

## SOCIOLOGY OF TECHNOLOGY FEATURES OF SMES' E-COMMERCE

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**ABSTRACT:** *The aim of this research paper is to discover factors associated with sociology of technology and their impact on SMEs' E-Commerce Acceptance within Jordanian context. A proposed research's conceptual model is developed in order to investigate the relationship and influence between sociology of technology associated factors (online social interaction and online commercial interaction) through intermediary factors (Perceived Usability of EC, Perceived advantage of EC, Sentiment toward EC acceptance, EC Use intention) with the adoption of EC innovation. The data analysis was based on 400 Jordanian SMEs; also data analysis was based on multivariate statistical techniques encompassing multiple linear regression, simple linear regression, and one-way ANOVA. The study framework has been shown to be very viable and useful. The framework can be used as a tool to enable Technology innovation and adoption scholars to encourage and advising SMEs to adopt appropriate ecommerce technology to improve their business performance. Suggestions are made to improve the framework with future work to apply this framework in more SMEs. The findings from this research show that the current research framework is beneficial to both governmental and private sectors who intend to accelerate the adoption rate of electronic commerce implementations and their relevant components among SMEs in Jordan.*

**KEYWORDS:** Sociology of Technology, Perceived Usability, Perceived Advantage, SMEs, Jordan.

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### INTRODUCTION

Advances in information and communication technologies and the emergence of the Internet have revolutionised business activities enabling new ways of conducting business referred to as electronic commerce (Zwass, 2003; Turban *et al*, 2004). Electronic commerce is viewed as a process of buying, selling, transferring, or exchanging products, services, and/or information through computer networks, mainly the Internet (Turban *et al*, 2004). Electronic commerce can also be defined as: "The sharing of business information, maintaining of business relationships, and conducting of business transactions by means of telecommunications networks" (Zwass, 2003, p. 8).

Electronic commerce activities encompass the inter-organisational processes of market-based sell-buy relationships and collaboration (known as business-to-business, or B2B, consumer-to-consumer, or C2C), also the intra-organisational processes that support them (Zwass, 2003). Electronic commerce as a way of doing business has significant advantages; organisations are embracing e-commerce as a means of expanding markets, improving customer service, reducing cost, and enhancing productivity (Wenninger, 2000). A vital benefit of e-commerce is access to global markets which enables businesses to expand their reach. The Internet allows for unconstrained awareness, visibility and opportunity for an organisation to promote its products and services (Senn, 2000).

A prominent role of electronic commerce is that it assists firms to compete, have access to new markets and extend the geographic reach of their operations. An adoption of appropriate technology can lead the company to greater business competency, improve its business performance, and ensure it retains its competitive advantages. Despite this awareness, many SME in the developing countries in the Middle East have yet to fully embrace this adoption of ecommerce in the running of their business.

Various studies have reported that SMEs are generally lagging behind to large organisations as far as the adoption and usage of e-commerce is concerned (see for example Simpson & Docherty, 2004; Chau & Turner, 2002; Ihlstrum et al, 2003; Stockdale & Standing, 2006). This sluggish uptake and diffusion of the technology among SMEs conflicted with the commonly held view that SMEs have been noted for their ability to respond to new opportunities and innovations more quickly than larger enterprises (Lomerson et al, 2004). Rao et al (2003) alluded to the fact that SMEs are generally considered to be flexible, adaptive and innovative making them a good fit for electronic commerce.

Furthermore, Internet sociologists claimed that virtual communities can resemble real-life communities because they give Internet users' access to a range of non-material social resources such as emotional support, companionship, information and a sense of belonging (Wellman & Gulia, 1999). Besides, social scientists stressed that online activism and the mobilisation of citizens to participate in social action are supported by the Internet's technological and social structure (Gurak, 1997). Virtual or online communities are groups of people connected via the Internet and other information technologies. These have become a significant part of modern society and contribute to life in many aspects for instance social, educational, political and business. Rowley (2000) stated that consumers' approaches to products searching on websites are a key factor in successful e-business that can enhance product visibility and ease of location is the key in defining and maintaining competitive advantages.

Specifically, this study will be focused on twofold of sociology of technology: online social interaction and online commercial interaction, and their relationship and influence via intermediary factors with the adoption of EC innovation by SMEs in Jordan.

### **Theoretical Background**

The framework to be embarked in this study is constructed from several scholars who have studied different aspects of the necessary phenomenon of individual reactions to information technology, which is based on a variety of theoretical perspectives, consisting of: Technology Acceptance Model (TAM) (Davis, 1993, 1989; Davis et al, 1989; Venkatesh & Davis, 2000; Malhotra & Galletta, 1999; Liu & Ma, 2006; Bagozzi, 2007); Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975; Lukas & Spitler, 1999; Venkatesh & Davis, 2000, Mao & Palvia, 2006); Theory of Planned Behaviour (TPB) (Ajzen, 1985); Diffusion of Innovations Theory (IDT) (Rogers, 1995); Social Cognitive Theory (Bandura, 1986; Compeau & Higgins, 1995a, 1995b; Hill et al, 1986, 1987); and E-Commerce Technology Acceptance Model (Al-Haraizah, 2011).

