# Analysis of models for e-commerce adoption factors in developing countries

Hassen Houache, Noor Hayani Binti Abd Rahim and Asadullah Shah
Department of Information Systems, Kulliyyah of Information and Communication Technology, International Islamic University Malaysia (IIUM), 53100 Jalan Gombak, Malaysia
houache.hassen@gmail.com
noorhayani@iium.edu.my
asadullah@iium.edu.my

***Abstract***— Small and Medium-sized Enterprises (SMEs) have a considerable role in most developing countries because they are able to develop and improve the economy. Whereas e-commerce is also a vital subject in the field of research, where they offer significant benefits for these countries. However, the adoption of e-commerce in developing countries by Small and medium sized enterprises (SMEs) is low due to several factors, including the lack of a suitable model for the adoption of e-commerce. Therefore, some of the most widely used models for the adoption of e-commerce in developing countries were highlighted, which were Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Technology Organisation Environment (TOE) Integration of TOE and TAM, Perceived eReadiness Model (PERM) established by Molla and Licker and E-commerce Success Factors (ESF). The exploratory research was conducted in this study. Finally, some recommendations were reached that may give the researchers a better understanding of the adoption of e-commerce in developing countries which they have not yet started using e-commerce.

***Keywords***— Conceptual Model, Small and Medium sized Enterprises, e-Commerce, Developing Countries.

## INTRODUCTION

In a dynamic time of globalization, SMEs represent a vital role in any economy, whether in developing or developed countries, because they provide jobs and business, reduce unemployment and are required for economic success. In particular, SMEs are the leading operators of the digital economy [1]. According to Askarzai [2] noted that SMEs are essential for economic health whether in low-income and high-income economies. SMEs are important because they drive economic growth, facilitate active competitive markets, help reduce poverty and cause social cohesion, making up more than 95% of companies in the world level. Ale Ebrahim et al., [3] have argued that economic growth and wealth of nations are related to the growth and progress of SMEs. Moreover, SMEs play an active role in many developed and developing countries as they act as a significant driver behind equalising income and bring economic stability to countries [2].

E-commerce is widely used as a means of integrating societies and countries into a global market economy. It is seen as a significant innovation that can promote good governance, social and economic development and poverty reduction in developing countries [4]. According to Uzoka et al., [5] E-commerce activities would be an essential indicator of national development and an important source of external exchange. Studies on e-commerce have traditionally concentrated on companies in developed economies. Whereas, studies focusing on developing countries mentioned that the adoption of e-commerce has not yet reached its full potential [6]. E-commerce has become a way for large enterprises in particular small and medium-sized enterprises to gain a competitive advantage in the global environment. Moreover, the e-commerce platform allows SMEs to overcome their boundaries by giving them the opportunity to expand beyond their geographical reach, secure new market opportunities and attract new customers. Although, the many benefits of e-commerce, SMEs in developing countries are far from achieving e-commerce success [6].

An examination of the literature shows that there are fewer research studies on e-commerce adoption in developing countries which applied theoretical models on the adoption of e-commerce in developing countries [7]. Besides, those existing theories used adoption of innovation that was designed in the context of developed countries. As a result, our understanding of why the adoption of e-commerce among small and medium-sized enterprises in developing countries continues to be limited. In this paper, it was argued that one contributing factor is the lack of a comprehensive theoretical framework that may explain the contextual features of SMEs in developing countries. For example, some critical contextual characteristics are known to

affect small and medium-sized enterprises in developing countries such as lack of government policy, poor infrastructure as well as cultural and social issues that are not assimilated by dominant models.

The objective of this research was to highlight some of the dominant models in the research of e-commerce adoption of small and medium enterprises as well as their critical analysis. These models are: Unified Theory of Acceptance and Use of Technology (UTAUT) established by Molla and Licker [8], Technology Acceptance Model (TAM), Technology Organisation Environment (TOE) Integration of TOE and TAM, Perceived eReadiness Model (PERM) and E-commerce Success Factors.

