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## RESEARCH ARTICLE

### EMPIRICAL ADOPTION PATTERNS OF E-COMMERCE IN DEVELOPING COUNTRIES: CASE STUDY IN PALESTINE

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#### ABSTRACT

More and more people from around the world have become accustomed to buying and selling across the Internet. E-Commerce has become an important interaction channel with customers and partners. Today's enterprises cannot afford being left behind. This is very true from a competitive perspective. This study investigates e-commerce adoption patterns in Palestine. There are commonalities across countries of the Middle East and North Africa (MENA) region. The similarities span across culture, language, economic situation...etc. Therefore, outcomes of this study may be extrapolated to the MENA region to some extent. The study explores the relevant criteria local enterprises consider when deciding to adopt e-commerce. In particular, we assess the relevancy of (18) different parameters from the perspective of decision makers. The study involved a relatively large sample of (3006) enterprises from the West Bank and Gaza Strip. Optimal Data Analysis (ODA) was used for analysis. ODA identifies non-parametric model that maximizes weighted classification accuracy for the tested variables. Bivariate discrimination of enterprises which "do" versus "don't" practice e-commerce was evaluated for each parameter. The results revealed that both technological and organizational attributes are more influential than external or environmental ones. The availability of technology, ICT competencies, enterprise size, and the availability of financial resources are found to have effective impact in pushing towards adopting e-commerce. Environmental attributes like culture, cost, nature of product, etc. have failed to have significant persuading power on adopting e-commerce

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#### INTRODUCTION

This research investigates the factors that influence e-commerce adoption by Palestinian enterprises. The research comes at a time when both business and research communities are paying growing attention to this region. E-Commerce activities are booming into unprecedented rate (Wasimi 2015). E-marketer reported that even though the MENA region is still among the least developed in e-commerce, it is catching up very quickly. Annual growth rate of e-commerce was estimated to be (31%), the highest on a global scale (ibid). In 2010, e-commerce business volume is estimated at (8.48) billion USD, and this figure is expected to rise up to (45.5) billion USD in 2016 (Wamada Research lab 2013). To our knowledge, there is no data available on the volume of e-commerce in Palestine. In 2012, however, the Palestinian Central Bureau of Statistics, (PCBS) reported that only (7.0%) of enterprises performed at least one e-commerce transaction. Furthermore, only (0.2%) of Palestinians used Internet for business transactions (PCBS 2012). In 2013, VISA reported that credible information about e-commerce market in the MENA region was lacking.

This has prevented businesses and governments from effectively evaluating the potential for e-commerce growth and development. This study is the first of its kind in Palestine which investigates the factors influencing adoption patterns of e-commerce by enterprises. We researched similar studies carried out in different regions of the world that identified criteria relevant to e-commerce adoption. We found diverse outcomes from these studies. We needed to contrast these criteria collectively against the Palestinian case. The aim was to establish a local model of e-commerce adoption. A model that immerses only from the most relevant parameters. A classification method, called Optimal Data Analysis (ODA) is used to analyze collected data and to classify the (18) different parameters the study covered. Naturally, the study surveyed decision makers through direct interviews. The study assessed the level of awareness of these decision makers of the strategic values of e-commerce. In addition, the interviews solicited the significant external barriers that affect e-commerce adoption by enterprises. Due to the relative lack of rigorous research focusing on the use of e-commerce in the MENA region, the present study is designed to provide an empirical basis for understanding the drivers and impediments for adopting e-commerce using the Palestinian case as an exemplar. The MENA region, after all, has some important commonality such as culture, language, business structure...etc. The objective,

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therefore, is to contribute to the understanding of e-commerce adoption in Palestine and in the MENA region to some extent. The study analyses nationwide statistical records gathered from thousands of enterprises of various sizes, and diverse businesses activities.