Significantly, these paradigms have been acknowledged in the IS literature, as they enable researchers to gain a beneficial insight into the reaction of individuals toward computer technology and the factors that create the reactions. For instance, TRA is used to predict and understand intentions, behaviours and upshots related to consumer online shopping behaviour

(Vijayasathy, 2001). Song and Zahedi (2001) examined the effects of website design on the adoption of Internet shopping built on the model of the Theory of Planned Behaviour (TPB).

### **Sociology of Technology**

Sociology of technology (Internet) is reflected by social facets of technology. Sociology of technology is affected by sociological thinking, cultural and technological change. Steven (1999, p.2) stated that:

*The Internet is not only a technology but an engine of social change, one that has modified work habits, education, and social relations generally, and may be most important, our hopes and dreams.*

The acceptance of this belief has made it commonplace for social scientist to refer to today's society as the 'information society' (Castells, 1989; Webster, 2002), a 'cybersociety' (Jones, 1998), a 'network society' (Castells, 1996), the 'global village' (Rheingold, 1993), and the 'age of access' (Rifkin, 2000). Internet sociologists have become more and more interested in the implications of social access to the Internet including: an increase in social involvement (Fischer, 1992); the facilitation of the formation of new relationships (Parks & Roberts, 1998), the development of new identities and commitments amongst otherwise isolated persons (McKenna & Bargh, 1998), the emergence of new online communities supporting sociability (Preece, 2000), and the participation in groups and organisations by distant or marginalised populations (Sproull & Kiesler, 1991).

Social networks (e.g., My Space, Facebook, Twitter, and You Tube) have made an important impact on how today's Internet users communicate, search for and share information (Swamynathan *et al*, 2008). Social networking as an emerging phenomenon holds attractive attributes and all interesting for both consumers and business (Qiao, 2008). Users can join networks, publish and maintain their personal profiles, and initiate links to their friends; hence, social links considered to be an evidence that a level of trust has been established between the linked users.

Social network could be a chat room, debate forum, or rating and comment function embedded in an e-shopping website, for instance a social recommendation system (Kim & Srivastava, 2007). An e-commerce website can identify opinion leaders with high impact and maximize the effectiveness of marketing based on a social network surrounding opinion leaders; therefore, it can assist the firm to establish its competitive advantage differentiating from others. The focal notion of social networking is that valuation generated from trusts within particular social networks, and consequently, can improve profitability, effectiveness and efficiency of advertising (Qiao, 2008).

Although the Internet is often used to contact existing relationships, it also has the potential to create new relationships. Much of the hype surrounding the Internet has been about the possibility of people becoming immersed in relationships with people who they have never seen in "real life" (Boase & Wellman, 2004). Some researchers referred to the Internet portray users so taken with online relationships that their ties with offline friends and family recede into the background (e.g., Chayko, 2002; Kendall, 2002; Rheingold, 2000). Most of work done has concentrated on the potential of the internet for social interaction. At the same time as marketers were focusing attention on 'the technology-induced transformation that are revolutionising the marketplace' (Parasuraman & Zinkhan, 2002, p.286) cumulatively, these

two significant research development: that online commercial interaction can be successfully achieved using the Internet, and that people engage the Internet not just for commercial transactions, but also for social and personal reasons.

Based on the literature review, the social aspect of technology (Internet) can be identified within two broad conceptual categories related to e-commerce sociology of technology: online social interactions and online commercial interactions. To be more precise, in this research paper Internet-based technology will be utilized as an online social and commercial interactions tool.

### **Online Social Interaction**

Virtual or online communities are groups of people connected via the Internet and other information technologies. These have become a significant part of modern society and contribute to life in many aspects for instance social, educational, political and business. Online communities built on social network structure commence appearing in 2002 and have become among most popular Web-based application. Such sites permit individuals to publish personal information in a semi-structured form. Current examples consist of Friendster, LinkedIn, Trib.net and Orkut. Other Web-based online communities have successfully combined social networking with a variety of interests, for examples photography ([www.Flickr.com](http://www.Flickr.com)), film ([www.Netflix.com](http://www.Netflix.com)), personal blogging ([www.Myspace.com](http://www.Myspace.com)), and dating ([www.Thefacebook.com](http://www.Thefacebook.com)) (Finin et al, 2005). Szmigin et al (2005) have proposed that Internet communities enhance relationship marketing mainly in two ways. First, they provide the opportunity for interactivity and the building of a consumer relevant community. Secondly, through evaluating the nature of such communities, organisers can meet the needs of the communities' participants better. In order to service these communities well. Therefore, organisers have to consider carefully the most suitable form their community should take.

### **Online Commercial Interaction**

Bidgoli (2002) mentioned the importance of marketing and advertising on the web, that the web offers many technologies and implementations, so that could enhance customer service, marketing, and advertising efforts with a reasonable cost. The web provides customer service through commercial websites, integrated call centre, online help desk, and online customer service. Recently, corporate websites have been used by consumers for various applications for instance; downloading forms, software patches, printer drivers, and receiving prompt answer to frequently asked questions (FAQs).

Moreover, all mentioned features in the study have improved customer service and lowered cost for both firms and consumers. Customers, by using online catalogues, are able to carry out product searches and contrast diverse features of different products. Rowley (2000) stated that consumers' approaches to products searching on websites are a key factor in successful e-business that can enhance product visibility and ease of location is the key in defining and maintaining competitive advantages. However, the study has been concentrated on search engines rather than on the design of individual commercial web site. Kolesar and Galbraith (2000) stressed the importance of search and evaluation information to commercial web site users, and stated that web site design should make searching as easy as possible for the consumers. Nonetheless, they did not discuss how to design web sites to achieve this aim.

