Internet adoption and usage patterns among Students in selected South African Universities

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Abstract: This study examines the case of student adoption and usage patterns of the Internet as an innovation in delivering important services that include financial services. The quantitative approach employed in this study utilizes an extended version of Rogers' model of perceived innovation attributes. Consistent with previous studies, the perceived innovation attributes were found to be important determinants of students' adoption decisions. However, two dimensions, namely relative advantage and perceived usefulness were found to influence this consumer groups' adoption decisions more prominently, thus highlighting the complex nature of the innovation and adoption decisions for Internet services users.

Keywords: *Innovation; usage patterns; perceived attributes; Internet*

1. Introduction

This paper is fundamentally concerned with the question of what drives the youth segment in this case students, to adopt or reject an innovation. In this study the specific case of the Internet, a comprehensive medium is examined. Much of the available literature in the area of Diffusion of Innovations, or adoption of new technological innovations particularly in the form of products and services is concerned with the success of new product launches (Black et al., 2001). Black et al. (2001) add force to the argument that new product and service launches is not only an area of importance to academics, it is also important to practitioners particularly given the increasing rate of change in technology, the competition as well as in consumers' needs. Black et al. (2001) however, concur with previous studies that have shown that, the vast majority of products and services, which are, launched every year fail at considerable cost to those involved (Foxall, 1994; Rugimbana, 1998; 2007; Shambare, 2013). It follows then that, a clearer understanding of the influencing factors behind the consumer decision of whether to adopt or not adopt an innovation is likely to be of considerable academic and practical value. Equally, from a consumer behaviour perspective, the issue of understanding the different usage patterns or "differential rates of adoption" as Black et al. (2001) put it becomes an important area for researchers who seek to improve our understanding in this area. The Internet is an interesting innovation that leads to various service implications. However, its services characteristics may imply a greater sense of perceived risk and uncertainty in terms of consumer evaluation. For this reason, the internet presents particular interest for the understanding of the decisions for its adoption and corresponding usage patterns. This is an important observation, which helps in setting the scene for this study. That is, essentially to assess the importance of the attributes or characteristics of the internet services. Second, how these influence their adoption and usage patterns and as perceived by the youth segment (in this case as represented by students) in two South African Universities. To achieve this, the rest of the paper is structured as follows: It commences by presenting an overview of the relevant literature to provide the theoretical background for the study. Thereafter, the methodology is presented and the subsequent section presents the findings from the administered survey. The paper concludes with a discussion of the implications of the findings for theory and practice.

2. Literature Review

Over the last five decades or so, researchers have used or suggested a wide range of attribute descriptors in an attempt to obtain measures of preference behaviour for competing products and brands (Lancaster, 1966; Baumol, 1967; Ratchford, 1975). However, it is only in times that are more recent that researchers have made the effort to test the reliability of the concept of perceived attributes of innovations as predictors of choice behaviour (Ostlund, 1972; Rugimbana, 1994, 2007, Shambare, 2013). This development seems to have been made possible

by efforts by researchers to group or classify various attributes of innovations into specific frameworks. The classification process is essentially based on distinguishing the various product related attributes in terms of their inherent utility nature, their points of similarities and differences, and the implications they have for scaling methodology as well as overall effects on consumer choice behaviour (Myer & Shocker, 1981). After an extensive review of the literature on the nature of product attributes, and also based on their own work, Myers and Shocker (1981) proposed that most product/service attributes that are of interest to marketers fall into three major categories as follows. These are: (i) *Product referent attributes [or characteristics]* mainly consisting of physical characteristics or properties of a product that are deemed objective. (ii) *Outcome Referent attributes [or benefits]* which reflect the perceived results or outcomes from using a product/service. The latter primarily involves instrumental types of outcomes, but also includes ambient conditions surrounding use, and (iii) *User referent attributes [or imagery]* which essentially reflects what the usage of the product or service implies or says about the person who is selecting or using it. According to the latter authors, such attributes basically refer to expressive properties and are subjective in nature.