### Literature Review

A number of researchers investigated factors influencing the acceptance of ICT by enterprises. Poon (1999) classified three drivers for ICT adoption by small to medium enterprises (SMEs): perceived benefits, organizational readiness, and external pressure. Previous research emphasized the perception of decision makers in SMEs towards the use of the Internet in their enterprises. Potential benefits of the Internet were found to play a major role ((Kenny, 2000); (Chong 2001); (Mehrtens, Cragg and Mills 2001); (EBPG 2002); (Levy and Powell 2002); (Stansfield 2003); Kendall, 2001). Senior management do not necessarily feel that the Internet provides meaningful benefits to their businesses. Some enterprises in developing countries are adopting ICT not as a result of true need, but rather as victims of competitive pressure and media hype (Taylor 2004). Most SMEs are reluctant to support ICT- especially the most sophisticated technologies- because they lack visible indications of attainable benefits (Wolcott 2008). Similarly, Schlenker (2003) mentioned that some decision makers in SMEs are incapable, unable and unwilling to invest in ICT, because of the limited number of success stories of adoption and implementation. Research also investigated the influence of the availability of financial resources on Internet penetration. Mehrtens, Cragg, & Mills (2001) reported that financial status plays a minor role in the decision to endorse the Internet. Bharati & Chaudhary (2006) mentioned that decision makers are not easily convinced to adopt uncertain and risky solutions. Therefore, decision makers' ability to recognize and understand the benefits and relevance of these technologies was classified as a major driver of Internet acquisition.

On the other hand, Lau (2004) found that e-commerce adopters are highly motivated, have high degree of entrepreneurship, and are risk takers. Jeffcoate (2002) identified top management support, process improvement, effective integration, and enterprise culture as critical success factors for successful ICT implementation among businesses. Beckinsale (2004) identified three drivers for enterprises to adopt e-commerce: customers, suppliers, and employees. Simpson (2004) identified perceived benefits as the most influential factor, but that this perception should be accompanied by external pressure of customers and suppliers, and by organizational readiness. (Sadowski, Maitland, & van Dongen (2002) and Bengtsson (2007) agreed that business organization size, level of exporting activities, awareness of benefits, and pressure from customers and trading partners, are among the most important elements supporting the adoption of technologies by businesses. Levy & Powell (2002) defined ICT adoption in terms of four phases: book keeping, customer care service, networking and relationship built up along the value chain, and innovation. In the last phase, ICT becomes interwoven as an integral part of the business strategy. They indicated the use of the Internet in phase three involves the use of e-mail and other World Wide Web (WWW) services to establish linkages with their value chain members. Marshall (2000) considered that WWW surfing and carrying out basic market research as the lowest level of Internet adoption by

businesses. Marshall (2000) noted that SMEs are not making the necessary internal changes to fully exploit the potential benefits of the Internet. Costello (1998) suggested that firms first publish information on the WWW, then they interact with their customers, and finally business processes are transacted electronically. Potential advantages of the Internet for businesses are still indistinguishable for enterprises in developing countries (Currie 2000). It is hypothesized that the primary benefit arises when the full supply chain is incorporated. These benefits emerge throughout the stages of business development. This is particularly true when decision makers are aware of these benefits (ibid). According to Kendall (2006), utilization of Internet services is necessary for the full development of business processes. Transformation capability emerges when businesses identify the need to re-engineer processes to become Internet-centered, (Levy and Powell 2002). Many researchers describe e-commerce in developing countries as being weak, primitive, and at its earliest stages (e.g. (Blili 1993) and (Oyelaran-Oyeyinka 2006)). Poon (1999) listed factors prohibiting e-commerce from flourishing in developing countries. Among these are organizational, technical, and environmental factors. Kshetri (2007) found the lack of: compatible ICT infrastructure, electronic payment facilities, and distribution logistic services to be important barriers. Additionally, Kshetri (2008) and Kshetri (2010) emphasized the impact of cognitive factors in hampering e-commerce adoption in developing countries. Among these factors are knowledge, skills, confidence, and awareness. Molla (2005) attributed weakness of e-commerce in developing countries to the lack of awareness of the potential benefits of e-commerce, lack of trust, and absence of governmental regulations. Elahi & Hassanzadeh (2009) identified the lack of technological advancement (e.g. Internet security and privacy, speed of Internet connection, and interoperability) as being trammels to advancement of e-commerce in developing countries. Kwon (1987) emphasized the importance of organizational context as a determining factor of e-commerce adoption. Furthermore, top management support, enterprise size, user involvement, and product champion were identified as important factors (ibid). Damanpour (1991) discussed organizational context, especially organizational innovation, as a primary contributing factor in e-commerce adoption. More recent studies emphasized the aggressiveness of the market in general, and the enterprise strategy in particular (Bahaddad 2012). Bahaddad (2012) believe that the development of new markets and/or products, and the introduction of new technology serve to promote the use of e-commerce in developing countries. Employee and management information technology skills, and their learning mode and capabilities are also considered factors that determine the adoption of e-commerce technologies by businesses (Oyelaran-Oyeyinka 2006). Some research investigated the nature of goods and products on e-commerce activities, (2009) found that the critical factors affecting e-commerce include the degree of product digitability and the nature of business. Premkumar (1999) suggested that linkage to suppliers and the reliance on online reservation systems impact e-commerce adoption. Several other studies examined the impact of culture on the acceptance of new and evolving technological solutions. Grandón (2011) found that culture has a central role to play in understanding the difference in adoption patterns of e-commerce between developed and developing countries. Al-Qirim (2007) studied adoption patterns in Jordan and found that culture is an important factor

