

An Examination of the Factors that Contribute to the Adoption Success of B2B E-Commerce in Saudi Arabia

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Abstract:- E-commerce has captured the attention of the business world as both a great opportunity and as a source of competitive threat. This study aims to identify the factors that support or impede the use of e-commerce among Saudi organisations. This study draws upon Diffusion of Innovation (DOI) theory to develop and test a model of e-commerce adoption in organisations. We specify three innovation characteristics (relative advantage, compatibility, quality of service provider and security risks) as determinants of the adoption of e-commerce. Results reveal that relative advantage, compatibility, quality of service provider and security risks influence e-commerce adoption. The study results are both theoretically and empirically valuable in which organisations may find the study results useful for the creation of policies that can foster e-business adoption.

Keywords:- Innovation Adoption; E-Commerce; Technology Diffusion; Developing Arab Nations; Saudi Arabia; Diffusion Of Innovation (DOI) Theory.

II. INTRODUCTION

Electronic commerce (e-commerce) is not solely restricted to the actual buying and selling of products, but also covers sharing business information, maintaining business relationships, and conducting business transactions by means of telecommunications networks [1]. E-commerce is rapidly expanding and plays a major role in the world's economy. Also, it contributes to the achievement of competitive advantage. Business-to-Business (B2B) e-commerce is believed to be an important and a promising area of research for scholars and practitioners [24, 26].

Today e-commerce plays a major role in the world's economy and different sources of literature recognize the relevance of e-business for companies across the world [2]. Moreover, the factors that influence or inhibit the adoption of e-commerce in organisations have been well-documented and a sizable body of literature [10, 11, 26] continues to grow. However, it seems that there is a limited published work exploring the factors that capture organisational adoption of B2B e-commerce in the context of developing countries in the Middle East. Thus, the aim of this study is to bridge the knowledge gap in the extant literature about organisational e-commerce adoption and provide insights into the factors that support or impede e-commerce adoption in the context of developing countries in the Arab world, extending beyond

the industrialized Western context. In fact, studies conducted in Western countries tend to embody the values, attitudes, and beliefs of the West, which are different from those of non-Western cultures. This paper focuses upon Saudi Arabia that has a diverse immigrant population, a highly homogeneous culture like most Arab nations due to the profound effects of Islamic teachings on the society and a developing economy and therefore makes an interesting and unique case study.

This study draws upon Diffusion of Innovation (DOI) theory to develop and test a model of e-commerce adoption and stabilisation in organisations. We specify five innovation characteristics (relative advantage, compatibility, adoption cost, security concern and language barrier) as determinants of e-commerce adoption and stabilisation.

This paper is structured as follows: the next section (Background) gives a picture of the Saudi Arabian population and economy. Next, the paper describes the theoretical background that brought about a need for this research. The processes of e-commerce adoption in organisations, the research model and its associated hypotheses are subsequently presented and outlined. The methods and results of the study are then described, followed by a discussion of findings, conclusions, and implications for future research..

III. BACKGROUND

Saudi Arabia is a developing country and is located on the Arabian Peninsula with a land area of about 2 million square kilometres. The World Bank classified Saudi Arabia as a high-income economy and the Gross Domestic Product (GDP) was worth 792.97 billion US\$ in 2019 [23]. The Geert Hofstede analysis for Saudi Arabia is almost identical to other Middle East countries [7] where Islam plays a large role in the people's lives.

The private sector in Saudi Arabia is set up by individuals and entrepreneurs and the government is encouraging the growth of the private sector to diversify the economy and to create more jobs for Saudi nationals. In 2016, Saudi Arabia announced a new socio-economic development plan named 'Vision 2030', which is led by Crown Prince Mohammed Bin Salman [21].

IV. E-COMMERCE INNOVATION CHARACTERISTICS

This study will try to explore the influence of relative advantage, compatibility, quality of service provider and security risks on the adoption success of B2B e-commerce in private organisations in Saudi Arabia. Figure 1 shows the research model.