Based on these seminal works, the extant literature now shows that there are various diffusion models or Technology Acceptance (TA) models that have been developed to gauge the acceptance of products, which are innovations, by their nature, based on their perceived attributes. However, it would appear that the most dominant theoretical framework for analyzing adoption and non-adoption of innovations based on innovation attributes has been the Rogers (1962; 2003) model. In this model, the perceived attributes of an innovation have been found to be the key predictors of whether or not an innovation will be adopted by consumers (Rugimbana, 1998, 2007). A number of these studies have also included the additional dimension of perceived risk (e.g. Ostlund, 1974; LaBay & Kinnear, 1981; Rugimbana & Iversen, 1994; Holak, 1988; Lockett & Littler, 1997). Black et al. (2001) argue correctly that much of the works that are available in the area of *diffusion of innovations*, have been undertaken largely in the context of the consumers' adoption of the *tangible* innovative products. They further point out that the innovation of delivering services (such as finance) through the Internet is quite different in that it represents a more complex interaction between an intangible service (which is high in credence qualities) and an innovative medium of service delivery.

With respect to the Internet, a review of the relevant literature of the Diffusion of Innovations brings to light a number of important patterns. First many available works in this area have concentrated on providing evidence of the association between consumers' acceptance/non-acceptance of the Internet and personal characteristics (Teo, 2001; Hinson, 2005), and more recently, *intentions to use* (Fusilier & Durlabhji, 2005; Teo & Noyes, 2011; Park, & del Pobil, 2013). While the information gained from such associations has been useful, particularly in helping commercial organizations to understand and react to the more visible demands of the Internet communications marketplace, the apparent lack of information about consumer usage patterns would suggest that research focus might need to be directed towards other factors. As pointed out earlier in this paper, the most dominant theoretical framework for analysing the adoption and non-adoption of innovations has been the Rogers (1962) model. In this model, the perceived attributes of an innovation have been found to be the key predictors of whether or not an innovation will be adopted by consumers (Rugimbana, 2007; Shambare, 2013). Rogers (2003:265-266) identified five characteristics or attributes of innovations that affect the rate at which innovations are adopted (and ultimately their usage patterns): their relative advantage, compatibility, complexity, divisibility (trialability) and communicability (observability). Additional characteristics were later added; perceived risk (Ostlund, 1974) and financial and social cost (Zeithaml, 1981).

The relationships between these characteristics or attributes and the nature of their influence on adoption are discussed as follows. First, relative advantage (or convenience) is concerned with the degree to which an innovation is perceived by potential adopters as being better than the idea, product or service it supersedes (Rogers, 1962; 2003). According to Szymigin and Bourne (1999), an important factor here is that superior performance of an innovation is only as *subjectively* perceived by the consumer. Second, compatibility of an innovation is defined as the degree to which an innovation is perceived as consistent with past values, experiences and the needs of the potential adopter (Rogers, 1962; 2003). In the case of the Internet, this concept of compatibility may refer to a consumer's familiarity with the use of the Internet. Third, trialability refers to the degree to which an innovation is perceived as being subject to being tried on a limited basis prior

to any decision to adopt (Rogers, 1962; 2003). Clearly if an innovation can be easily trialed, this can have important effects on lowering perceived risk levels. Finally, the observability of an innovation such as the internet describes the extent to which an innovation is visible to other members of a social system (Rogers, 1962; 2003). It follows then that the more recognizable an innovation (and its benefits), the greater the likelihood of its adoption (Black et al., 2001).

The aforementioned perceived innovation attributes are positively related to the adoption of an innovation. However, there are two that are negatively correlated to the adoption of an innovation. These are complexity and perceived risk. According to Rogers (1983), the complexity of an innovation is the degree to which it is perceived as relatively difficult to understand and use by members of a social system. According to Singh, (1966), with the exception of relative advantage, the complexity of innovations is more highly correlated to their rate of adoption than any other characteristic of the innovations. This attribute is therefore expected to be of considerable significance in relation to the adoption of the internet. In the case of the internet service, there have been a limited number of studies into the adoption of related new technologies for distribution (for a review, see Hinson, 2005). While these studies are indicative of the relevance of the Rogers framework in the adoption of the internet, more studies are needed that examine the adoption of the internet in differing contexts. Consequently, strategic questions such as how consumers perceive the Internet technology and the patterns of its usage have remained largely unanswered. In addition, although recent marketing literature - notably that emanating from the USA (United States of America) and the UK (United Kingdom) reflect strong growth in Internet usage, much less is known about its adoption and patterns of its usage amongst the youth, in particular amongst university students in African countries (Hinson & Amidu, 2006). The present study was initiated in response to these apparent gaps in the literature on the Internet. As such, the study aims to examine the Internet usage patterns of students (who invariably represent the youth segment) in two universities based in Tshwane; namely the Tshwane University of Technology (TUT) and the University of Pretoria (UP).

