INFORMATION INTENSITY AND ITS EFFECT ON EC ADOPTION

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Abstract

The rapid advancement made by information technology have changed the policy of firms who conduct businesses, especially regarding selling their products and services. The main objective of this paper is to examine if there is a relationship between information intensity 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 methodology approach was adopted in this study. To check if information intensity has a relationship in EC adoption, data was collected from 332 hotel managers in South Africa. The collected data were analysed using correlation and multiple regression analysis. The study revealed that there is a relationship between information intensity and e-commerce adoption.

Index Terms—**information intensity, adoption, electronic commerce**

Introduction

Innovation is necessary for any establishment that exists in a changing environment. [1] [2] have found that information intensity encourages innovation adoption. Information intensity "refers to the degree of information that is present in the product or service of an organization" [3]. [4] state that businesses can improve their products with high information by means of information technology. The "information content of a product is the useful information within a product that is received and understood by the user of that product" [3]. Similarly, "the information of a product's value chain is said to be the information processing that is needed for processing the product in its final form" [3]. When there is enough information about a product, it is likely that the product will be adopted [3]. Therefore, higher information intensity results in an establishment perceiving innovation as being a competitive tool and this encourages the level of innovation that is adopted. For a complex product to be adopted, an establishment has to have sufficient information in order to have an understanding of the benefits of that product [5] [6]. Information intensity is important to the extent of IS adoption [7]. On the other hand, [8] argued that information intensity of products is insignificant when it comes to adoption. Consistent with most literature, [6] used information intensity to indicate the content and extent of IT usage in a firm's products and value chain. Firms that have low technology content in their products are expected to have low information intensity. But firms that have high technology content will also have high information intensity. Information intensity therefore depends on the level of IT used by a firm. It is only when there is enough information that a product can be easily accepted. Industries with high value chain information intensity should benefit more from investment in IT than those with low value chain information intensity.

The following studies [9] [10] have observed that information intensity stimulate innovation adoption. It is therefore important to find out if that is the case in EC adoption in the hotel industry; hence, this study looks at information intensity as an environmental factor for adoption of EC. The purpose of this study is to find out if there is a relationship between information intensity and the extent of adoption of EC (B2C outbound communication, B2C order taking, B2B inbound communication and B2B outbound communication).

In relation to an organisation having a website, the information has to be suitable for EC if the hotels are to have customers. Otherwise, customers will not know anything about the hotel if the hotel's products are not put on the website. Customers want to know about a hotel's rating, the technology that is available and any other facilities that are available. Hotels have to advertise on their website for potential customers to know about their prices. [12] Investigated the impact of information intensity on the adoption of e-commerce among SME's in New Zealand and found that the information intensity was influenced by the adoption of websites.

There is a relationship between the website and information intensity in relation to the hotel being able to access information quickly. The hotel has to access information quickly so that its employees can know about any new technological developments as well as any other developments needed or wanted by customers. Hotels need to know how many customers are coming and whether or not the hotel will be able to accommodate them. Confirmation also has to be made quickly so that customers are not inconvenienced. [11] states that the hotel industry is a very competitive business; if hotels do not access information on time and customers are delayed, the customers may well take their patronage to another hotel. The efficiency of the hotel relies on the efficiency of information processing.

Hotels have to be aware of the industry standards so that they can keep up with them and provide customers with up-to-date information [13]. Therefore the website must have the necessary information.

Hotels are in a more information intensive environment and are more likely to adopt e-commerce technology [11]. The products found in the hotels come with information regarding the characteristics, nature and method of usage. If the product is complex or the IT is complex the more information is required to describe the product and service of the hotels. [14] state that organisations in service oriented industries are likely to have higher information content in their products and services in comparison to manufacturing oriented industries. Therefore organisations like the hotels which are a service industry are more likely to adopt e-commerce technology.

Methodology

The purpose of the study is to find out if there is a relationship between the independent variable and the dependent variables. In the present study the independent variable used is information intensity and the dependent variables are B2C outbound communication, B2C order taking, B2B inbound communication and B2B outbound communication.