in the adoption process. We focused our research on two theoretical adoption models: The Diffusion of Innovation (DOI), proposed by Roger (1995), and the Technology, Organization and Environmental (TOE) framework developed by Tornatzky & Fleischer (1990). The study comprised (18) parameters that either of the two models covers. The DOI emphasizes the characteristics of the innovation per se, while the TOE focuses on the context which incubates the organization adopting the innovation. DOI started back in 1962 by Roger, focusing on adoption of innovation on individual level (Rogers 1962). Later on, he expanded his model to cover adoption by organizations (Rogers 1995). Decision making mechanisms in organizations is more complex than it is at individual level (Rogers, Diffusion of Innovations 1995). Roger attributed organizational usage of innovation to the following characteristics: relative advantage, innovation compatibility, innovation complexity, innovation observability, and innovation trialability. All of the above characteristics concern innovation itself. Tornatzky & Klein in (1982) added other features to DOI model, such as cost, profitability, and culture. Tornatzky & Klein in (1982) concluded that the tested features by researchers that are most common are; relative advantage, compatibility, cost, security, and culture. Many researchers successfully used DOI model to analyze Information systems adoption by organizations (e.g. (Zhu, Kraemer and Xu 2003), (Zhu and Kraemer 2005), (Liu 2008), (Teo, Ranganathan and Dhaliwal 2006)). As mentioned earlier, we sought to build an adoption model specific to the Palestinian case. In the process, we studied similar models of which some were generic while others were region-specific. TOE has been used to evaluate the adoption of a wide spectrum of ICT-based systems, including Internet access (Oliveira and Martins 2011), Enterprise Resource Planning (ERP) (Pan and Jang 2008), e-commerce systems, (Zhu, Kraemer and Xu 2003), (Zhu and Kraemer 2005), (Liu 2008), (Teo, Ranganathan and Dhaliwal 2006), (Oliveira and Martins 2010), Electronic Data Interchange, (Kuan and Chau 2001), web site development and utilization (Oliveira and Martins 2008), and Knowledge Management Systems (Lee, et al. 2009).

TOE considers three dimensions: technological context, organizational context, and environmental context. Technological context comprises availability characteristics. Organizational context, on the other hand, includes formal and informal linking structures, communication processes, size and slack. Finally, environmental context consists of industry characteristics, market structure, technology support infrastructure and government regulations. As mentioned above, we based our research on theoretical TOE and DOI factors. The aim was to assess applicability to the Palestinian case. Further details will follow in the next section. We measured which of the factors were being considered, in real-life, when it comes to making decisions regarding investment in e-commerce. The result is a model which depicts the Palestinian decision makers' point of view.

## RESEARCH METHODOLOGY

To have reliable results that reflect the true situation on the ground, the study is done in collaboration with the PCBS. PCBS took responsibility of all steps needed to prepare data, such as sample selection, data collection, data entry and verifications. More than (3000) enterprises were included in

the study which covers all active economic sectors. The target population consisted of all operating private enterprises in the Palestinian Territories. The sample was a regular stratified random sample of one stage. The enterprises were divided into three categories; geographical, consisting of two regions: West Bank and Gaza Strip; economic activity, as defined by the International Industrial Classification for Economic Activities; and enterprise size, defined by the number of employees. Weights were calculated per sampling unit and reflected in the sampling procedures. Adjusted weights are significant to reduce bias resulting from non-responses. The sample size was (3006) of which (2281) enterprises located in the West Bank and (725) located in the Gaza Strip. The response rate was (84.9%).