3. Methodology

Data collection and survey instrument: Given the descriptive nature of the study, it was decided to utilize a quantitative approach. Using a self administered questionnaire was deemed appropriate subsequent to it being pretested on some 20 participants and appropriate amendments made. The advantage of using a questionnaire is that it provides standardisation across all the respondents interviewed (Malhotra et al., 2006). The essential or *core* aspects of the instrument itself were based on the Rogers model. Since this conceptual frame has been tested in numerous studies for validity and reliability (Rogers, 1962; Rugimbana, 1994; 2007) these tests were not deemed necessary here.

Sample method and size: In all, a convenience sample of some three hundred (300) students from two universities, that is, Tshwane University of Technology and University of Pretoria was utilized applying a campus intercept approach. The size of the sample (150 students per institution) selected for the survey is in keeping with that of similar studies on internet usage (Hinson & Amidu, 2006). The choice of a convenient sampling approach was made because complete databases of these students were classified as “confidential” and not accessible to the researchers to allow for non-probability sampling.

4. Findings and Implications

Since the main aim of the study was to ascertain the extent to which the perceived attributes of the Internet as an innovation influenced adoption and usage patterns by students at both institutions, it was then necessary to assess the latter against Roger’s (1962) individual attributes. The subsequent analysis and outcomes are presented below-

Relative advantage: the results for this attribute of the Internet were obtained under three sub-headings of 1) *Economic benefits*, 2) *Convenience* and 3) *Service levels*. (please refer to Table 1. for details).

- **Economic benefits:** From the results, 91 per cent of respondents agreed that using the Internet is the fastest way to obtain information. In consent with this view 73 per cent of respondents agreed that using the Internet services is time-saving. Not surprisingly only some 36 per cent of respondents were neutral in their opinion regarding the affordability of connecting to the Internet whilst off campus.
- **Convenience:** The results to this attribute were somewhat mixed. Although some 35.67 per cent of the sample was neutral in their opinion in regards to the availability of the Internet without any system interruptions, some 57 per cent, of the sample agreed that this innovation medium was very convenient through ease of connectivity. This response correlates strongly with the samples response to the many ways available to connecting the internet to other complementary devices such as “cell phones”, “cell phones as modems” and “3G cards”.
- **Service level:** over 83 per cent of the sample either strongly agreed or agreed that the Internet offers current and updated information. Some 68 per cent of these respondents also acknowledged that they can perform their tasks faster and safely when using the Internet.

The overall results for the above attribute clearly suggest that users do recognise significant benefits of the internet or its *relative advantage* as an innovation. This response correlates with available data on the relatively high expenditures on Internet usage, the high average duration of an Internet session, and level of computer literacy as well as their overall Internet literacy.

Compatibility: For many of the users of the Internet, compatibility with their lifestyles, experience and values appeared to be an important issue. From the responses, over 57 percent of the sample agrees that they can perform their normal tasks on the Internet and 59 per cent also agree that they can perform their transactions on the Internet. As expected, many participants were enthusiastic users of IT and tended to also adopt other complimentary technical equipment such as 3G cards etc. This contributed to a noticeable degree of acceptance of the Internet as a distribution channel. Consequently, the degree to which an innovative channel such as the Internet is compatible with the individual’s past experiences and values appears to have a significant impact on willingness to adopt. In this study, respondents generally felt that the Internet was an important part of their lifestyle and were also relaxed about computers in general. Although *perceived usefulness* is not one of the nominated attributes of Roger’s model, in this study it was introduced mainly as an expression of the degree of compatibility. The majority of the sample agreed to four out of the five statements presented above. 1) First Some 81 per cent of respondents felt that the Internet enables them to perform their tasks quicker, 2) Over 70 per cent found the Internet useful to their work and 3) Some 54 per cent believed that it enhances the quality of their work, whilst 4). More than 50 per cent agree that using the Internet made it easier to perform their work.