A. Relative Advantage

In this study, relative advantage of e-commerce is defined as the degree to which e-commerce can help organisations to be competitive and increase profits [16]. In fact, the higher the perceived profit from an innovation, the faster adoption will occur. Previous research found that e-commerce can help organisations to improve business performance by increasing revenue and reducing cost. Moreover, e-commerce enables firms to operate globally and broaden firm's customer base. Based on the above discussion, this study hypothesize that:

H1: Relative advantage contributes and significantly influences the adoption of e-commerce.

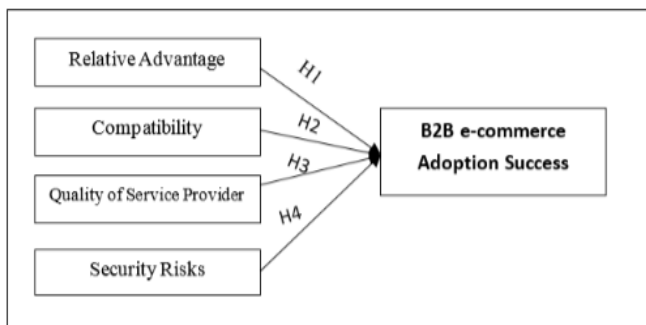


Fig. 1. Conceptual framework for B2B e-commerce adoption

B. Compatibility

Compatibility of the innovation has been found to be an important factor in influencing the adoption and diffusion of the innovation [4, 28]. compatibility is defined as the degree to which the innovation is consistent with current values, procedures, infrastructures and existing work practices of organisations [16]. The adoption of e-commerce can lead to significant changes in work procedures by replacing the manual paper-based work activities with electronic means which may involve the reengineering of the entire business processes [10]. Therefore, if conducting electronic activities and transactions over the Internet is compatible with the activities and practices of the organisation, firms will aim to use e-commerce [3, 4]. Conversely, lack of compatibility may result in organisational resistance, which might impede e-commerce adoption. Therefore, in this study we hypothesize that:

H 2: Compatibility contributes and significantly influences the adoption of e-commerce.

C. Quality of Service Provider

Quality is the whole features and characteristics of services that bear its ability to satisfy implied needs. It is simply defined in daily life as meeting the requirements of a user, unstated desire, and degree of excellence. It is the result of comparing between expectations of a service and the real perception of the way the service has been performed [8]. The quality of service is the overall effect of the use of services in which these effects determine the degree of satisfaction of a user to this service.

Quality is often a crucial variable in strategic planning. Generally, the service quality is an assessment of how well a delivered service conforms a client's expectations. In e-commerce, Quality of Service (QoS) is the un functioning properties of the service which describe how well a service is performed, such as availability, reliability, responsiveness, and security. Indeed, QoS is an important aspect in the adoption of e-commerce [27]. Moreover, it is believed that improving of QoS is an essential aspect of the adoption of e-commerce [12]. Hence, the study hypothesises that:

H3: Quality of service provider contributes and significantly influences the adoption of e-commerce. The word "data" is plural, not singular.

D. Security Risks

Security is about safeguarding confidentiality, integrity and availability in all domains of information. In fact, security issue is a universal concern in which organisations are consideration it when engaged in electronic trading. Organisations are found to be concerned about cyber risks and crimes such as fraud, hacking, and loss of data. Internet security is related to protecting the accessibility and reliability of firm's internet-based services and protecting end users both at work and in their home environment [18]. In fact, e-commerce is linked with insufficient security protections and verification issues because e-commerce uses the Internet and companies using e-commerce generally move away from private networks to public and open networks [15]. Moreover, e-commerce is exposed to a wide range of threats and interactions with multiple computers that are more difficult to manage. In fact, security risks associated with e-commerce will affect the future adoption and diffusion of e-commerce. Therefore, based on the discussion above, the following hypothesis is proposed:

H4: Security risks contributes significantly and is negatively related to the adoption of e-commerce.