### **Perceived Usability**

The Perceived Usability construct is derived from the concept of perceived ease of use in TAM, complexity in DOI, and perceived behavioural control in Theory of Planned Behaviour (TPB). Perceived ease of use refers to the degree to which the prospective user expects the use of the target system to be free of effort (Davis, 1989; Davis et al, 1989). Complexity represents the degree to which an innovation is perceived not to be difficult to understand, learn or operate (Rogers, 1983). Additionally, perceived behavioural control refers to people's perception of the ease or difficulty of performing the behaviour of interest, capturing "beliefs regarding access to the resources and opportunities needed to perform a behaviour, or alternatively, to the intention and external factors (including requisite skills and other external factors) that may impede performance of the behaviour" (Ajzen, 1985, 1991). From these definitions, perceived electronic commerce usability can be referred to as the degree to which users predict that accomplishing the task will be as easy as painless.

### **Perceived Advantage**

Perceived advantage in this study is reflected through an amalgamation of perceived usefulness in TAM, outcome expectation in Social Cognitive Theory (SCT), and relative advantage in Diffusion of Innovation (DOI). Perceived Usefulness (PU) refers to the degree to which a prospective user believes that using a particular system would improve his/her job performance (Davis et al, 1989, P. 320). Outcome expectation is "the perceived likely consequences of using a computer" (Compeau et al, 1999, P.147), Relative advantage refers to "the degree to which an innovation is perceived as better than the idea it supersedes" (Rogers, 2003, P. 229). There is a consensus among these models that all definitions are indicating the benefits gained from using a new technology by individuals and organisations such as electronic commerce.

### **Sentiment toward EC Acceptance**

An attitude (sentiment) is defined as:

"a person's general feeling of favourableness or unfavourableness for the behaviour" (Fishbein & Ajzen, 1975, p. 216).

It is a function of the product of one's behavioural belief that performing the behaviour will lead to certain outcomes, and the evaluation of the outcomes. Beliefs about the consequences of performing behaviour are the individual's subjective probability that performing the target behaviour will result in a desired consequence. Evaluation refers to an implicit evaluate response to the consequence (Fishbein & Ajzen, 1975). Also attitude has been defined as:

"a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour" (Eagly & Chaiken, 1993).

Ajzen (1991) reviewed prior research that contented attitude as a factor to predict behaviour and accentuated that intention to perform behaviours of various types can be predicted with high accuracy from attitude.

Harrison et al (1997) discovered that attitude significantly affects executive decisions about the adoption of IT in small firms. Importantly, it is undoubtedly viewed that attitude influences the decision to adopt different technological innovations. This evolves that attitude might also affect the adoption of E commerce technology implementations.

## **EC Use Intention**

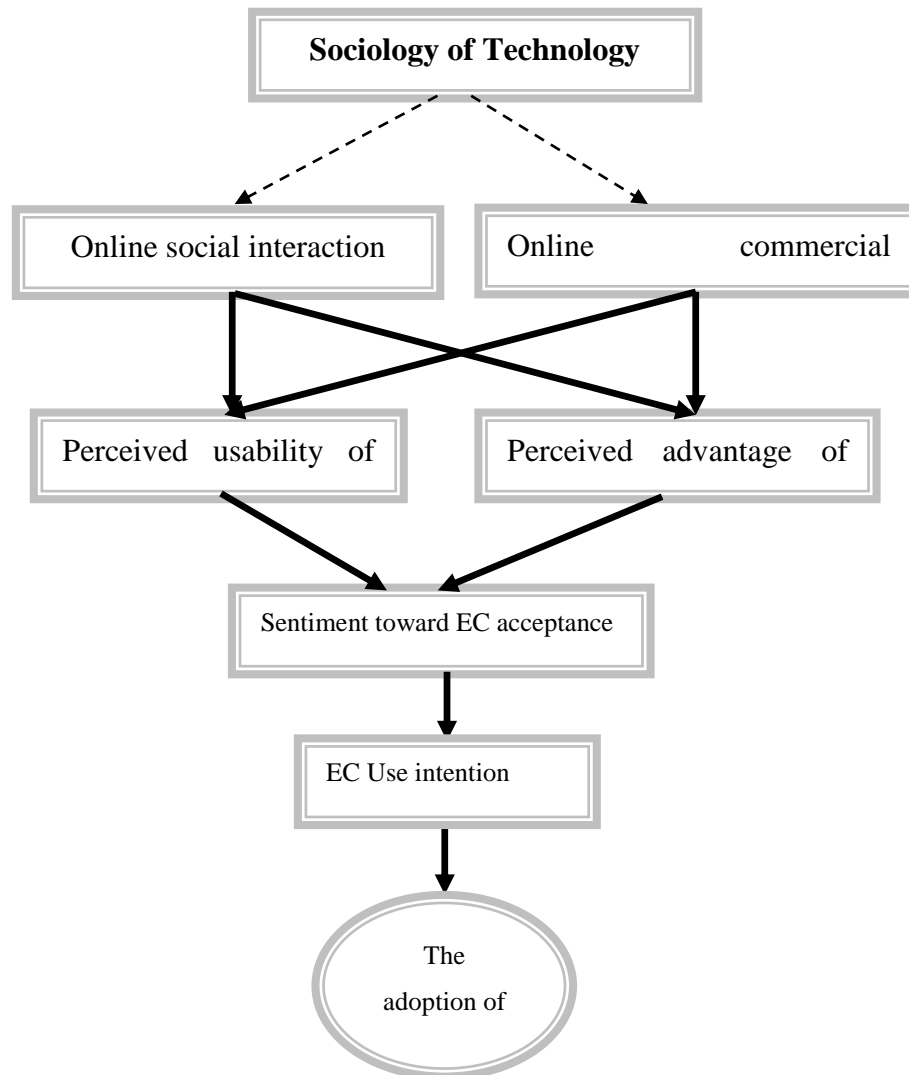
Behavioural intention is considered as an indication of how hard people are willing to try and of how much an effort that they are planning to exert, in order to perform the behaviour, which is influenced by three components: person's attitude toward performing the behaviour, the perceived social pressure, and behavioural control (Ajzen & Fishbein, 1980). According to the Theory of Reasoned Action (TRA), a specific behaviour can be predicted reasonably well from intention to perform the behaviour, while behavioural intention is influenced by one's attitude, which is determined by one's beliefs.

