E-Services Usage Evaluation; Applications' level of Co-Creation and Digitalization

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Abstract

Nowadays, many traditional services have been moved or planning to move to the electronic environment. As a result of this movement enterprises need to realize the users' motivations regarding the electronic service applications. Electronic services have been classified on two dimensions, the degree of digitization and the ability for co-creation in 2*2 matrix. This paper aims to evaluate the usage of these four areas. In this regard, 38 services have been introduced under the eleven e-service applications, and then a questionnaire was distributed among 172 e-service users. The results show that services with the high level of digitalization and the low level of co-creation be mostly used.

Key Words

E-service, Digitalization, Co-Creation, E-commerce, Classification of Service.

I. INTRODUCTION

Increases in labor costs and innovations in technology have contributed to the growth of Internet-based e-service. Customers use the new technologies to produce and consume services without direct personal contact with companies. E-services can be used to deliver the products

and services effectively. In other words, it can transform and mechanize the customers' relationship and marketplace. Therefore, several firms have been begun to develop and implement the e-service to expand their performance effectiveness and efficiency. This expansion and evolution significantly affect on the customer behaviour (Sharma 2007).

Although e-service would reduce the cost of any transaction it can adjust the customer desires by movement from time and location based activities to nonlocational and nontemporal behaviours (Watson, Leyland et al. 2002). However a system can improve the job performance but sometimes users are not eager to use the systems (Nickerson 1981; Mathieson 1991). E-services are offered to consumers to not only provide better customer service, but also to offload labor-intensive activities from the provider to the consumer. Implementing e-services is a central strategic imperative for many consumer related businesses and while the technology protocols are developing quickly, little is known about how consumers perceive and evaluate e-services, as well as what attributes of the human computer interface e-service providers can use to encourage rapid consumer adoption (Featherman and Fuller 2003). E-Services are important for consumers in business environment because they represent the ways to provide demand solutions to the customers, which in turn strengthen customer service provider relations, create transactional efficiencies, and improve customers' satisfaction (Ruyter, Wetzels et al. 2001).

Nowadays, e-services are applied in various applications such as e-ticketing, e-government, e-commerce, e-health, e-banking, e-booking, e-education. (Sheth and Sharma 2007) classified products and services on two dimensions, the degree of digitization and the ability for co-creation. This study is going to introduce 31 services under eleven e-service applications and categorized these applications under the 2*2 matrix to evaluate the usage of these services base on the defined categories.

II. CLASSIFICATION OF PRODUCTS AND SERVICES

Sheth and Sharma (2007) classified products and services on two dimensions, first dimension is the degree of digitization which is defined in their framework as "the degree to which the product or service can be digitized" and the second aspect is the ability for co-creation which "involves both the marketers and the customer interacting in aspects of the design, production and consumption of the product or service" (Sheth, Sisodia et al. 2000; Prahalad and Ramaswamy 2004).

For better understanding some examples are given. There are some services or products that their entire delivery and interaction are digitalized such as iTunes. In contrast, although the process around the physical products can be digitalized but they have to be manufactured and delivered physically (Sheth and Sharma 2007) so they have a small scope of digitalization, the examples are commodities like shoes (www.otabo.com), cloths (www.obeyclothing.com) and jewellery (www.goldpalace.com). Regarding the second dimension, it can be seen in material products such as Dell computers and services like hair styling. Nevertheless, some providers design standard services and products like online payment so level of co-creation is low.
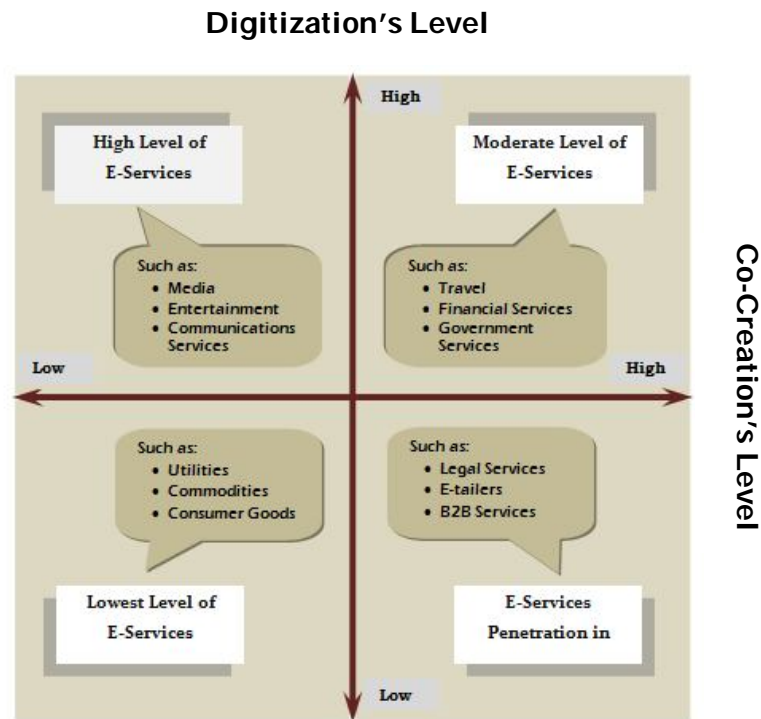
Digitization's Level

