

The Effects of Relative Advantage, Compatibility and Complexity in the Adoption of EC in the Hotel Industry

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Abstract—The paper examines three technological factors that were identified by Rogers 1990 and Tornatzky and Klein 1982 as technological determinants for IT adoption. The main objective of this paper is to examine if there is a relationship between each of the technological factors (i.e. relative advantage, compatibility and complexity) and the extent of Electronic Commerce adoption in Business to Business (B2B) inbound and outbound communication as well as Business to Consumer (B2C) order-taking and B2C inbound communication. A quantitative research design was used through a questionnaire to collect the data from a sample of 332 hotels in South Africa 2012.

Index Terms—Adoption, compatibility, complexity, electronic commerce, and relative advantage.

I. INTRODUCTION

The term ‘e-commerce’ (EC) emerged some time ago when businesses started to realise that the Internet is a powerful medium for conducting business. [1] defines EC as the use of electronic communication and digital information processing technology in business transactions to create, transform and redefine relationships for value creation between or among organisations, and between individuals and organisations. [2] defines EC as any form of business, administrative transaction or information exchange between the organisation and the outside world that is executed using any form of ICT.

Several studies [3]-[6] used a number of determinants to assess the degree to which technological factors influence the extent of EC adoption. In the present study, the determinants used are: relative advantage, compatibility and complexity. It is, therefore, important to assess if the perceived relative advantage, compatibility and complexity of the industry have a positive relationship with the degree of adoption of EC in Business to Business (B2B) inbound and outbound communication, Business to Consumer (B2C) communication and B2C order-taking. [7] describe ‘technological context’ as a collection of technologies accessible for innovation adoption by an organisation. [8] studied thirty distinguished innovation attributes and [9] identified five technological characteristics. Amongst the five that [9] identified, three were the same as those studied by [8]. These three characteristics were relative advantage, compatibility and complexity. [8] concluded that these three characteristics are the ones that influence an organisation’s decision to use or ignore innovation. The purpose of the

study is to find out if there is a relationship between each of the technological factors and the extent of EC adoption.

II. RESEARCH HYPOTHESIS

Relative advantage: [10] defines the “relative advantage” of an innovation as “the degree to which the innovation is perceived as being better than the idea it supersedes”. Organisations must recognise that the adoption of innovation will either offer solutions to existing problems or present new production opportunities, such as increased productivity and improved operational efficiency [11]. A rational adoption decision in an organisation requires that one assesses the potential benefits of the new technology to the business. Organisations adopt a technology when they see a need for that technology, believing it will either take advantage of a business opportunity or close a suspected performance gap [12]-[14] argue that web technology is most likely to be adopted when organisations perceive that it will help with the sharing of business information within an establishment.

H1. Relative advantage has a positive impact on the extent of IT adoption use in the hotels.

Compatibility: Compatibility is defined as “the degree to which a technological innovation is perceived as being consistent with existing operating practices, beliefs, values, past experiences and needs” [10]. If previous technological ideas were introduced and were not accepted then the new ideas will be judged based on the performance of the previous ideas [8]. When organisations perceive that the technology they want to adopt is consistent with their beliefs, culture and values and there is no resistance to change from the staff, they will adopt that technology [13], [15]. The greater the compatibility with the felt needs, the greater the diffusion rate.

Attributes of compatibility can impact on the decision to use new technology because technology often requires establishments to change their existing business practices and operations in order to increase the benefits of using the technology.

[16] see compatibility as a key determinant of implementation as long as proper infrastructure is put in place, because companies do not want compatibility issues to become a problem when they implement IT. [17] concluded that one of the major problems in the adoption of IT is the incompatibility of new technologies with present standards and business procedures. Previously introduced ideas may hinder or help the adoption of new technology. Compatibility practices can have a positive role in deciding whether a new idea will be introduced [18], [8].

H2. Compatibility has a positive impact on the extent of

IT adoption in the hotels.

Complexity: [19] defines complexity as “the degree to which an innovation is perceived to be relatively difficult to comprehend and use”. The chances that a hotel will decide to implement technology that is complex are very low. [20] states that the adoption of IT is highly related to this perceived complexity. Because of previous experience with technology, complexity will consequently be negatively associated with IT adoption and any subsequent technology that emerges will not be accepted [14].

Very few organisations will want to spend time training the employees on the level of expertise because that is time wasted for them. Businesses would rather have people applying to them with the skill that is needed, than spend money on training employees [21]. Studies show that an organisation is less likely to accept a new technology if it expects that a high level of new expertise must be acquired by its employees [22], [13]. If employees find that it is difficult to use the technology they will not use the technology whatever benefits it may have [23], [24]. Concludes that the adoption of IT equipment is highly related to its perceived complexity. If the technology is easy to use it, is very likely that it will be adopted.

H3. Complexity has a positive impact on the extent of IT adoption in the hotels.

III. METHODOLOGY

The purpose of this study is to explore the experiences of the participants in relation to the introduction of new technology, specifically EC in the hotel industry, and to identify the unique conditions that may cause users to either accept or reject the new technology. According to literature some suggestions exist as to why some of the users resist using new technology. Some of the main reasons include the complexity of the new technology and previous experience.