A distinct academic tradition of user acceptance and usage behaviour has been established in the IS literature, also the social psychological standpoint in user acceptance research has become dominant since Davis (1989) proposed Technology Acceptance Model (TAM). TAM adapts the reasoning logic of TRA (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), which posits that human behaviour is the result of rational reasoning by which information is processed along the logical chain of belief-intention-behaviour. Behavioural intention has been examined impressively for instance Baker-Eveleth and Stone (2008) have examined the expectancy theory and behavioural intention to use computer applications. In addition, an empirical study of testing the factor structure of the behavioural-intentions battery that focused on Australian Banking industry (Pont & McQuilken, 2002).

It has been established that behavioural intention is considered as a good predictor of self-reported and actual usage (Mao & Palvia, 2006; Jackson et al, 1997; Agarwal & Prasad, 1999; Venkatesh & Davis, 2000). Theory of reasoned action (TRA) (Fishbein & Ajzen, 1975) proposed that beliefs lead to attitude, which leads to behavioural intention that leads to actual behaviour. From this point, it can be predicted that EC use intention could impact the actual adoption of e-commerce innovation.

## **Sociology of Technology Features of SMEs E-Commerce**

A research framework is drawn to clarify the linkage between four phases and their associated components within the sociology of technology e-commerce Acceptance model. The social stimulus factors presented by sociology of technology, While the cognitive response presented by perceived advantage of EC, perceived usability of EC. The third phase (affective response) presented by sentiment toward EC acceptance, and finally behavioural response reflected by EC use intention. The model of the study is illustrated in Figure 1.



**Figure 1: conceptual study model**

From the conceptual model mentioned above, the research hypotheses can be developed as follow:

**H1:** *There will be a positive relationship between sociology of technology and perceived Usability of e-commerce technology.*

This hypothesis is divided into two sub-hypotheses as follows:

**H1a:** *There will be a positive relationship between online social interaction and perceived Usability of e-commerce technology.*

**H1b:** *There will be a positive relationship between online commercial interaction and perceived Usability of e-commerce technology.*

**H2:** *There will be a positive relationship between sociology of technology and perceived Advantage of e-commerce technology.*

This hypothesis is divided into two sub-hypotheses as follows:

**H2<sub>a</sub>:** *There will be a positive relationship between online social interaction and perceived Advantage of e-commerce technology.*

**H2<sub>b</sub>:** *There will be a positive relationship between online commercial interaction and perceived Advantage of e-commerce technology.*

**H3:** *There will be a positive relationship between perceived Usability and Sentiment toward E-Commerce Acceptance.*

**H4:** *There will be a positive relationship between perceived Advantage and Sentiment toward E-Commerce Acceptance.*

**H5:** *There will be a positive relationship between Sentiment toward E-Commerce Acceptance and E-Commerce Use Intention.*

**H6:** *There will be a positive relationship between E-Commerce Use Intention and Electronic Commerce Innovation Adoption.*

## **METHODOLOGY**

With reference to the phenomenon in the current study, it seems that there is an inadequate framework for investigating the factors affecting the adoption of e-commerce technology referred to sociology of technology features. In reaction to this, it has been viewed that the survey research strategy is the most applicable. Precisely, the author's philosophical standpoint lies in the territory of positivism which typically applies deductive research approach to test and verify existing theories in a new context.

The method of data collection techniques consists of Survey and document analysis. With regard to survey, questionnaire was distributed to the staff of the SMEs in order to investigate their response on the acceptance of e-commerce technology.

Intentionally, SMEs in Jordan were selected and served as the sampling population for this study. As mentioned earlier, SMEs have various definitions as well as characteristics, which are based on each country's viewpoint regarding several aspects of SMEs such as number of employees, capital, sales, and industry type. The current study follows the SME definition formally proposed by the Ministry of Industry and Trade (MIT)-Jordan, which is mainly based on number of employees and registered capital. Small enterprises employ between 10-49 employees and have a registered capital of more than \$42,300. While, Medium enterprises employ between 50-249 employees and have a registered capital of more than \$42,300.

