotheses including factors evaluate along with coefficient values were testing. From the hypothesized theoretical framework provided in Figure 1, the overall of the fitness signs an ultimate gradually and scarce values found that were pivotal towards approaching the threshold value. Furthermore, it was found out that the direct relationship between reliability, online transaction, and privacy with behavioural intention were significant at a p-value of 0.05 and z value of greater than 1.96. Thus, path analysis in terms of re-specified structural modeling was evaluated. Goodness-of-fit indices demonstrate acceptable results; with a ($\chi 2 = 703.068$, df = 543, $\chi 2$ /DF = 1.295, P = 0.000, TLI = 0.963, CFI = 0.968 and RMSEA = 0.032) as shown in Figure 3.

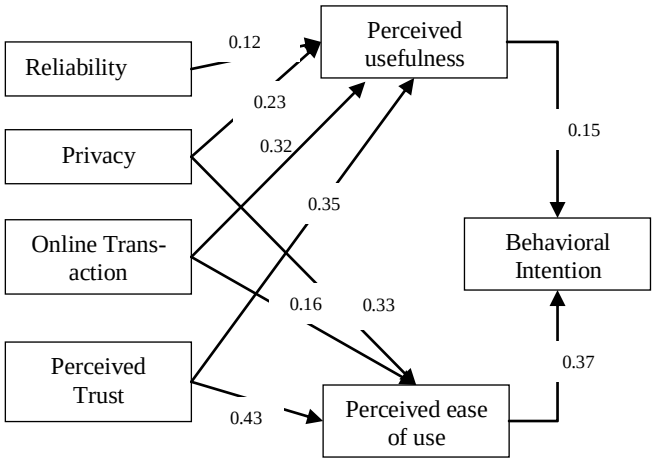

Fig. 3: Structural Model

Table 3: Regression weights for Structural Model

			Estimate	S.E.	C.R.	P
Perceived ease_use	<--	Reliability	0.129	0.061	2.126	0.0
Perceived usefulness	<--	Reliability	0.075	0.059	1.266	0.2
Perceived ease_use	<--	Online Trans-action	0.168	0.077	2.165	0.0
Perceived ease_use	<--	Privacy	0.330	0.085	3.897	**
Perceived usefulness	<--	Privacy	0.237	0.081	2.918	0.0
Perceived usefulness	<--	Online Trans-action	0.324	0.08	4.063	**
Perceived ease_use	<--	Perceived Trust	0.430	0.084	5.112	**
Perceived usefulness	<--	Perceived Trust	0.352	0.081	4.36	**
Behavioral Intention	<--	Perceived usefulness	0.15	0.064	2.347	0.0
Behavioral Intention	<--	Perceived ease-use	0.374	0.067	5.565	**

Approximate validity is existing based on high factor loadings (larger than 0.50) most of all factors [45]. Construct validity is insured based on goodness-of-fit-indices. From the standardized regression estimation showed in Table 3, it was found out that the beta coefficient of perceived trust and perceived ease of use was having a high effect on behavioral intention by 0.562 and 0.374 respectively. Similarly, the impact of trustworthy factors (reliability, online transaction, privacy and perceived trust) on technology-driven variables (perceived usefulness, perceived ease of use) was significant at a p-value of 0.05. The hypothetical relationship between reliability, online transaction, and privacy as well as behavioral intention were found to be non-significant at a p-value of 0.05. Therefore, the result is generally fit. In order to confirm the relationship, previous studies and their outcomes were highlighted. In [46] conjunction with [16, 18] found out that perceived usefulness is an important predictor of behavioral intention. On the other hand, in [47] found out that perceived usefulness does not fully support behavioral intention as a mediating effect. However, from the statistical evidence, the hypothesis representing the relationship between perceived usefulness and behavioral intention of customers was supported since the parameter estimates was significant. Given the square-multiple correlation results acquired in Figure 3, it can be surmised that the effects of perceived trust towards behavioral intention were 56%, followed by the influence of perceived ease of use with 37.4%, and finally perceived usefulness on behavioral intention 15%. Thus, from the attributes of technology-driven variables, perceived trust and perceived ease of use are very important for the increase in the behavioural intention of the customers.

5. Conclusion

This study has successfully identified the factors that influence behavioral intention of e-commerce of SMEs in Libya and determined the impact of technologically-driven factors, together with subjective norms and perceived trust that influence the behavioral intention of consumers. The results of the study showed that an e-commerce provides an opportunity for consumers to choose a quality product or service with a cheaper price and pay easily via online transaction. Hence, an e-commerce requires a trustworthy model that can fulfill different customer demands, as well as requirements especially for online transactions. According to the result presented in this paper, the proposed trustworthy model can be very useful and suitable for an e-commerce model in Libya when it comes to boosting the income and economy of the country.

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