The questionnaire was developed following a review of international recommendations and experiences of several countries in the field. It was further amended by recommendations of local stakeholders who serve as a consulting body for the PCBS. The questionnaire was administered by a team of trained interviewers dispatched to the field to interview decision makers through face-to-face meetings. Interviewing decision makers is considered to be one of the best methods to investigate ICT adoption patterns (Mehrtens, Cragg and Mills 2001), (Levy and Powell 2002). Interviewers were trained to adapt to the situation, and to stay within the bounds of the designated survey. Additionally, a training manual for supervisors and editors was prepared in order to ensure team qualification and homogeneity. A field work plan was prepared involving questionnaires, maps, sample lists, and teams. A team of editors ensured that each questionnaire was thoroughly completed. They also made sure that interviewees were all eligible. The editors evaluated the accuracy of the completed forms. The team was also granted authority for returning incomplete questionnaires, as-well-as those with errors, to the field for completion. The same team was also responsible for data coding and data entry. Data quality was evaluated and ensured by the team. Re-interviewing focused on specific objectives on a number of levels. They insured that all field workers carried out their visits, documented any problems in the field, in data collection, and in data coding.

Statistical analysis was conducted using maximum accuracy ("optimal") methodology. This methodology identifies a non-linear, non-parametric model. It explicitly maximizes (weighted) classification accuracy for the sample. It also provides exact (distribution-free) Type I error estimates (Yarnold and Soltysik, Optimal data analysis: Guidebook with software for Windows 2005), (Yarnold and Soltysik 2010) (Yarnold and Soltysik 1991) and (Yarnold 2013). Bivariate discrimination of enterprises which do (n=219) versus don't (n=2760) participate in e-commerce was separately evaluated for each measured attribute using univariate optimal discriminant analysis (UniODA). Multivariate discrimination was conducted using enumerated Classification Tree Analysis ((Yarnold and Soltysik 2005), (Yarnold 1996), (Soltysik and Yarnold 2010)). The impact of all variables included in the study on the e-commerce activities is evaluated through the calculations of two parameters; Effect Strength Sensitivity – ESS, and Effect Strength Predicted Value – ESP. ESS reassembles the probability that an observation actually from class category "C", will be classified in "C". ESP reassembles that the probability that an observation classified into "C"

actually is a member of "C". Zero ESS represents the classification accuracy expected by chance for the analysis, and (100) represents perfect, errorless classification, (Yarnold and Soltysik 2005). This statistic indicates the ability of the model to accurately identify the actual class status of the observations in the sample. By convention, models achieving  $ESS < 25\%$  represent relatively weak effects;  $ESS < 50\%$  represent moderate effects;  $ESS < 75\%$  represent *relatively* strong effects; and  $ESS > 75\%$  represent strong effects, (ibid). Prognostic utility of the model in making accurate classifications of observations into class categories is assessed using the effect strength for predictive value (ESP) statistic. It is normed for chance and has relative strength evaluated in the same manner as is the ESS statistic, (ibid), and (Yarnold 2013). No multivariable statistical model for discriminating enterprises which do versus don't participate in e-commerce was possible. This is due to the strong effect of many of the variables in combination with multi-collinearity existing between the variables having a strong effect and weaker variables ((Grimm and Yarnold 2000), (Soltysik and Yarnold 2010)).

internet was nearly as strong: if no employees used the internet then it was predicted that there was no e-commerce (always true), and if the enterprise did have employees capable of using the Internet then it was predicted that there was e-commerce (true for 22.0% of the enterprises with at least one employee using the internet). A weaker model emerged for computer ownership: if the enterprise did not own computers then it was predicted that there was no e-commerce (always true), and if the enterprise did own computers then it was predicted that there was e-commerce (true for 17.4% of the enterprises with an Internet connection). The weakest of the four relatively strong models emerged for expenditure on ICT: if the enterprise did not have expenditure on ICT then it was predicted that there was no e-commerce (true for 97.4% of the enterprises without expenditures on ICT). If the enterprise did have expenditure on ICT then it was predicted that there was e-commerce (true for 22.3% of the enterprises with expenditures on ICT). All five of the remaining statistically significant UniODA models achieved moderate effects ( $25\% \leq ESS < 50\%$ ).

**Table 1. Descriptive summary of ordered attributes**

Ordered Attribute	Using E-commerce (N=219)			Not using E-commerce (N=2,360)		
	Mean	Median	SD	Mean	Median	SD
Number of employees using the Internet	13.60	4.00	36.70	2.00	0.00	7.40
Expenditure on ICT (\$US)	82,753	10,400	366,557	7,026	1,150	44,773
Number of employees using a computer	21.70	7.00	44.40	5.20	2.00	19.20
Enterprise size	39.00	19.00	59.00	10.80	4.00	28.50
Number of ICT specialists	3.21	1.00	16.56	0.41	0.00	2.93