For Jordan, it was complicated to count companies gaining both characteristics as the Ministry of Industry and Trade enacted new regulation for companies' registered capital in order to release some restrictions in accordance with World Trade Organisation (WTO) to increase investment rate in Jordan. More specifically, a registered capital has been reduced to 1000 JDs (\$1500) instead of \$42,300. Consequently, the researcher has taken the employees number dimension that could determine the population of the study in a proper way.



According to the yearly report prepared by the Social Security Corporation, there are approximately 5216 SMEs in Jordan, those who have 10-149 employees. Table (1) presents the number of enterprises in each category and the proportion that each category constitutes of all SMEs in this sampling frame.

**Table 1: categories, number, proportion, and number of employees of SMEs in Jordan**

Category (economic activity)	Number of enterprises	Proportion	Number of employees
<b>Agriculture</b>	42	0.008	1528
<b>Industry and mining</b>	926	0.18	42787
<b>Trade</b>	1057	0.20	36875
<b>Construction</b>	372	0.07	15216
<b>Transportation</b>	106	0.020	3916
<b>Finance and banking</b>	79	0.015	4167
<b>Tourism</b>	181	0.035	6916
<b>Others</b>	2442	0.47	102921
<b>Unknown</b>	11	0.002	428
<b>Total</b>	5216	100%	214754

The population size is likely to be the factor only when a researcher targets a relatively small group and the accurate number of population is known. Moreover, when the known population size is less than 10,000 a smaller sample can be used without affecting the accuracy (Saunders et al, 2007).

Since the sampling frame for this study was less than 10,000, the statistical formula used to calculate an adjusted minimum sample size, the number of the population was included in order to attain more sample size accuracy. From the calculation, the minimum sample size required was 384 in order to be representative of the population. Nonetheless, it is unlikely that a 100% response rate can be obtained. Thus, the highest possible number of responses should be achieved. The exact response rate is unknown but based on the authors' experience in Jordan, a 50% response rate is possible. Consequently, this study estimated the response rate to be 50% and recalculated a new sample size required in order to achieve the minimum sample size. This was by using following formula so called adjusted or actual sample size (Saunders et al, 2007).

$$n' = \frac{n}{1 + \left(\frac{n}{N}\right)}$$

Where

$n'$  = is the actual or adjusted sample size

$n$  = is the minimum sample size (as calculated above)

$N$  = is the total population

$$n' = \frac{384}{1 + \left(\frac{384}{5216}\right)}$$

$$n' = \frac{384}{1.0736196}$$

$$n' = 357.668$$

The actual sample size was approximately 358. However, the number of 400 was used; hence, the final sample size for this study was 400. The table 4.4 summarises the calculated number of sample size argued above.

**Table (2) Summary of the Calculated Number for the Sample Size**

Minimum sample size	Estimated response rate	Actual sample size	Adjusted sample size required
384	50%	358	400

Moreover, the data obtained from survey were analyzed by using descriptive statistics, statistical package for social science (SPSS).

In addition, the internal consistency reliability method was used to verify the reliability of the scales employed in the questionnaire. Cronbach Alpha was used to measure internal consistency for survey and research variables based on sample estimation. Cronbach Alpha can be increased in either the average correlation or number of items (Zander & Kogout, 1995). Nunnally (1978) stressed that Cronbach Alpha must be greater than 0.7 to be considered good and acceptable for most research. Furthermore, value more than 0.6 is regarded as a satisfactory level (Dinev & Hart, 2002; Nunnally, 1978; Hair et al, 2000). In this stage, some items were dropped to increase the reliability of the scale. Unreliable items were excluded in the final version of the questionnaire. The coefficient score of Cronbach Alpha for modified scales were relatively high and over 0.70 across all scales illustrating acceptable reliability of the scale. The table 3 reflects the Cronbach's Alpha scores for modified scales together with the number of items used in the final scale of the study.

**Table (3) Reliability Analysis- Questionnaire Pre-test**

Construct	Cronbach's Alpha	Number of items	
		Pretesting	Final scale
<i>Sociology of Technology</i>			
<i>Online social interaction</i>	.766	4	4
<i>Online commercial interaction</i>	.643	5	4
<i>Perceived Advantage</i>	.944	4	4
<i>Perceived Usability</i>	.804	4	4
<i>EC Perception accuracy</i>		2	2
<i>Sentiment toward EC Acceptance</i>	.672	4	4
<i>EC Use Intention</i>	.630	4	4

## FINDINGS

Research results from quantitative analysis for this study are based on a number of statistical techniques such as descriptive statistics, multiple linear regression, simple linear regression, one-way ANOVA, f-test. Several tables and figures are given to simplify the understanding of statistical results.

### Descriptive Statistics

This part presents descriptive statistics consisting of demographic information of the respondents and proportion of Internet usage. The frequency and percentage for each variable is listed as per the survey categories. The following table explains these results.