V. RESEARCH METHODOLOGY

A survey methodology was used for collecting the data to test the hypotheses. Direct delivery of the survey questionnaire to companies was used and a total of 202 usable surveys were analysed. Table 1 illustrates the profile of the final sample firms in which the sample consisted of 90.1% male and 9.9% female respondents.

Variables	Frequencies	Percentage %
Gender of the respondent		
Male	182	90.1
Female	19	9.4
Missing	1	0.5
Age of the of the respondent		
21-29 yrs	45	22.3
30-39 yrs	68	33.7
40-49 yrs	61	30.2
50- 59 yrs	24	11.9
60 or older	2	1
Missing	2	1
Education of the of the respondent		
Less than High School	3	1.5
High School	20	9.9
Trade qualifications	6	3.0
Diploma	6	3.0
Bachelor's	125	61.9
Master's	36	17.8
Doctoral	6	3.0
Used e-commerce technologies		
Connected to the Internet with e-mail but no web site.	40	19.8
Static Web without any interactivity.	34	16.8
Interactive web presence.	66	32.7
Transactive web that allows online selling and purchasing of products and services.	13	6.4
Integrated web in which most of the business transactions are conducted electronically (i.e. inventory update, electronic paperwork and receipts).	49	24.3

TABLE 1: SAMPLE DESCRIPTION (N = 202)

VI. DATA ANALYSIS AND RESULTS

Reliability and validity analyses on measurement model were conducted by using Cronbach's alpha (α), calculating convergent validity of the measures and discriminant validity. Cronbach's alpha (α) was calculated and as in Table 2, it can be observed that all Cronbach's alpha values were higher than 0.7, with the highest for compatibility (0.950) and the lowest for relative advantage (0.713). Moreover, table 2 shows the mean, standard deviation and the factor loading for the construct. It is noteworthy that all loadings were greater than 0.60 [5, 6].

TABLE 2: CRONBACH'S ALPHA RELIABILITY TEST AND FACTOR LOADING

Construct	Mean	STD	Cronbach's Alpha	Factor loading
Relative Advantage	4.21	0.76	0.713	0.720
				0.871
				0.722
				0.715
				0.823
Compatibility	3.65	0.72	0.950	0.556
				0.864
				0.838
Quality of Service Provider	4.20	0.62	0.822	8170.
				0.866
				0.824
Security Risks	3.85	0.75	0.829	0.856
				0.768
				0.634
				0.602

VII. DISCUSSION OF FINDINGS: TESTING THE RESEARCH HYPOTHESES

This study aimed to provide a clear understanding of the factors that influence or hinder the use of e-commerce by organisations in Saudi Arabia. We develop and test a model for e-commerce adoption. Moreover, we specify four factors (Relative Advantage, Compatibility, Quality of Service Provider and Security Risks) as determinants of the adoption of e-commerce. The model seems to adequately describe the factors that contribute to the successful adoption of e-commerce. Table 3 shows hypothesis testing results.

The coefficients of the underlying relationships between constructs were tested for validating the four hypotheses. Compatibility was the highest to predict e-commerce adoption ($\beta=0.750$). Moreover, relative advantage ($\beta=0.371$), quality of service provider ($\beta=0.540$) and security risks ($\beta= - 0.407$) were all significant at $p > 0.01$. All four hypothesis namely H1, H2, H3 and H4 were supported. Relative advantage, compatibility, quality of service provider and security risks accounted for 65% of the variation in e-commerce adoption. The standardized path coefficients and the significance level as recorded by each path are presented in Figure 2.

Prior studies of e-commerce focused on relative advantage because it represents the sum of benefits perceived by the adopter of an innovation [16, 19, 24]. This research shows that relative advantage has a significant positive influence ($P < 0.01$) on e-commerce adoption, supporting hypotheses H1. The support found for H2 implies that compatibility is positively related to the adoption of e-

commerce. In general, firms are found to adopt any innovation if it is compatible with their work activities. This result is consistent with other findings in other countries of the world such as Singapore [19, 20] that found that compatibility is an important factor in the adoption decision of innovations.