## RESEARCH METHODOLOGY

Due to the lack of empirical research in this area especially in developing countries that have not yet started using e-commerce. An exploratory investigation was considered the most suitable approach for this case. Exploratory research, as the name implies, aims only at exploring research questions and does not intend to provide definitive and decisive solutions to existing problems. This type of research is usually done to study an issue that has not yet been identified. If the search is done to determine the nature of the problem, the exploratory search is not intended to provide conclusive evidence, but it helps us understand the problem better. When conducting exploratory research, the researcher must be prepared to change direction as a result of the discovery of new data and new insights [9].

This study seeks to explore which model/theory are suitable for the adoption of e-commerce by SMEs in developing countries, which they have not yet started using e-commerce. Therefore, it was started by highlighting and analysing the most common model/theory of e-commerce adoption in developing countries. Secondly, these factors have been identified and studied through previous studies of different countries at different times. Finally, the results were presented, then the conclusions were drawn.

## MODELS FOR ECOMMERCE ADOPTION

### *Technology Acceptance Model (TAM)*

The Technology Acceptance Model (TAM) has underpinned many studies related to the adoption of Information Systems (IS) [10][11]. TAM was founded by Davis [12] to describe the adoption of new technology innovation in organisations by the user [13]. Evolution of the technology acceptance model to answer the question: Why do people reject or accept information technology? Davis [14]. Among the many variables discovered by examination, may affect the rejection or acceptance of information technology was: First, people believe that the application will help them do their job better and will tend to use it or not. Second, even if potential users believe that an application is useful, at the same time they may also believe that the system is very difficult and that the performance benefits of use outweigh the application usage efforts [12]. According to Davis' theorise, the acceptation of new technology by people, is according to their perception of its ease of use and their understanding of its usefulness [15]. In other words, Davis' TAM model posits that perceived usefulness (PU) and perceived ease of use (PEOU) are the two most important determinants of technology adoption [13]. Perceived usefulness was defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" while perceived ease of use was defined as "the degree to which a person believes that using a particular system would be free of mental and physical effort" [15]. However, TAM is not suitable to understand the adoption of e-commerce in SMEs on their own, because they do not take into account the contextual factors, infrastructure and social issues of small and medium enterprises [7][16][17]. Also, El-Gohary [18], and Rita Rahayu & Day [19] argues that it ignores the influence of many important factors that come from inside and outside of the organisation. The model TAM is shown in the following Fig. 1.

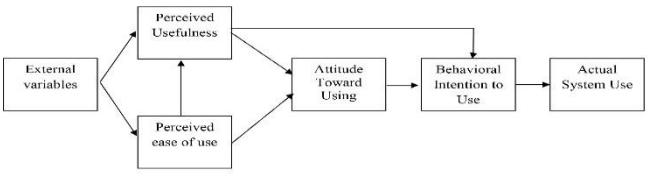


Fig 1: Technology Acceptance Model (TAM) Sources [17]

### *Unified Theory of Acceptance and Use of Technology (UTAUT)*

Unified Theory of Adoption and Use of Technology (UTAUT) is used to study the behavioural intention to use technology [20]. The UTAUT model is an extension of the Technology Acceptance Model (TAM) introduced by Venkatesh et al., [21] to combine an alternative view of users and accept innovation. This model consists of four primary determinants of intent and uses which are Effort Expectancy, Social Influence, Performance Expectancy and Facilitating Conditions, as well as four editors of critical relationships: age, sex, voluntariness and experience. The key determinants are the main factors that directly affect a user's behavioural intent to use new techniques [20]. However, it is not clear whether UTAUT alone embodies the contextual factors associated with SMEs in developing countries, that is, the complex relationship between SME owners, households, customers and employees [16][17]. The Fig. 2 shows the UTAUT Model.

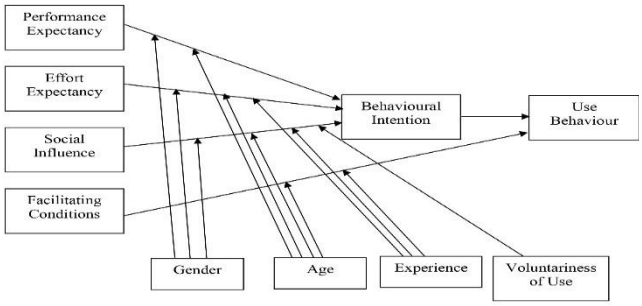


Fig 2: Conceptual model of Unified Theory of Acceptance and Use of Technology (UTAUT) Sources [17].