The descriptive design was chosen because it examines the present status [25] and extent of adoption of EC within the South African hotel industry. A quantitative research design has been used for the study. To answer the research questions, the questionnaire was divided into the following sections: (1) relative advantage, (2) compatibility (3) complexity and (4) the degree of adoption of EC, which includes EC acceptance of B2B inbound communication, EC acceptance of B2B outbound communication, EC acceptance of B2C inbound communication and EC acceptance of B2C order-taking.

The hotels were drawn from the database of three major groups of hotels as suggested by the South African Tourism office [26]. The target population was hotel managers in South Africa because they make the final decisions on capital expenditure and they work directly with the information technology professionals. Systematic sampling was done from each of the groups so that they would all be represented.

400 questionnaires were e-mailed and reminders were sent out. After two months only 26 questionnaires were returned. The remaining questionnaires were self-administered and the researcher was able to get 306 questionnaires answered. Pearson's correlation analysis and Spearman's correlation were used to assess the relationship between technological factors and of each of the dependent variables [27].

IV. RESULTS AND DISCUSSIONS

TABLE I: CORRELATION ANALYSIS OF RELATIVE ADVANTAGE

	Correlation	Sig.
B2C outbound communication	0.0328	1.
B2C order-taking	.117	1.
B2B inbound communication	.029	1.
B2B outbound communication	0.13	1.

Seventeen questionnaire items were used to measure the relationship between the managers' perceptions of EC on relative advantage and the extent of EC adoption. Most of the hotels that were sampled believed that EC adoption could bring benefits to their organisation in different fields, such as reducing costs, enhancing their relationships with their suppliers and increasing sales [28]. The Table above indicates the four categories of EC adoption as well as the strength of the relationship of the manager's perception of EC on relative advantage. To examine the association between a manager's perception on relative advantage and the extent of EC adoption, Pearson *r* correlation analysis was employed [29]. All four categories showed a negative relationship with the extent of adoption of EC.

On the extent of the overall adoption prediction, it can be concluded, therefore, that the findings did not support the assumption that there could be a relationship between management perceptions of EC on relative advantage and each of the four categories.

The study indicates that relative advantage is not a predictor of the extent of adoption of EC within the hotel industry. Managers in the South African hotel industry (those surveyed) agree that relative advantage is not a predictor of adoption of innovation. However, in a study by [30], [31] South African firms were asked to state the benefits of EC and it was found that most of the firms at that time were not aware of its advantages.

TABLE II: CORRELATION ANALYSIS OF COMPATIBILITY

	Correlation	Sig.
B2C outbound communication	.165**	.003
B2C order-taking	.244**	.000
B2B inbound communication	.143*	.011
B2B outbound communication	.347**	.000

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Four items on the questionnaire were used to measure the relationship between a manager's perception and the extent of EC adoption. The descriptive statistics shows a mean score of 4.257. Most of the sampled hotels agreed that EC is compatible with their organisations as to experiences, values, beliefs, business needs and activities.

Cronbach's alpha value for this set of questions is 0.865. Pearson *r* correlation analysis is applied to investigate the relationship between a manager's perception on compatibility and the extent of EC adoption. All four dependent variables showed a positive relationship with the extent of EC adoption. The strength of the association between management perceptions of adoption of EC on compatibility, and each of the four dependent variables of EC adoption, from lowest to highest, is shown in Table II.

The correlation analysis indicates that there is a positive

association between the extent of adoption of EC and managers' perceptions of compatibility. The association is at the significant level of 0.01. [14] stated that organisations would be more willing to adopt technology if innovations were compatible with the environment and work practices.

TABLE III: CORRELATION ANALYSIS OF COMPLEXITY

Dependent variable	Correlation	Sig.
B2C outbound communication	.122*	.027
B2C order-taking	.295**	.000
B2B inbound communication	.338**	.000
B2B outbound communication	.195**	.000

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

A composite of four questions in the questionnaire was

TABLE IV: SHOWS THE MULTIPLE REGRESSION COEFFICIENTS

Predictor variable	B2C outbound communication		B2C ordertaking		B2B inbound communication		B2B outbound communication	
	Beta	Sig	Beta	Sig	Beta	Sig	Beta	Sig
Compatibility	0.052	.124	.144	.000	-.109	.000	.197	.000
Complexity	.234	.000	.521	.000	.306	.000	.288	.000

All the variables in Table IV have a positive influence on the extent of adoption of EC on all the dependent variables, except for B2B inbound which has a negative influence. Compatibility does not significantly contribute to the model for predicting the extent of adoption of EC on B2C outbound communication.

H1. relative advantage was not a predictor of EC.

H2. was a positive and a negative predictor in the other three variables.

H3. as anticipated, complexity was positively related to all the dependent variables.

V. CONCLUSION

Among the three technological factors that were researched the results show that complexity and compatibility have a positive relationship with the extent of EC adoption. Comparing the two factors, the results indicate that the relationship between complexity and the extent of EC adoption is stronger than it is between compatibility and the extent of adoption of EC. The results also show that relative advantage does not correlate with the extent of adoption of EC.

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