Finally, Saudi firms perceived security as a barrier for the adoption and diffusion of e-commerce technology. Previous research found that, a major barrier for encouraging SMEs in regional Australia to become involved in electronic business is the concern about security and privacy of online transactions [9].

VIII. LIMITATION AND FUTURE RESEARCH

There were several limitations in our study. First, our results reflected only Saudi perspectives; different social and cultural aspects may create different results. Second, future research can conduct a longitudinal research to explore behavioural intention of managers to the underlying effects more clearly. Another limitation is concerned with the use of single respondent and they were managers involved in the decision to adopt e-commerce, we suggest that future research may use multi-level data collection. Future study can examine the effect of organisational characteristics such as size, corporate culture and learning orientation on e-commerce adoption.

IX. CONCLUSION

Innovation is the key to the organisational survival and growth and organisations are found to adopt new innovations and technologies to sustain their business models. The study results are both theoretically and empirically valuable in which organisations may find the study results useful for the creation of policies that can foster e-business adoption.

TABLE 3: HYPOTHESIS TESTING RESULTS

H#	Standardised beta coefficient (β)	T-Value	R ²	Result
H1	0.371	4.172	0.238	Accepted
H2	0.750	9.253	0.342	Accepted
H3	0.540	6.570	0.215	Accepted
H4	-0.407	-2.080	0.244	Accepted

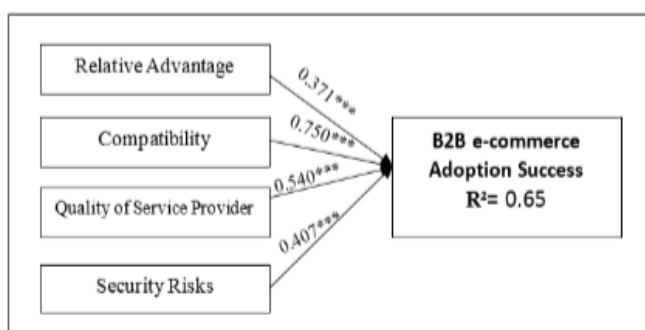


Fig. 2. Research model with results

REFERENCES

- [1]. Ahluwalia, P., & Merhi, M. I. (2020). Understanding country level adoption of e-commerce: a theoretical model including technological, institutional, and cultural factors. *Journal of Global Information Management (JGIM)*, 28(1), 1-22.
- [2]. Borges, M., Hoppen, N., & Luce, F. B. (2009). Information technology impact on market orientation in e-business. *Journal of business research*, 62(9), 883-890.
- [3]. Chatterjee, D., Grewal, R. and Sambamurthy, V. (2002). Shaping up for e-Commerce: institutional enablers of the organisational assimilation of web technologies. *MIS Quarterly*, 26 (2), 65–89.
- [4]. Downs, G. W. and Mohr, L. B (1976). Conceptual Issues in the Study of Innovation. *Administrative Science Quarterly*, 21, 700-714.
- [5]. Field, A. P. (2009). *Discovering statistics using SPSS*, (3rd edition). Sage, London, 2009.
- [6]. Hair, J.F, Anderson, R.E. and Tathom, R.L. (2014). *Multivariate Analysis*, PPC Books, Tulsa, OK.
- [7]. Hofstede, G. (1980). *Culture's Consequences: International Differences in Work-Related Values*. Beverly Hills CA: Sage Publications.
- [8]. Lewis, Robert C. and Bernard H. Booms (1983). The Marketing Aspects of Service Quality, in *Emerging Perspectives on Services Marketing*, L. Berry, G. Shostack, and G. Upah, eds., Chicago: American Marketing, 99-
- [9]. Lin, H-F. and Lee, G-G. (2005). Impact of organizational learning and knowledge management factors on e-business adoption. *Management Decision*, 43(2), 171-88
- [10]. MacGregor, R.C. and Vrazalic, L. (2006a). E-commerce adoption barriers in small businesses and the differential effects of gender. *Journal of Electronic Commerce in Organizations*, 4 (2), 1-24.
- [11]. Molla, A. and Licker, P.S. (2005). Perceived E-Readiness factors in E-Commerce adoption: an empirical investigation in a developing country. *International Journal of Electronic Commerce*, 10 (1), 83–110
- [12]. Mondal, H. S., Hasan, M. T., Karmokar, T. K., & Sarker, S. (2017, September). Improving quality of service in cloud computing architecture using fuzzy logic. In *2017 4th International Conference on Advances in Electrical Engineering (ICAEE)* (pp. 149-152). IEEE.
- [13]. Mustonen-Ollila, E., & Lyytinen, K. (2003). Why Organizations Adopt Information System Process Innovations: A Longitudinal Study using Diffusion of Innovation Theory. *Information Systems Journal*, 13(3), 275-297.
- [14]. Nunnally, J.C. (1967). *Psychometric Theory*. McGraw-Hill, New York.
- [15]. Premkumar, G., Ramamurthy, K. and Nilakanta, S. (1994). Implementation of electronic data interchange: an innovation diffusion perspective. *Journal of Management Information Systems*, 11 2, 157–186.