**Table 2. Descriptive summary of binary attributes**

Binary Attributes	Using e-Commerce		Not using e-Commerce	
	YES (%)	No (%)	YES (%)	No (%)
Internet connection	100.0%	0.0%	32.0%	68.0%
Computer ownership	100.0%	0.0%	44.0%	56.0%
Website ownership	56.0%	44.0%	11.0%	89.0%
Use of electronic payment	43.0%	57.0%	4.0%	96.0%
Is culture/tradition a barrier for e-commerce?	23.0%	77.0%	28.0%	72.0%
Is lack of experience a barrier for e-commerce?	11.0%	89.0%	9.0%	91.0%
Is cost a barrier for e-commerce?	6.0%	94.0%	5.0%	95.0%
Is nature of products a barrier for e-commerce?	22.0%	78.0%	23.0%	77.0%
Does enterprise use Internet to provide customer service?	8.0%	92.0%	8.0%	92.0%
Does enterprise use Internet to purchase products?	11.0%	89.0%	12.0%	88.0%
Is firm acting as customer over the Internet?	13.0%	87.0%	16.0%	84.0%
Is privacy a barrier for e-commerce?	8.0%	92.0%	9.0%	91.0%
Is firm acting as supplier over the Internet?	4.0%	96.0%	4.0%	96.0%

## RESULTS

Tables 1 and 2 present descriptive statistics on study attributes for enterprises which do versus don't participate in e-commerce. They are included for completeness. Table 3 presents the findings of UniODA used to discriminate which do versus don't participate in e-commerce. As Table 3 shows, statistically significant effects emerged for nine of the study attributes. When considering the ability of the model to accurately classify the actual participation status of the enterprises in the sample, four UniODA models achieved relatively strong effects ( $ESS > 50\%$ ). The strongest model emerged for Internet Connection: if the enterprise did not have an Internet connection then it was predicted that there was no e-commerce (always true), and if the enterprise did have an Internet connection then it was predicted that there was e-commerce (true for (22.2%) of the enterprises with an Internet connection). The model for number of employees using the

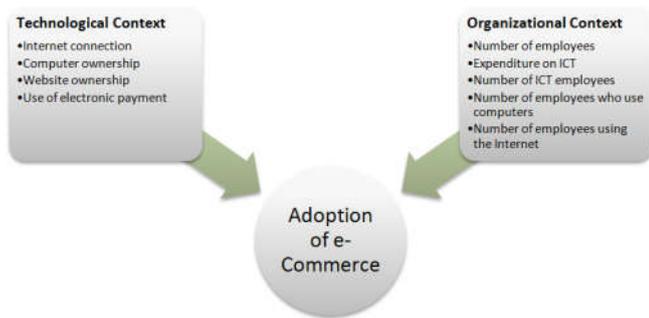
The strongest among these five models emerged for employee's skills in using computers, with ESS of (49.1%). When the enterprise does not have any employees competent with computer skills it was predicted that there was no e-commerce activity (true for 97.8% of enterprises with no employees competent in using computers), and if the enterprise has employees with some level of computer skills it was predicted that there was e-commerce (true for 18.1% of the enterprises with some employees competent in using computers). Enterprise ownership of a website had the next greatest ESS value of (44.1%). When the enterprise does not have a website it was predicted that there was no e-commerce activity (true for 95.5% of enterprises without website). Enterprises with a website were predicted to have e-commerce activities (true for 31.5% of the enterprises that own a website). Enterprise size was the next strongest with ESS of (43.2%).