*Technology Organisation Environment (TOE)*

The researchers Tornatzky and Fleischer [22] develop The Technology Organisation Environment (TOE) framework to illustrates the factors that have been affecting the firm's decision to adopt an innovation. The framework identifies three factors, namely, the technological and regulatory environment and the external environment, as being influenced by technological innovation in organizations. However, one of the restrictions on TOE with regard to SMEs in developing countries is that some structures in the adoption forecasts are assumed to be more applicable to large organisations because of the abundance of resources. For this reason, TOE alone is not enough to explain the adoption of SMEs [23]. Despite many positive views about the TOE, however, there is still some critique directed at this theory. One of these factors which have been revealed the researchers M. Ghobakhloo and Tang [24] is that this model ignores factors related to individual employee and manager attributes [19]. Fig. 3 shows the TOE Model.

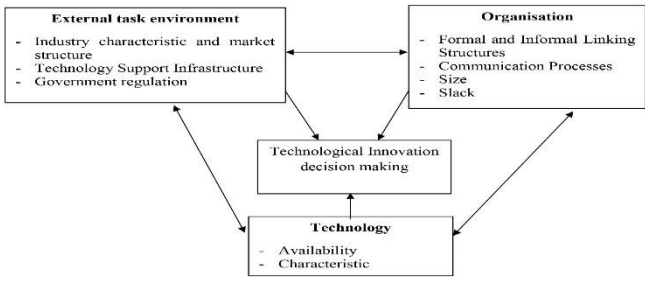


Fig 3: Conceptual model of Technology Organisation Environment (TOE) Sources [17]

*Integration of TOE and TAM*

After a review of critical literature on TOE and TAM by the researchers, Gangwar et al. [25] suggested that for providing a richer theoretical lens to understand the adoption of e-commerce by SMEs in developing countries, should integrate both TOE and TAM to give a clearer picture. Also, the same suggestion was echoed by Awa et al., [23]. Despite their suggestions, it is not clear that the integration of both TOE and TAM would be appropriate for understanding the adoption of SMEs in e-commerce in developing countries, as the two theories often ignore the contextual issues of SMEs in developing countries [26]. Fig.4 shows integrate both TOE and TAM as following.

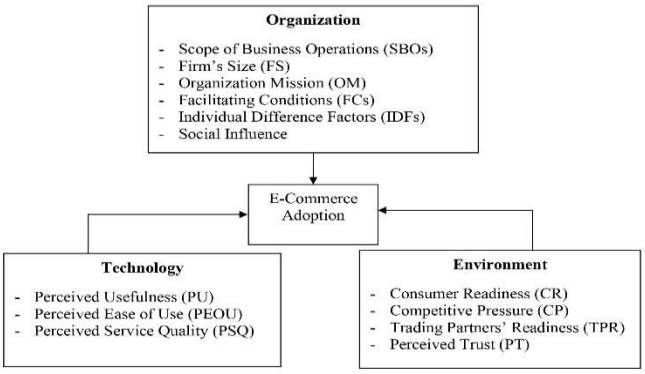


Fig 4: Integrated TAM and TOE frameworks of adoption e-commerce

Source: [23]

*Perceived eReadiness Model (PERM) (Molla and Licker 2005)*

Perceived E-Readiness Model (PERM) developed by Molla and Licker [8]. This model assumes that the multiple perspective of assessing external contextual issues and internal organisational can provide meaningful forecasts for the adoption of e-commerce in developing countries. PERM assumes that the interaction of all these perspectives creates a more dynamic framework for understanding the unique environment of organisations in developing countries [16].