- [16]. Rogers, E. M. (1995). *Diffusion of Innovations* (4th Edition). Free Press, New York.
- [17]. Salman, A. (2004). Elusive challenges of e-change management in developing countries. *Business Process Management Journal*, 10 (2), 140-157.
- [18]. Sutton, D. (2017). *Cyber Security: A Practitioner's Guide*. Swindon, UK: BCS, the Chartered Institute for IT.
- [19]. Tornatzky, L.G. and Klein, K.J. (1982). Innovation characteristics and innovation adoption–implementation: a meta analysis of findings. *IEEE Transactions on Engineering Management*, 29 (11), 28–45
- [20]. UN databases (2009). Fixed telephone lines per 100 inhabitants. The United Nations Statistics Division (UNSD). Available from: <http://data.un.org>, Accessed 4 December 2011.
- [21]. Vision 2030. (2016). Saudi Vision 2030. Retrieved from: <https://vision2030.gov.sa/en> [Accessed 18 May 2019]
- [22]. Won, J. Y., & Park, M. J. (2020). Smart factory adoption in small and medium-sized enterprises: Empirical evidence of manufacturing industry in Korea. *Technological Forecasting and Social Change*, 157, 120117.
- [23]. World bank (2019). Saudi Arabia. Available from: <https://data.worldbank.org/country/saudi-arabia?view=chart> [Accessed 7 August 2020]
- [24]. Zhu, K., Dong, S., Xu, S. X. and Kraemer, K. L. (2006). Innovation diffusion in global contexts: determinants of post-adoption digital transformation of European companies. *European Journal of Information Systems*, 15(6), 601-616
- [25]. Zhu, K and Kraemer, K. L. (2005). Post-Adoption Variations in Usage and Value of E-Business by Organizations: Cross-Country Evidence from the Retail Industry. *Information Systems Research*, 16(1), 61–84.
- [26]. Zhu K, Xu S, Kraemer KL, Korte W and Selhofer, H. (2006b). Contingency effects in innovation diffusion: why does the same technology attract firms differently?, Working paper, Center for Research on Information Technology and Organizations, University of California, Irvine.
- [27]. Zheng, X., Da Xu, L., & Chai, S. (2017). QoS Recommendation in Cloud Services. *IEEE Access : Practical Innovations, Open Solutions*, 5, 5171–5177.
- [28]. Zwass, V. (1996). Electronic commerce: structures and issues. *International Journal of Electronic Commerce*, 1(1), 3-23..