Table 3. Summary of bivariate UniODA findings

Attribute	UniODAModel	No. of Enterprises	% Using e-Commerce	True for (%)	p	ESS (%)	ESP (%)
Internet connection	IF No, THEN No E-commerce	1593	0.0%	100%	<0.0001	67.5	22.2
	IF Yes, THEN E-commerce Used	985	22.2%				
Number of employees using internet	IF None, THEN No E-commerce	1581	0.0%	100%	<0.0001	67.0	22.0
	IF > 0, THEN E-commerce Used	997	22.0%				
Computer ownership	IF No, THEN No E-commerce	1320	0.0%	100%	<0.0001	56.0	17.4
	IF Yes, THEN E-commerce Used	1258	17.4%				
Expenditure on ICT (\$US)	IF ≤ 3,415, THEN No E-commerce	1807	2.6%	97.4%	<0.0001	53.2	19.7
	IF > 3,415, THEN E-commerce Used	771	22.3%				
Number of employees who use the computer	IF ≤ 2, THEN No E-commerce	1558	2.2%	97.8%	<0.0001	49.1	16.0
	IF > 2, THEN E-commerce Used	1020	18.1%				
Website ownership	IF No, THEN No E-commerce	2194	4.5%	95.5%	<0.0001	44.1	27.0
	IF Yes, THEN E-commerce Used	384	31.5%				
Enterprise size (number of employees)	IF ≤ 9, THEN No E-commerce	1761	3.6%	96.4%	<0.0001	43.2	15.5
	IF > 9, THEN E-commerce Used	817	19.1%				
Use of electronic payment	IF No, THEN No E-commerce	2384	5.2%	94.8%	<0.0001	38.7	43.2
	IF Yes, THEN E-commerce Used	194	48.5%				
Number of ICT specialists	IF 0, THEN No E-commerce	2125	5.0%	95%	<0.0001	37.2	20.0
	IF > 0, THEN E-commerce Used	453	25.0%				
Is culture and tradition a barrier for e-commerce?	IF Yes, THEN No E-commerce	694	7.3%	92.7%	<0.12	8.4	3.1
Is lack of experience a barrier for e-commerce?	IF No, THEN No E-commerce	718	7.7%	92.3%	<0.28	5.6	2.3
	IF Yes, THEN E-commerce Used	242	9.9%				
Is cost a barrier for e-commerce?	IF No, THEN No E-commerce	831	7.9%	92.1%	<0.48	3.3	2.1
	IF Yes, THEN E-commerce Used	129	10.1%				
Is nature of products a barrier for e-commerce?	IF Yes, THEN No E-commerce	599	7.8%	92.2%	<0.62	3.2	1.0
	IF No, THEN E-commerce Used	361	8.7%				
Does enterprise use internet to provide customer service?	IF Yes, THEN No E-commerce	397	7.3%	92.7%	<0.38	2.4	1.4
	IF No, THEN E-commerce Used	2181	8.7%				
Does enterprise use internet to purchase products?	IF Yes, THEN No E-commerce	315	7.3%	92.7%	<0.45	1.9	1.4
	IF No, THEN E-commerce Used	2263	8.7%				
Is firm acting as customer over the internet?	IF No, THEN No E-commerce	2382	8.4%	91.6%	<0.80	0.7	0.8
	IF Yes, THEN E-commerce Used	196	9.2%				
Is privacy a barrier for e-commerce?	IF Yes, THEN No E-commerce	221	8.1%	91.9%	<0.99	0.2	0.1
	IF No, THEN E-commerce Used	740	8.2%				
Is firm acting as supplier over the internet?	IF Yes, THEN No E-commerce	96	8.3%	91.7%	<0.99	0.1	0.2
	IF No, THEN E-commerce Used	2482	8.5%				

When the enterprise has fewer than (9) employees it was predicted that there was no e-commerce activity (true for 3.6% of enterprises with fewer than nine employees). Enterprises with nine or more employees it was predicted that there was e-commerce activity (true for 19.1% of enterprises with nine or more employees). It turned out from the study that owning an electronic payment system does encourage e-commerce for enterprises. An ESS value of (38.7%) means that electronic payment is classified as moderate parameters. When the enterprise does not have an electronic payment system, then there was no e-commerce activity (true for 94.8%). Conversely, when the enterprise did have an electronic payment system it was predicted that there was e-commerce activity (true for 48.5%) -the highest among all parameters.

To a lesser degree, the employment of ICT specialists by the enterprise did impact the enterprise decision to use e-commerce, with an ESS value of (37.2%). When the enterprise did not have any ICT specialists, then it was predicted that there were no e-commerce activities (true for 95%). When the enterprise did employ ICT specialists, the chance was significantly enhanced (true for 25% for enterprises with one or more ICT specialists). It was mentioned before that ESP measures the ability of the model to predict correct classification of the sample points into each class. As presented in Table 3, the strongest model emerged for "Use of Electronic Payment", with ESP value of (43.2%). When the model predicted that the enterprise practiced e-commerce, it was correct (48.5%) of the time, and when the model predicted no e-commerce it was correct (94.8%) of the time.