**Table 4: Demographic Information**

Demographics	Number of respondents = 415	%
<b>Gender:</b>		
Male	297	71.6
Female	118	28.4
<b>Age:</b>		
18-25	154	37.1
26-35	170	41.0
36-45	68	16.4
>45	23	5.5
<b>Education Level:</b>		
High school	48	11.6
Diploma	62	14.9
Bachelor	263	63.0
Master	34	8.2
Doctorate	3	.7
Other	5	1.2
<b>Management Position :</b>		
Top Management	73	17.6
Middle Management	231	55.7
Lower Management	110	26.5

**Table 5: Use of Internet**

	N= 415	%
<b>Use of Internet :</b>		
Yes	404	97.4
No	11	2.6
	No= 404	%
<b>Time Period :</b>		
Less than 6 months	25	6.3
6-12 months	26	6.4
1-3 years	83	20.5
4-6 years	106	26.2

<b>Over 7 years</b>	164	40.6
<b>Frequency:</b>		
<b>Less than once a month</b>	22	5.4
<b>Once per month</b>	20	5.0
<b>Once per week</b>	38	9.4
<b>Once per 2-3 days</b>	54	13.4
<b>Every day</b>	270	66.8
<b>Knowledge and Skills:</b>		
<b>Beginner</b>	46	11.4
<b>Moderate</b>	193	47.8
<b>Advanced</b>	165	40.8

**Use of Internet:** Roughly most respondents (97.4%) indicated that they have used the Internet. Whereas, 2.6% of the surveyed samples have not used the Internet. Therefore; this reflects that there is a high Internet usage rate within the small and medium sized enterprises in Jordan.

**Time period of Internet usage:** The highest proportion of Internet usage regarding period of time was chiefly gained over 7 years (40.6%); followed by 4-6 years (26.2%). Afterwards, 1-3 years period of time that presented by 20.5%, and both 6-12 months and less than 6 months have similar percentage fluctuate between 6.3-6.4%.

**Frequency of Internet usage:** The majority indicated that they used the Internet every day (66.8%), 13.4% have used the Internet once per 2-3 days, 9.4% respondents have used the Internet once per week, 5.0% of respondents have the used the Internet once per month, and 5.4% of samples have used the Internet less than once a month. As a result, the Internet has a high proportion of usage via the daily use by the examined participants.

**Knowledge and skills:** The respondents were asked to rate their level of knowledge and skills relating to the use of the Internet. Upshots showed that the highest percentage of knowledgeable and skilled respondents in the Internet were classified within the moderate level that presented by 47.8% of the investigated sample, followed by advanced level of Internet knowledge and skills, which articulated by 40.8%, then the lowest percentage have taken place within the beginner level and reflected by 11.4% of the intended sample.

### **Classification of Variables as Applicable Within Jordan Context**

A survey of individuals within small and medium sized enterprises who are potential electronic commerce adopters: there is a confirmation of the relationships between the components via the framework phases. This confirmation of the relationships appeared between Perceived Advantages (PA), Perceived Usability (PU), and social stimulus, which are in turn presented by social aspects of technology (online social interaction and online commercial interaction). Additionally, there is a confirmation of the affective and behavioural response relationships between Sentiment towards Electronic Commerce Acceptance (STECA), and Electronic Commerce Use Intention (UI).

Table (6) shows the classification of the variables used in the research framework.

**Table 6: Upshots of the respondents' classification of the main study- High or Low**

Variable	Low<4%	Neutral=4	High>4%	The Results
<b>Sociology of Technology</b>				
<b>Online Social Interaction (OSI)</b>	23.2	11.1	<b>65.7</b>	High
<b>Online Commercial Interaction (OCI)</b>	18.3	13.4	<b>68.3</b>	High
<b>Perceived Advantage (PA)</b>	9.7	6.6	<b>83.7</b>	High
<b>Perceived Usability (PU)</b>	8.1	4.6	<b>87.3</b>	High
<b>Perception Accuracy</b>	6.3	5.0	<b>88.7</b>	High
<b>Sentiment Toward Electronic Commerce Acceptance (STECA)</b>	25.8	6.3	<b>67.9</b>	High
<b>Use Intention (UI)</b>	22.8	6.6	<b>70.6</b>	High
<b>The Adoption of Electronic Innovation (AECI)</b>	33.0	20.9	46.1	Low

### The Analysis Approach

The analysis process for the embarked study's framework is conducted within three phases: first, using multiple linear regressions for variables such as sociology of technology, perceived advantage, perceived usability, and sentiment toward accepting electronic commerce. While a simple linear regression used to explain the relationship between sentiments toward accepting electronic commerce and use intention.

Finally, in the last phase, one-way ANOVA is used because electronic commerce adoption was a category variable with two items. These phases are illustrated in the following table (7).

**Table 7: Types of Analysis Undertaken in each phase**

Phase	Analysis Type	Hypotheses		Independent Variable	Dependent Variable
		Main	Sub		
<i>1</i>	Multiple Linear Regression	<b>H1</b>	H1 <sub>a</sub> H1 <sub>b</sub>	<b>Sociology of Technology</b> ○ Online Social Interaction (OSI) ○ Online Commercial Interaction (OCI)	Perceived Usability
		<b>H2</b>	H2 <sub>a</sub> H2 <sub>b</sub>	<b>Sociology of Technology</b> ○ Online Social Interaction (OSI) ○ Online Commercial Interaction (OCI)	Perceived Advantage
		<b>H3</b> <b>H4</b>	----- -----	○ <b>Perceived Advantage (PA)</b> ○ <b>Perceived Usability (PU)</b>	Sentiment Toward E-Commerce Acceptance (STECA)

2	Simple Linear Regression	<b>H5</b>	----	<b>Sentiment Toward E-Commerce Acceptance (STECA)</b>	Use Intention (UI)
3	One- way ANOVA	<b>H6</b>	----	<b>Use Intention (UI)</b>	Electronic Commerce Innovation Adoption (ECIA)

## TESTING THE HYPOTHESES

### The Main Hypothesis 1: Sociology of Technology vs. Perceived Usability

To test this hypothesis, Multiple Regression Analysis (coefficient beta) was used between PU, as dependent variable, and Sociology of Technology as the independent variable. As presented in table 8, the complete model has a significant impact on PU ( $p=0.000<0.01$ ). In the entire model for all the predictors,  $R^2$  explains 28.7% of the variance related to PU, and consequently supports hypothesis H1.