PERM provides a helpful lens for studying the adoption of e-commerce SMEs due to it takes into consideration the interaction and structural characteristics that affect the adoption of e-commerce in developing countries:

Firstly, PERM takes the organization's perception, understanding, potential gains and risks of e-commerce, which are referred to in the model as imperative attributes of innovation [8]. Secondly, it includes the knowledge of e-commerce and the commitment of decision-making bodies in SMEs, which are defined by the necessary managerial features. It takes into consideration the key organizational component, such as governance, business process, and business infrastructure, which are known as organizational mandatory features [8]. Fourthly, researchers Tan et al., [27], who used the PERM model to differentiate between non-adoption and adoption of e-commerce in the context of developing countries. For this reason, one of the suggestions is that PERM can offer the researchers to identify different patterns of e-commerce adoption for SMEs in developing countries, leading to an understanding of why e-commerce adoption is

successful in some small and medium enterprises [26]. Molla and Licker's [8] Perceived eReadiness Model for identifying environmental and organisational factors that affect e-commerce adoption, given its focus on developing countries and electronic commerce. PERM has two constructs namely Perceived External eReadiness (PEER) and Perceived Organisational eReadiness (POER) [28]. The conceptual model for PERM is shown in Fig. 5.

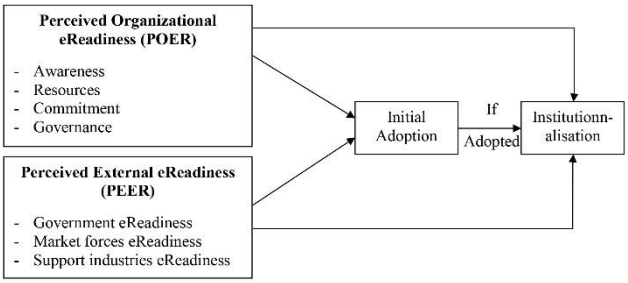


Fig 5: Conceptual Model for PERM (Molla and Licker 2005).

Although the PERM model is useful for understanding e-commerce adoption in developing countries, its main restrictions are that it excludes significant industry specifications, such as firm size and sector activity [16]. Moreover, another prospective extension of this study could be the integration of other supervisors, such as culture, socioeconomic status, etc., and qualitative research to a deeper understanding of users' needs and ideas [28] [27]. Whereas, this aspect was covered by TOE. Thus, the integration of theoretical models into the understanding of e-commerce adoption in developing countries allows small and medium enterprises to operate TOE as a comprehensive model and PERM to serve as a lens for the context of the various interactions that occur within SMEs and beyond. The rationale here is that understanding the adoption of e-commerce for SMEs in developing countries requires models flexible enough to capture changes [29] [30] [16].

*E-commerce Success Factors in SMEs*

According to Ajmal and Yasin [31], Ronald Daniel, in the 1960s, was the first to introduce the concept of Critical Success Factors (CSF). Has been used later at the Massachusetts Institute of Technology (MIT) by John F. for the purpose of building the idea of helping managers and circulating them to identify the basic information needed by senior management. The searcher Rockart in 1979 [32] also draws conclusions about its CSF concept as areas of activity that must receive constant and careful management attention. Critical success factors are also known as key success factors [33]. In the sense of factors of paramount importance and critical to success. On the other hand, success factors are important to the success of the system. Success factors in e-commerce are determined by a comprehensive literature review, which is looking at the last 25 years of research conducted in the field of success factors in e-commerce. These critical success factors are then categorised into six main sections: environmental, technology, organisation, individual, management and implementation. These success factors are identified to develop a conceptual model of integrated e-commerce factors shown in Fig. 6 [34].

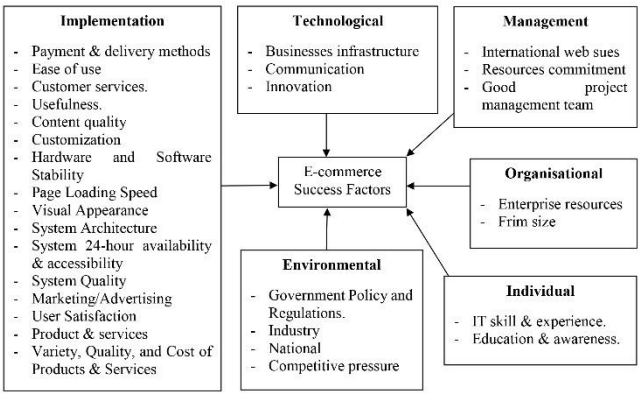


Fig. 6: E-commerce Success Factors in SMEs. Source: [34].