FIGURE 1: CLASSIFICATION OF SERVICE AND PRODUCT

Although some services and products cannot be changed, costumers are able to create their own outcome examples are like hand phones that users can form their own screen and sound (Sheth and Sharma 2007) and further, Yahoo calendar which is created and stored as an algorithm by yahoo programmers but users can producing different appearance and feature and interactions (Hofacker, Goldsmith et al. 2007). Lastly, there are some service and product that may provide a high level of co-creation such as legal services (Sheth and Sharma 2007). Figure 1 shows the classification of service and product with respect to the dimensions in 2*2 matrix (Sheth and Sharma 2007).

There are eleven different types of e-service applications which are e-health, e-ticketing, e-booking, e-banking, e-government, e-education, e-commerce, entertainment, social networking, communication services and information access. For each of these applications, some services have been introduced which can be seen in Figure 2.

e-health	• E-healthcare
e-ticketing	• Buy flight ticket • Buy a concert ticket
e-booking	• Hotel booking • Travel services
e-banking	• Bill payment • Transfer money • Applying for loan • Check exchange rates
e-government	• Financial Services • Legal services • License renewals • Filing and payment of income taxes
e-education	• e-library • Online classes • Downloading notes • Checking marks • Downloading forms • Examination and registration
Social networking service	• Social networking service
e-commerce	• E-commerce • Marketing • Commodities like cloths and books (buy) • Scientific Paper (buy) • Any kind of downloading like music (buy) • Commodities like cloths and books (sell) • Scientific Paper (sell) • Any kind of downloading like movie (sell)
Entertainment	• TV stations • Radio stations • Newspapers • Online games • Online music • Online movies
Communication Services	• Email and chat sites • Other communication services (forums and …)
Information Access	• Using Web search engines like Google • Journals

FIGURE 2: E-SERVICE APPLICATIONS

III. METHODOLOGY

The questionnaire has been developed and distributed among the 172 e-service users to answer

which of the introduced services they are using. Then the mean for each of the services are calculated. Afterward, according to the classification of services based on the four defined categories (High level of digitization with high level of co-creation, Low level of digitization with high level of co-creation, High level of digitization with low level of co-creation and low level of digitization with low level of co-creation), the geometric mean will be analyzed and compared.

IV. ANALYSIS

As it can be seen in Table 1, the number of females that participant in the survey is more than males. Also none of the respondents are below 19 years old and most of them are among young generation of the society, 48.8% are from 20-24 years old and near 24% are from 25-29. The superior point of the demographic section is that near nine out of ten of the respondents have been using e-services about or more than a year so since the main question of questionnaire is about the e-service usage therefore the results of the survey would be more reliable. On the other hand, 40% of e-service users contributed in the survey mentioned that they use e-services monthly and near 24% and 19% stated respectively weekly and daily usage of e-services.

TABLE 1: DESCRIPTIVE STATISTICS

Items		N	Percentage
Gender	Male	76	44.2
	Female	96	55.8
Age	19 or Under	0	0
	20-24	84	48.8
	25-29	41	23.8
	30-34	29	16.9
	35 or older	18	10.5
How long have you been using e-services	More than a year	109	63.4
	About a year	38	22.1
	More than a month	10	5.8
	Less than a month	8	4.7
	None	9	5.2
How frequently do you use e-services	Daily	32	18.6
	Weekly	41	23.8
	Monthly	70	40.7
	More than once a day	25	14.5
	None	6	3.5

Table 2 shows the e-services' application which are at the high level of co-creation. As it can be seen, transfer money (e-banking service) with 76% has the highest usage and then journals, using Web search engines like Google, applying for loan and bill payment with respectively 75%, 73%, 68% and 65% have the top ranks. On the other hand, the lowest usages are for filing and

payment of income taxes, e-healthcare, e-library and license renewals.