**Table 8: Results of Multiple Regression Analysis for PU (Dependent Variable) and Sociology of Technology Dimensions (Independent Variables)**

Model (Independent Variables )	Unstandardized Coefficients		standardized Coefficients	t	Sig.
	B	Std.Error	Beta		
H1 <sub>a</sub> : Online Social Interaction(OSI)	.397	.044	.407	9.052	.000** *
H1 <sub>b</sub> : Online Commercial Interaction (OCI)	.462	.055	.402	8.377	.000** *
<b>Equation</b>					
R	.536				
R <sup>2</sup>	.287				
F	154.241***				

\*\*\* $P<0.01$ , \* $P<0.1$  ~ Dependent Variables: PU

According to the above table, the Standardized coefficient (beta) value for OSI is positive and significant ( $p=0.000<0.01$ ), and thus supports hypothesis H1<sub>a</sub>. The Standardized coefficient (beta) value for OCI is positive and significant ( $p=0.000<0.01$ ), and therefore supports hypothesis H1<sub>b</sub>.

### The Main Hypothesis 2: Sociology of Technology vs. Perceived Advantage

To test this hypothesis, Multiple Regression Analysis (coefficient beta) was used between PA, as dependent variable, and Sociology of Technology as the independent variable. As exhibited in table 9, the entire model has a significant influence on PA ( $p=0.000<0.01$ ). In the entire model for all explanatory variables,  $R^2$  explains 39.5% of the variance related to PA, and thus supports hypothesis H2.

**Table 9: Results of Multiple Regression Analysis for PA (Dependent Variable) and Sociology of Technology Dimensions (Independent Variables)**

Model (Independent Variables )	Unstandardized Coefficients		standardized Coefficients	t	Sig.
	B	Std.Error	Beta		
H2 <sub>a</sub> : Online Social Interaction(OSI)	.563	.044	.531	12.750	.000** *
H2 <sub>b</sub> : Online Commercial Interaction (OCI)	.484	.055	.388	8.770.	.000** *
<b>Equation</b>					
R	.629				
R <sup>2</sup>	.395				
F	266.672***				

\*\*\*P<0.01, \*P<0.1 ~ Dependent Variables: PA

Based on table 9, the Standardized coefficient (beta) value for OSI is positive and significant ( $p=0.000<0.01$ ), and therefore supports hypothesis H5<sub>a</sub>. The Standardized coefficient (beta) value for OCI is positive and significant ( $p=0.000<0.01$ ), and hence supports hypothesis H2<sub>b</sub>.

#### **Hypotheses 3and 4: perceived Usability and Perceived Advantage of E-Commerce vs. Sentiment toward E-Commerce Acceptance**

To test this hypothesis, Multiple Regression Analysis (coefficient beta) was utilised between STECA, as the dependent variable, and PU and PA as the independent variables. As presented in table 10, the entire model has a significant effect on STECA ( $p=0.000<0.01$ ). In the entire model for all explanatory variables,  $R^2$  explains 48.8% of the variance related to STECA. The standardized coefficient (beta) value for PU is positive and significant ( $p=0.000<0.01$ ), thus it supports hypothesis H3. The Standardized coefficient (beta) value for PA was positive and significant ( $p=0.000<0.01$ ), and therefore supports hypothesis H4.

**Table 10: Results of Multiple Regression Analysis for STECA (Dependent Variable) and PA, and PU (Independent Variables)**

Model (Independent Variables )	Unstandardized Coefficients		standardized Coefficients	t	Sig.
	B	Std.Error	Beta		
H3: Perceived Usability (PU)	.248	.029	.404	8.580	.000** *
H4: Perceived Advantage (PA)	.352	.022	.622	16.144	.000** *
<b>Equation</b>					
R	.698				
R <sup>2</sup>	.488				
F	391.151***				

\*\*\*P<0.01, \*P<0.1 ~ Dependent Variables: STECA

**Hypothesis 5: STECA vs. Use Intention**

To test this hypothesis, simple Linear Regression (coefficient beta) was used between UI, as the dependent variable, and STECA as the independent variable. As shown in table 11, the entire model has a significant impact on UI ( $p=0.000<0.01$ ). In the entire model,  $R^2$  explains 16.4% of the variance related to UI.

**Table 11: Results of Simple Linear Regression Analysis for UI (Dependent Variable) and STECA (Independent Variable)**

Model (Independent Variables )	Unstandardized Coefficients		standardized Coefficients	t	Sig.
	B	Std.Error	Beta		
H5 : Sentiment Toward Electronic Commerce Acceptance (STECA)	.586	.065	.405	9.014	.000** *
Equation					
R	.405				
$R^2$	.164				
F	81.255***				

\*\*\* $P<0.01$ , \* $P<0.1$  ~ Dependent Variables: UI

**Hypothesis 6: Use Intention vs. E-Commerce Innovation Adoption**

This hypothesis proposes that the individuals' electronic commerce adoption does not vary as per their electronic commerce use intention. To test this hypothesis (H6), One-Way Analysis of variance (ANOVA) was used between the electronic commerce innovation adoption as a dependent variable and use intention as independent variable.