Although the CSF model seems to be comprehensive, the implementation factor has been highlighted and some other factors such as security, culture, social impact, etc. are ignored. Therefore, CSF does not provide on its own a lens to explain clearly the adoption of e-commerce by SMEs in developing countries.

*The necessity for a combination of theoretical frameworks.*

The DOI, TPB, TAM and UTAUT are suitable for examining the individual level of adoption, while the PERM and TOE framework are often used at a firm level. Molla and Licker's [8] Perceived eReadiness Model for identifying environmental factors and organisational affect the adoption of electronic commerce, given its focus on electronic commerce and developing countries [6]. However, PERM ignores integrating other moderators factor such as socio-economic status, culture, etc.. [28]. Through the review of prior e-commerce adoption literature in both developed and developing countries. It suggests that the prevalent theoretical models, when used on their own, do not provide a lens to explain the contextual issues of SMEs in developing countries. Moreover, it also appeared from the literature that there is no consensus which theory/model can sufficiently explain e-commerce in developing countries SMEs [7]. In other words, there is no single theory or model dominate among the more frequently applied theoretical models such as TPB, TAM, Combined TAM-TPB, TRA, UTAUT, TOE, Combined TOE-TAM and PERM are suitable for examining the adoption of e-commerce by SMEs [35] [17][6] [36][19] [28][16] However, integration of some models/theories would

offer a richer theoretical lens for understanding the adoption of e-commerce by SMEs in developing countries [17] [23] [21].

### MAPPING OF MODELS' CHARACTERISTICS

The factors for the adoption of e-commerce that collected from the models and theories, are among the most frequently applied theoretical models on the adoption of e-commerce in developing countries such as TAM, UTAUT, TOE, PERM and ESF. These factors were highlighted by a literature review of previous studies in different years and countries, the total number of studies was around 22, of which eight were conducted in Algeria since it is one of the developing countries that has not yet used e-commerce. In order to explore what are the most influential factors for SMEs in the adoption of e-commerce. Which the theory/model is more suitable to test the adoption of e-commerce? Also, to check the hypothesis that says no single theory/model can sufficiently explain the adoption of e-commerce by SMEs in developing countries. As well as can the results of the study be generalised to other countries or not? Or that each state has its results. Can all factors be studied in one study? Are there some factors that are not important and not taught in any research? All of these and other questions concerning developing countries that have not yet started using e-commerce will be answered after analysing the results of the following Table 1:

### FINDING AND DISCUSSION.

From Table 1, it can be seen there is XX symbol that means this factor is significant. As for X symbol, that means non-significant, or the authors did not mention this factor is significant or not and for the grey colour that means this study is conducted on Algeria. Besides, it can be seen that the total number of the factors are 48 which is gathered not only from the most common modes and theories such as TAM, UTAUT, TOE, PERM and ESF that applied to the adoption of e-commerce in developing countries, but also from deferent studies. In addition, it can be seen clearly that some factors are not checked by any study, such as performance expectancy, effort expectancy, Facilitating Conditions (FCs) and Perceived Service Quality (PSQ). This may be depending on the purpose of the research, or these factors are inappropriate for its study. Moreover, other factors are checked only by one or two authors such as content quality (detailed product specification), Organization Mission (OM) and the Scope of Business Operations (SBOs). In addition, there are some factors that are critical for some studies and not for others; that means some factors are essential for the adoption of e-commerce for some countries and not important for others countries, such as bank readiness, Perceived Usefulness (PU) and market forces eReadiness; whereas some factors are significant for the majority of studies such as government eReadiness, technology resources and payment methods. Also, no study testes all these factors; on the other word, each author takes only some factors on consideration. Moreover, noting that Algerian studies focused on the culture and social factor, unlike other studies which did not take it into consideration. Therefore, it can be concluded that:

1. Every study focuses on some factors only and ignores some others; it depends on the research problem.
2. One study cannot collect all the factors at once; this is due to a large number of factors which cannot be tested in one research at the same time.
3. The results of any study of any country cannot be applied to another country, that means the result cannot be generalised for all countries because each country has its own characteristics and the level of using ecommerce.
4. There are some factors related to the use of e-commerce that can only be verified after the implementation of e-commerce such as governance, Perceived Usefulness (PU), Perceived Ease Of Use (PEOU), content quality (detailed product specification) and implementation (page loading speed, visual appearance, system architecture, system 24-hour availability & accessibility, system quality ...). That means they cannot be tested in a developing country which they have not started using e-commerce.
5. The more frequently theoretical models such as TAM, UTAUT, TOE, PERM and ESF are applied to the adoption of e-commerce in developing countries, which they have been using e-commerce. However, for developing countries which they have not yet started using e-commerce, they will use other new appropriate models.
6. The Algerian studies take into consideration the social and cultural factor more than other studies. As well as the majority of them did not apply the more frequently theoretical models used to the adoption of e-commerce in developing countries. Perhaps because Algeria is one of the countries that have not to start using e-commerce in everyday life, and because these models may not be suitable for examining factors that influencing for the adoption of e-commerce.
7. The expected model for developing country, which they have not started using e-commerce, such as Algeria; may differ for other models by the integration of some models/theories and adding the culture and the social factor as well as the government policy. This would be a particular model flexible enough to capture changes and would offer a richer theoretical lens for understanding the adoption of e-commerce by SMEs.

### CONCLUSION

In summary, the most common models and theories such as TAM, UTAUT, TOE, PERM and ESF that are applied

to adopt e-commerce are not suitable for developing countries since they have not started using e-commerce due to models ignore some factors as well as some other factors cannot be applied and are not appropriate such as governance, perceived usefulness and perceived ease of use. Therefore, it is suggested to develop a special model for developing countries which they have not started using e-commerce. Besides, the moderating and mediating variables also can be included in future research for better understanding.

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TABLE 1: TESTING THE FACTORS THROUGH DIFFERENT STUDIES.