A quantitative research design has been used for the study. For the data collection, a correlation and descriptive survey has been used. Correlation was chosen because the researcher wanted to find out if there is a relationship between the information intensity and the dependent variables. A pilot survey of IT managers of 8 hotels was conducted. The questionnaire was self-administered and 332 were obtained giving an overall response rate of 83%. Pearson's correlation analysis and Spearman's correlation were used to assess the relationship between the independent variable and the dependent variables [15].

The South African Tourism office [16] suggested three major groups companies that would have a list of most of the hotels in South Africa. The target population was hotel managers in South Africa because they make the final decisions on capital expenditure. In most cases the manager's work directly with the information technology professionals so they would know what is going on in the IT department. Systematic sampling was done from each of the groups so that they would all be represented.

In the literature reviewed, the researcher identified information intensity as a success factor that was perceived as being of importance with regard to EC adoption by hotels in South Africa. [14] in his study found that information intensity had a strong positive relationship with e-commerce adoption, and thus higher levels of information intensities were related to higher e-commerce adoption. If the information intensity was high on a firm, then it is more likely for the firm to adopt e-commerce.

Findings

Table 1 below, indicates the four categories of EC adoption and the strength of the relationship between information intensity and the extent of EC adoption. To examine the association between information intensity and the extent of EC adoption, Spearman's 6 correlation analysis is employed. All the categories show a positive relationship with the extent of EC adoption, with a medium to small effect size. Hence, all of the four categories of EC adoption are statistically significant. The four categories of EC adoption showing the strength of the relationship between information intensity and the extent of adoption of EC are shown below.

Table 1: Correlation analysis of information intensity of EC

	Correlation	Sig.
B2C outbound communication	.465**	.000
B2C order taking	.358**	.000
B2B inbound communication	.467**	.000
B2B outbound communication	.503**	.000

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

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

The statistical significance of information intensity in the four dependent variables is at the significance level of 0.01, between information intensity and the extent of adoption of EC. On B2C outbound communication the correlation coefficient r is 0.465; B2C order taking correlation coefficient r is 0.358; B2B inbound communication correlation coefficient r is 0.467 and B2B outbound communication correlation coefficient r is 0.503. The effect is positive in all four variables and the strength of the relationship is medium.

A mean score of 4.207 indicates that the hotel managers surveyed are in agreement that they are working in an information intensity industry. This tells us that hotels need up-to-date information in order to survive in the hotel industry.

Table II: Multiple regression analysis on the extent of EC adoption

Equation	RMSE	R-sq	F	P
B2C outbound communication	1.019	.221	6.296	.000
B2C order taking	.874	.204	5.681	.000
B2B inbound communication	1.354	.124	3.137	.002
B2B outbound communication	1.265	.296	9.333	.000

RMSE = Root Mean Square Error

Regarding the extent of the overall adoption prediction, all the dependent variables have a positive influence on the extent of adoption of EC on information intensity as shown in Table II. The dependent variables significantly contributed to the model for predicting the extent of adoption of EC on information intensity prediction.

The R^2 overall variation is explained by the independent variables in the model. In the case of B2C outbound communication, the value is .221, which means that 22.1% of the variance in the overall extent of EC adoption on information intensity prediction is explained by this model. This finding, which is consistent with the findings of [17] shows that if the information intensity of a product or service is high, the degree of information system acceptance will be high as well.

Conclusion

The environmental factor used in this study is information intensity. There is a positive relationship with the extent of adoption of EC with information intensity. The research in this study therefore confirms that: Information intensity has a significantly positive relationship with the extent of adoption of EC in B2C outbound communications, B2C order taking, B2B inbound communication and B2B outbound communication.

Information intensity can be explained as the degree of information that is in the product or service of an organisation [18]. The average score for information intensity was 4.21, and this indicates that most of the South African hotel managers who were surveyed believe that the hotel industry is an industry of high information intensity.

The correlation analysis indicates that there is a positive association between the extent of adoption of EC and information intensity. The significant level of information intensity is 0.01. The relationship between information intensity and each of the following categories is positive: B2C outbound communications, B2C order taking, B2B inbound communication and B2B outbound communication.

The findings of this study are consistent with studies stating that information intensity has a positive association with the adoption of innovation [6]. [19] also found information intensity is significant to the extent of IS adoption, unlike [12], however, who found information intensity to be an insignificant factor regarding the adoption of innovation.