**Figure 1. Drivers of e-commerce adoption in Palestine**

The next strongest model emerged for "Website Ownership" with an ESP value of (27.0%). When the model based on this variable predicted that the enterprise practiced e-commerce it was correct (31.5%) of the time. Similarly, when the model predicted no e-commerce it was correct (95.5%) of the time. The model depending on "Internet Connection" comes next, with an ESP value of (22.2%). Based on this attribute, when the model predicted that the enterprise practiced e-commerce, it was correct (22.2%) of the time and when the model predicted no e-commerce it was correct all the time. Almost at the same level of significance is the model that exemplifies "Availability of Internet" variable, with an ESP value of (22.0%). Based on this attribute, when the model predicted that the enterprise practiced e-commerce, it was correct (22%) of the time, and when the model predicted no e-commerce, it was correct all the time. The model based on "Number of ICT specialists", recorded (20%) for ESP. For this attribute, when the model predicted that the enterprise practiced e-commerce, it was correct (25%) of the time, and when the model predicts no e-commerce, it was correct (95%) of the time. An ESP value of (19.7%) is recorded for the model relied on the variable "Expenditure on ICT". When the model predicted that the enterprise practiced e-commerce, it was correct (22.3%) of the time, and when predicted no e-commerce, it was correct (97.4%) of the time. Models based on variables like computer ownership, number of employees using computer, enterprise size- as measured by number of employees recorded less significant ESP values, and designated weak prediction capabilities. Variables like, culture, lack of experience, cost of IT, nature of products, and privacy, recorded ESP values far below (5%) which is signify a much weaker prediction model.

## DISCUSSION

The objective of this study was to test the impact of a list of internal and external parameters on the adoption and use of e-commerce by enterprises in Palestine. To some extent, Palestine and the MENA region at large, lack studies that discuss technology adoption in general and e-commerce in particular. As alluded to earlier, the present study encompasses (18) different parameters, covering technological, organizational, and environmental contexts, evaluated using a nationwide sample of (3006) enterprises involved in most kinds of economic activities. In general, e-commerce endorsement by local Palestinian enterprises is very weak. Out of the total number of enterprises included in the study, only (219) reported that they executed at least one electronic transaction in a year. This represents only about (7%) of all enterprises. This percentage includes enterprises acting as customers or as suppliers to e-commerce services. One reason for this low e-commerce penetration has to do with cognitive

and knowledge-related factors. Most business owners and managers are either unaware of e-commerce or need to be convinced about the potential benefits of this service for their business model. This is in agreement with many research results, such as in studies by (Kenny and Marshall 2000), (Chong 2001) (Mehrtens, Cragg and Mills 2001) and (Bharati and Chaudhary 2006).

As is seen in table 3, nine attributes out of the eighteen studied have significant impact on the decision to adopt e-commerce. These are the attributes that recorded *p*-value of less than (0.05). The attributes are: Internet connection, number of employees using the Internet, computer ownership, expenditure on ICT, number of employees using computer, website ownership, enterprise size, availability of electronic payment, and number of ICT specialists. Other attributes, like culture, experience in using ICT, cost, nature of products, privacy, etc. failed to have any significant impact on e-commerce activities. The results show that attributes with significant impacts, are classified into technological and environmental categories in the TOE framework. As mentioned earlier, ESP expresses the percentage of correct classification into each class category. In our case these categories are "use e-commerce" and "Not use e-commerce". The highest scoring parameter in the study that was capable of predicting the use of e-commerce by the enterprise is the "Electronic Payment". As shown in Table 3, when the enterprise owns an electronic payment system or means, then that enhances the chance of prediction to accurately classify observation into the use or not use of e-commerce by (41.6%). The remaining parameters from the strongest to the weakest are; website ownership, Internet connection, number of employees using the Internet, number of ICT specialists, expenditure on ICT, computer ownership, and number of employees who use computers. It may be surprising that attributes with no significant impact on e-commerce adoption are mostly from the environmental context. The study covered three critical parameters in this context: privacy, culture, and traditions. The results clearly indicate that these parameters have no impact on enterprise's decision to adopt or not to adopt e-commerce. This result is in obvious contradiction with the TOE framework and other contributions which stress the significance of environmental parameters including the need for privacy and the strong influence of the prevailing culture in the society (e.g. Elahi and Hassanzadeh, 2009, Grandon, 2009, Al-Qirim, 2009, Kapurubandara, and Lawson, (2006), and García-Murillo, M. (2004). On the other hand, our results are in agreement with other research reports placing less weight on the cultural parameters (e.g. Bahaddad, AlGhamdi, & Houghton (2012), AlGhamdi, Nguyen, Nguyen, & Drew S. (2012), and Wymer, & Regan, (2005)). This phenomenon can be explained by the fact that the Palestinian local businesses do not have that history in transacting through the Internet, and that they are still in the process of building their own capacities and competencies. They focus more on attributes in the technology and organization context. Furthermore, it so seems that Palestinian enterprises do not feel pressured to adopt e-commerce because of the obvious lack of competition in this domain. This constitutes a unique opportunity for competency among the Palestinian businesses. From the authors' own observations, the culture of buying and selling over the Internet is lacking, particularly for goods. This may be attributed to the poor postal services and lack of proper addressing in the country.