| | | Studies (author) | Karima K. (2018) | Youcef K. (2018) | Chebira F. F. (2018) | Ahmed & Apparatus | Ekanem & Abiade (2018) | Msitfa H., (2017) | Ben Sassi, (2017) | Hoque & Boateng (2017) | Fatima, A. (2017) | Ramdansyah & Taufik | Kabanda & Brown (2015) | Yeng et al. (2015) | Sara B. (2015) | Chaabna & Wang (2015) | Rahayu & Day (2015) | Chaabna et al. (2014) | Makame et al. (2014) | Rabie (2013) | Ghobakhloo et al. (2011) | Molla & Licker (2005) | Wymer et al. (2005) | Grandon & Pearson, |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Factor / Model | / | / | / | Qua /Qan | Qualitative | / | / | PERM | ESF | SM | PERM | TOE | | Porter's diamond | TOE | / | TAM | DOI RBV TOE TAM | TOE | PERM | / | SM |
| External | Environmental | Government eReadiness (rules and regulations) | | X | X | | | X | S | S | S | | X | X | X | S | | S | S | S | | X | X | X |
| External | Environmental | Government support | | | X | S | | X | X | | S | X | | | | | | | S | S | | | | X |
| External | Environmental | Market forces eReadiness | | | | | | | | S | X | | X | | | | | | | | X | X | X | |
| External | Environmental | Consumer Readiness (CR) | | | | X | | | | | | | | | | | X | | | | X | | | |
| External | Environmental | Competitive Pressure (CP) | | | | X | | | | | X | X | | X | | | X | | | | X | | X | X |
| External | Environmental | Trading Partners' Readiness (TPR) | | | | | | | | | X | | | | | | | | | | | | X | |
| External | Environmental | Support industries eReadiness | | | | | | | | X | | X | X | X | | X | X | | | S | | X | | X |
| External | Environmental | Bank readiness | X | | X | | | | S | | | | | | X | S | | S | | S | | | | |
| External | Environmental | Tax evasion | | | | | | | | | | | | | | | | | | | | | | |
| External | Environmental | State Policy | | | | | | | | | | | | | | | | S | | | | | | |
| External | Environmental | Excessive corruption | | | | | S | | | | | | | | | | | | | | | | | |
| Internal | Organisational | The scope of business operations (SBOs) | | | | | | | | | | | | | | | | | | | | | | |
| Internal | Organisational | Size of organisation | | | | X | | | | | X | X | | S | | | X | | | X | X | | | |
| Internal | Organisational | Business Resource | | | | | | | | | | | X | | | | | | | | | X | | |
| Internal | Organisational | Enterprise financial resources | X | | X | X | | X | | | S | | | | X | X | | | X | X | X | | | X |
| Internal | Organisational | Organization mission (OM) / resistance | | | | X | | | | | | | | | | | | | | | | | | |
| Internal | Organisational | Performance expectancy | | | | | | | | | | | | | | | | | | | | | | |
| Internal | Organisational | Effort expectancy | | | | | | | | | | | | | | | | | | | | | | |
| Internal | Organisational | Communication Processes | | | | | | | | | | X | | | | | | | | X | | | | X |
| Internal | Technology | Technology Resources (Infrastructure) | X | X | X | S | S | X | | S | S | X | X | | X | X | S | S | S | S | X | X | X | X |
| Internal | Technology | Perceived Usefulness (PU) | | | | X | | | | | | X | | S | | | S | | X | S | X | | X | X |
| Internal | Technology | Compatibility with cultural/ values/ habits /business | | | | X | | | | | | X | | S | | | X | | | X | X | | | X |
| Internal | Technology | Perceived Ease of Use (PEOU) | | | | X | | | | | X | | | | | X | | | X | | | | | X |
| Internal | Technology | Perceived Service Quality (PSQ) | | | | | | | | | | | | | | | | | | | | | | |
| Internal | Management | Human resources | | | X | | | X | | S | | | X | | | | | | | | X | X | X | |
| Internal | Management | Commitment | | | | | | | | X | X | | X | | | | | | | | | X | | |
| Internal | Management | Governance (management support, Level of management understanding) | | | | X | | | | X | S | X | X | | | | | | | S | | X | | X |
| Internal | Management | Facilitating Conditions (FCs) | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Individual | Education | | | | | | X | | | S | | | X | | | | | | X | | | | |
| | Awareness | X | X | X | X | | X | | S | S | | X | | X | S | | | | S | | X | | |
| | IT Skills and Expertise (owner, employment) | X | | X | S | S | X | | | X | | X | S | X | X | S | | X | S | X | | X | X |
| | Gender, Age, Experience, Type of SME | | | | X | | | | X | X | X | | X | | | X | | X | X | X | X | X | X |
| Implementation | Payment methods. | X | X | X | S | | | S | | S | | | X | X | S | | S | | | | | | |
| | Delivery systems | | | | | | X | S | | S | | X | X | | S | | S | | | | | | X |
| | Customer services (service quality) | | | | | | | | | S | | | | | | | | | | | | | X |
| | Content quality (detailed product specification) | | | | | | | | | S | | | | | | | | | | | | | |
| | Hardware and software stability and system quality (Stability platform) | | | | | | | | | X | | | | | | | | | | | | | |
| | Cost of platform & maintenance | | | X | | S | X | | | X | | | | X | | X | S | | S | X | | X | X |
| Trust & Security | Trust in the state system | | | | | | | | | | | | | | | | | | | | | | |
| | Security (Protection of the site, all transaction, the reliability of credit card, electronic means) | X | X | X | S | S | | | | X | | | S | X | S | | | X | S | | | X | |
| | Privacy policy for all information | | | | | | | | | X | | | | | | | | X | | | | | |
| | Loyalty and customer satisfaction and confidence. | | | | | S | | | | X | | | | | | | | | | | | | |
| Socio-cultural | Technical culture and electronic awareness | | X | X | | | X | | | | | | | X | | | | | | | | | |
| | Illiteracy and language barrier | | X | X | | | X | | | | | X | | X | | | | | | | | | |
| | Guidance and assistance needed to transform into e-commerce | | | X | | | X | | | | | | | | | | | | | | | | |
| | Community culture | | | X | | | | | | | | X | | X | | | X | | | | | | X |
| | Buying habits. | | | X | | | | | | | | X | | X | | | | | | | | | |
| | Fear of risk in e-commerce | | X | X | | | | | | | | | | X | | | | | | | | | |

S Significant factors

X Testing factor / Non-significant

SM Special Model

DOI Theory of the Diffusion of Innovation

RBV Resource-Based View of the firm

(Grey colour) the study was conducted in Algeria.