The results of this analysis demonstrate that the value of F is 1.972 at (0.006) level of significance. This means the rejection of the hypothesis, which stated that the adoption of e-commerce did not vary as per an individual's e-commerce use intention. It is therefore to be inferred that there is a significant difference between EC use intention of individuals who are EC adopters, and those who are EC non-adopters. These upshots are illustrated in table 12.

**Table 12: one-way analysis of variance ANOVA Analysis of the effect of Respondents' Use Intention of Electronic Commerce on their Adoption of E-Commerce Innovation**

Source of variance	Sum of squares	d.f	Mean square	F	Sig.
1. Between Groups	26.088	22	1.186	1.972	.006
2. Within Groups	235.726	392	.601		
Total	261.813	414			

Moreover, in order to test the associated hypothesis (H6) between the Adoption of E-commerce (ECA) and use intention (UI) in this study, Univariate Analysis of Variance (UANOVA), as ECA was a category variable and it gives the same results that supported H6. The hypothesis proposes that the adoption of e-commerce varies according to use intention of e-commerce. The mean, standard deviation and numbers of those who e-commerce adopters (see table 13



and 14) is  $M= 5.3437$ ,  $SD=3.06546$ ,  $n=191$ , whereas the mean. Standard deviation, and numbers of those e-commerce non-adopters is  $M=4.8706$ ,  $SD=3.18069$ ,  $n=139$ . Where  $F= 1.972$  at ( $p<0.01$ ) 0.000 significant level. As a result,  $H_6$  is supported. Furthermore, Partial Eta Squared showed that 4.2% of variance in use intention could be explained by differences between e-commerce non-adopters and E-Commerce adopters (Francis, 2004).

**Table 13: Descriptive Statistics the Adoption of E-commerce Innovation and Use Intention**

E-commerce adoption	Mean	Std. Deviation	N
Agree	5.3437	3.06548	191
disagree	4.8706	3.18069	139
<b>Total</b>	<b>5.1071</b>	<b>6.24617</b>	<b>330</b>

- The number of neutral responses is 85, with 1.05589 SD, and 5.2706 mean.

**Table 14: Tests of Between-Subjects Effects, Dependent Variable: Use Intention**

Source	Type III Sum of Squares	d.f	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	20.429 <sup>a</sup>	12	1.702	1.467	.006	.042
Intercept	1658.036	1	1658.036	1428.943	.000	.780
E-commerce adoption	20.429	12	1.702	1.467	.006	.042
Error	466.450	402	1.160			
Total	11532.375	415				
Corrected Total	486.879	414				

a. R Squared = .042 (Adjusted R Squared = .013)

## CONCLUSION

This study aims at identifying the main factors involved the adoption process of e-commerce technology by SMEs in Jordan. Thus, the sociology of technology features of SMEs e-commerce model was developed for empirical investigation in the circumstance of small and medium sized enterprises. A quantitative technique was conducted through employing self-administrated questionnaire.

The empirical data were collected by using self-administrated questionnaire and the data analysis was based on 400 SMEs in Jordan. Using multivariate statistical techniques, the findings indicate the effect of each proposed determinant factor.

This research aims at contributing to the knowledge with respect to electronic commerce in Jordan. This will be accomplished by identifying which factors are important for spurring willingness to adopt electronic commerce by SMEs in Jordan.

Precisely, this research deals with the interactions and relationships between the sociology of technology features of SMEs e-commerce model components and phases: social stimulus (sociology of technology), cognitive response (perceived usability and perceived advantage),

affective response (sentiment towards EC acceptance), and behavioural response (EC us intention).

This research establishes a number of interesting issues about e-commerce adoption in Jordan. It also helps to provide a better understanding of the diffusion in an emerging innovation in the country and aims to identify factors that are important for encouraging willingness to adopt e-commerce. The developed model of sociology of technology features of SMEs e-commerce has contained determinant components of e-commerce adoption that are theoretically and empirically acknowledged.

The findings of the study have revealed that the majority of SME managers are planning to adopt or expand businesses via the Internet but they are concerned about factors that relate to awareness consisting of how they could perceive the advantage, and usability of e-commerce technology. Besides, there is a vagueness concerning how to improve the features of new technologies in order to make it usable and understandable with a high consistency in the Jordanian context. Significantly, a comparison is needed for the use of modern technologies by SMEs with the traditional or manual tools of fulfilling their businesses activities within their unique situation. Moreover, clarifying and justifying advantages that could be achieved by applying electronic commerce activities to obtain competitive advantages.

In addition, the findings of this study on electronic commerce in Jordan could be well indicative of issues involved in the adoption of several technologies in Jordan and other developing countries such as Middle Eastern countries. The Middle East countries have many similarities with respect to language, religion, custom, values, manners, and way of thinking with regards to a specific technology and business. These technologies are tremendously important to facilitate such states to become as an effective part of the global economy. Thus, the involved elements of this study model could be beneficial for those policy makers who have an economic imperative to establish Jordan in the global marketplace.

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