Five out of the nine attributes that have significant impact on the e-commerce adoption belong to the technological context. These are; Internet connection, ICT competencies, computer ownership, expenditure on ICT, and website ownership. Our results are in agreement with that reported in many earlier studies. Such studies that emphasize the availability of technological resources as a catalyst for e-commerce include: (Al-Qirim 2007), (Elahi and Hassanzadeh 2009), (Bingi, Mir and Khamalah 2000), (Tan and Wu 2002), (AlGhamdi, et al. 2012). All of the above studies come from the developing countries. They all portray technological resources as critical success factors. Concerning organizational context, we investigated expenditure on ICT, enterprise size, electronic payment, experience in using ICT, cost, nature of products, and enterprise acting as customer/supplier. Out of this list only, expenditure on ICT, size, and electronic payment were significantly impacting the decision to adopt e-commerce. Others like experience in using ICT, cost, and nature of products, fail to have any significant impact on the decision to embrace e-commerce. Our findings are in agreement with (Mehrtens, Cragg and Mills 2001), and (Bharati and Chaudhary 2006). They reported that financial resources and cost of technology play a minor role regarding investment in e-commerce. Our results are in agreement with other reports concerning the impact of size in endorsing e-commerce. Among them are (Sadowski, Maitland and van Dongen 2002), (Bengtsson 2007), (Molla 2005), (Tan, Tyler and Manica 2007), (Cloete, Courtney and Fintz 2002), Wang and Cheung, 2004, and Zhu, Kraemer and Xu, 2003, Zhu and Kraemer 2005. Table 3 revealed the most influential factors that drive decision makers to adopt e-commerce in Palestine. The shaded area in the table shows the strongest nine drivers: Internet connection, number of employees using internet, computer ownership, expenditure on ICT, number of employees who use the computer, website ownership, enterprise size (number of employees), use of electronic payment, and number of ICT specialists. A closer look at these drivers reveals that they belong to two contexts based on the classification of the TOE framework: technology and organization. The technology context includes: Internet connection, computer ownership, website ownership, and use of electronic payment. On the other hand, the organization context comprises: number of employees, expenditure on ICT, number of ICT employees, number of employees who use computers, and number of employees using the Internet. Figure 1 visualises these drivers. It represents the major contribution of this research.

## Conclusion

In this study, we managed to introduce a unique model of e-commerce adoption in Palestine (Figure 1). It turned out that the real drivers for adopting e-commerce in Palestine are only contextual to technology and organization. This is, of course, from the decision makers' perspective. External or environmental variables are found to be of less significance to influence decision makers' aspiration to adopt e-commerce. The missing environmental context is surprising as mentioned earlier. This missing context can indicate many things. For one, this reveals a lack of the sense of urgency at the senior level of enterprises to invest in e-commerce. From our experience, this indicates that local business target mostly the local market. Obviously, it seems that the Palestinian market is immune from global competition for goods and services that have a local alternative. The indifference towards investment

in e-commerce means that Palestinian businesses do not compete in the online channel in the local arena. This means that there is quite a potential for competition in this domain in the future.

But a trigger for sparking this kind of competition maybe a change in the culture of local consumers. This can only be possible when Palestinian businesses feel the heat of International competition for local consumers. Then again, this needs facilitation from the governmental side. The Palestinian government has a critical role to play to promote e-commerce. There is neither complete postal addressing in Palestine nor a sufficiently functioning postal services. There is also a need for a secure nationwide payment system. This is particularly important since there is poor penetration of traditional online payment cards in the hands of the individuals. Most businesses in Palestine are small to medium enterprises and family-owned. They cannot afford building their own payment systems. e-Commerce has a great potential to stimulate economic growth. The government should raise awareness among local businesses on the importance of adopting e-commerce. Finally, the results of this study show that use of Internet among local Palestinian businesses for making online transactions is in its early stages. Only 7% of local Palestinian businesses had the opportunity to implement an electronic transaction at least once a year.

## Limitations

Though sample size is relatively large, it is still not based on a complete enumeration. As such, the study is subject to sampling errors as well as non-sampling errors. Data may be affected by statistical errors due to the use of the sample and certain differences may emerge from the real values anticipated from a census. Non-statistical errors are due to the nature of the survey. Most importantly the issue of privacy of the business themselves.

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