References

[1] [1]   L. Pitt, D. Cyr, and C. Campbell, "E-readiness and trust: macro and micro dualities for e-commerce in a global environment" *International Marketing Review*, vol. 25, no. 6, pp. 700-714, 2008.

[2] D. Naranjo-Gil, "The influence of environmental and organisational factors on innovation adoptions: Consequences for performance in public sector organisations," *Technovation,* no. 29, pp. 810-818, 2009.

[3] S. Whitaker, and V. Bellotti, "Email in Personal Information Management," *Communication of the ACM*, vol. 49, no. 1, pp. 68-73, 2006.

[4] T. G. Kim, J. H. Lee, and R. Law. "An empirical examination of the acceptance behaviour of hotel front office systems: An extended technology acceptance model," *Tourism Management,* pp. 500-513, 2008.

[5] N. Mndzebele, "The adoption of EC in B2C Order-taking in the hotel industry," *International Journal of Advanced Computer Technology*, vol. 2, no. 2, pp. 82-85, April 2013.

[6] A. Chandra, and T. G. Calderon, "Information intensity, control deficiency risk, and materiality," *Managerial Audinting Journal* , vol. 24, no. 3, pp. 220-232, 2009.

[7] T. S. H. Teo, C. Ranganathan, C. and J. Dhaliwal, "Key dimensions of inhibitors for the deployment of web-based business-to-business electronic commerce," *IEEE Transactions on Engineering Management ,* vol. 53, no. 3, pp. 395-411, 2006.

[8] NM. Gbolbakhloo, D. Arias-Aranda, J. Benitez-Amado, "Adoption of e-commerce application in SMEs", *Emeralds ,* vol. 111, no.8, pp. 1238-1269, 2011.

[9] N. Kshetri, "Barriers to e-commerce and competitive business models in developing countires: A case study," *Electronic Commerce Research and Applications,* vol. 6 no. 4, pp. 443-452, 2007.

[10] L. Chi, K. G. Jones, A. L. Lederer, P. Li, Newkirk, H. E. and Seth, V. "Environmental assessment in strategic information systems planning," *International Journal of Information Management* , vol. 25, no. 3, pp. 253-269, 2005.

[11] N. A. Y. Al-Qirim, "Personas of e-commerce adoption in small businesses in New Zealand," *Electronic Commerce in Organisations ,* vol. 4, no. 3, pp. 18-45, 2006.

[12] N. M.Mndzebele, "The Use of Information Communication Technologies in South African hotels-a self evaluation by hotel managers" Doctoral dissertation at University of KwazuluNatal, 2012.

[13] C. J. Liang, H. Chen, and W. H. Wang, Does online relationship marketing enhance customer retention and cross-buying. *The Service Industry Journal ,* vol. 28, no. 6, pp. 769-787, 2008.

[14] R.N.A.Almoawi and R. Mahmood,, "Applying the OTE model in determining the e-commerce adoption on SMEs in Saudi Arabia," *Asian Journal of Business and Management Sciences,* vol. 1, no. 7, pp. 12-24, 2012.

[15] P. Leedy, and J. E. Ormmrod, *Practical Research (Planning and Design).* New Jersey: Pearson Merrill Prentice Hall, 2005.

[16] TGCSA, T. G. Listing of graded hotels by province [online] URL: www.tourismgrading.co.za Accessed 20 April, 2009

[17] S. Mithas, and J. Whitaker, "Is the World Flat or Spiky? Information Intensity, Skills, and Global Service Disaggregation," *Information Systems Research* , vol. 18, no. 3, pp. 237-259, 2007.

[18] J. Y. Thong, "An intergrated model of information systems adoption in small business" *Journal of Management Information Systems* , vol. 15, no. 4, pp.187-214, 1999.

[19] H. F. Lin, and G. G. Lee, "Impact of organisational learning and knowledge management factors on e-busienss adoption," *Management Decision , vol. 43, no.* 2, pp. 171-188, 2005.

[20] U. Sekaran, and R. Bougie, R. *Research Methods for Business: A skill Building Approach.* West Sussex, United Kingdom: WILEY, 2010.

[21] M. D. Olsen, and D. J. Connolly, "Experiencce-based travel: how technology is changing the hospitality industry," *Cornell Hotel and Restaurant Administration Quarely ,* vol. 40, no. 1, pp. 30-40, 2000.

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