Furthermore, the last column shows the geometric mean of each e-service classes which have been calculated as below:

If a_1, a_2, …, a_n are non-zero positive numbers, then their G.M.(G) is given by

$$G = (a_1a_2a_3, ……, a_n)1/n$$

Therefore, e-services with the high level of digitization and high level of co-creation with 14.26% are more used than e-services with low level of digitization and high level of co-creation with 11.29%.

TABLE 2: ANALYSIS OF E-SERVICE APPLICATIONS WITH HIGH LEVEL OF CO-CREATION

Class of e-service	Application (service)	Count	Percentage	Geometric Mean (Percentage)
High level of digitization with high level of co-creation	Buy flight or train ticket	69	40	14.26
	Buy a concert or cinema ticket	26	15	
	Financial Services	15	8	
	Filing and payment of income taxes	2	1	
	Bill payment	113	65	
	Transfer money	132	76	
	Applying for loan	117	68	
	Check exchange rates	17	9	
	Marketing	16	9	
	Hotel booking	15	8	
	Travel services	30	17	
	e-healthcare	7	4	
	Journals	129	75	
	Using Web search engines like Google	125	73	
	e-library	7	4	
	Online classes	47	27	
Low level of digitization with high level of co-creation	Legal services	21	12	11.29
	License renewals	12	6	
	e-commerce	36	20	
	Commodities like cloths and books (buy)	35	20	

From another perspective, as it is shown in Table 3, downloading forms and examination and registration with 74% and 68% have the highest usage among the e-services with the low level of co-creation. Whereas, selling commodities like cloths and books, selling scientific papers and checking marks have the lowest usage.

Moreover, it is obvious from the results that the e-services with the high level of digitization

and low level of co-creation with 20.28% of geometric mean has been more used than e-services with low level of digitization and low level of co-creation with only 6.32%.

TABLE 3: ANALYSIS OF E-SERVICE APPLICATIONS WITH HIGH LEVEL OF DIGITIZATION

Class of e-service	Application (service)	Count	Percentage	Geometric Mean (Percentage)
High level of digitization with low level of co-creation	Scientific Paper (buy)	25	14	20.28
	Scientific Paper (sell)	8	4	
	Any kind of downloading like music (buy)	77	44	
	Any kind of downloading like movie (sell)	35	20	
	TV stations	60	34	
	Radio stations	18	10	
	Online newspapers	15	8	
	Online games	39	22	
	Online music	16	9	
	Online movies	37	21	
	Email and chat sites	32	18	
	Communication services (forums and …)	95	55	
	Social networking service	58	33	
	Downloading notes	46	26	
	Checking marks	13	7	
	Downloading forms	128	74	
	Examination and registration	118	68	
Low level of digitization with low level of co-creation	Commodities like cloths and books (sell)	4	2	6.32
	Commodities like cloths and books (buy)	35	20	

V. DISCUSSION AND CONCLUSION

It is believed that both enterprises and costumers would like to employ the system in the high level of digitization and low level of co-creation as a result it is expected that the maximum level of penetration would occur in these industries such as television stations, journals, radio stations and newspapers. Furthermore, in a quantity of entertainment industries like music download, if corporations do not supply electronic services it may result in less competitive thus it is expected that they also have the high level of electronic services penetration (Sheth and Sharma 2007).

In cases, where industries supply both co-creation and digitization in high levels, the moderate level of electronic services is expected. For example, a costumer can book the flight ticket; choose his/her seat in the plane and do the payment online but the real travel occurs physically! Likewise, in financial sectors although most of the transactions can be digitalized, all co-creation cannot be carried out using electronic services and additionally, in case of account modification, human intervention is required (Sheth and Sharma 2007).

On the other hand, Sheth and Sharma (2007) cleared that if firms are not able to digitalize the service and product, but there are high levels of co-creation, electronic services will be used in the fulfillment processes. For instance, e-tailer can conduct all users' transactions electronically except the material distribution like Amazon. The same, in HP, all invoices are processed using e-service (OB10). Though, lawyers retain the personal and complex cases but they have moved a number of basic legal services to the online environment .

Moreover, enterprises will slowly adopt e-service when the level of digitization and co-creation is low, because costumers and firms cannot obvious the benefits of electronic service. Instances are commodities, electricity and water utilities that have limited electronic services platform.

This paper introduced 31 services under eleven e-service applications. The results of this study support the finding by Sheth and Sharma (2007) that most of the users are using e-services with high level of digitization and low level of co-creation and after that the e-services with high level of digitization and high level of co-creation. For future work, the e-service could be classified based on the fulfillment process and its prototyping and then the user intention to use of new categories need to be evaluated

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