Figure 1: Perceived Compatibility

Complexity: There were generally mixed results on this attribute as well. Whereby most respondents were positive and comfortable about using the Internet, a notable 58 per cent of the sample found the Internet to be daunting. Among the latter was the view that memorising passwords presented difficulties. Overall, the perception of the complexity involved when using the Internet was inversely related to a participant's experience with other technologies such as computers.

Figure 2: Perceived Complexity

Trialability: The findings on this attribute were somewhat mixed, whereas 81 per cent of the sample agreed that one can get relatively quickly used to the Internet, provided one is literate, a good number of respondents (48 per cent) were neutral or disagreed. This pessimism is also reflected on a related question where only 58 per cent of respondents felt that the performance of tasks can be undertaken effortlessly whilst using the Internet. Other studies have shown for example, that where financial services providers have provided web pages containing demonstration facilities, respondents have warmed to these and emphasized their usefulness (Black et al., 2001). This highlights the fact that trialability is a crucial stage in adoption/usage. However, although Web-based demonstrations have been shown to be useful, other opportunities for trial need to be extended to consumers who may not own computers at home.

Figure 3: Perceived Trialability

Observability: Although the use of the Internet for undertaking say financial transactions or online purchases is not visible for other members of the society, it is widely discussed in social settings. Due inter alia to social

pressure the Internet has become more popular not just for say enacting financial transactions, but also for socializing. The rise in popularity of social forums such as **Face-book**, **MySpace** etc is testimony to the recognition of this innovation. This is a theme, which has emerged strongly from this study. Accordingly, most respondents agreed that it is an important social forum with 74 percent agreeing that their family and friends use the Internet. Significantly, however, up to 78 per cent of respondents felt that people could not afford an Internet connection at home.

Thus, it appears that using the Internet has tremendous association with social contact and esteem and therefore the extent to which others have been influenced through social pressure to use it, does appear to be a contributor to its acceptance, usage and adoption. In the case of South Africa universal connectivity and access is still a problem.

Figure 4: - Perceived Observability

Perceived risk: Perceived risk is analyzed here in terms of three forms of risk; *functional risk*, *security risk* and *service level risk*;-

- **Functional risk:** Some 83 per cent of respondents believed that viruses can be very harmful to their personal data and 74 per cent felt strongly that a possible computer mal-function would be risky for their personal data.
- **Security risk:** Some 64 per cent of respondents agree that their personal details or data can be hacked and 53 per cent also agree that their privacy is not guaranteed.
- **Service level:** Over 69 per cent of the sample agreed strongly that there are many dangers including sexual prowlers on the Internet and at least 61 per cent strongly felt that a low self-esteem could make an Internet user vulnerable to these online dangers. (please refer to table 2 for details).

5. Discussion and Conclusion

Overall, all five (5) attributes of innovations were found to be significantly applicable in explaining participant adoption behaviour. By implication, this study has shown that the reliance on perceptual variables to predict Internet usage may have significant implications for marketing practice particularly where members of the youth demographic are concerned. Given that internet services are designed essentially to suit individuals who prefer convenience, quicker service, more frequent and less face-to-face services, one would expect that young consumers more likely to use these e-banking services are those who are anti-social or more reclusive. However in this study it was found that apart from the most important attributes as perceived by the study sample using a *goodness of fit test*, that is, its *“relative advantage”* or convenience and its *“perceived usefulness”* young consumers use the Internet because of its tremendous association with social contact and esteem and therefore the extent to which others have been influenced through social pressure to use it, does appear to be a contributor to its acceptance, usage and adoption. This is despite anecdotal evidence that suggests that in South Africa, universal connectivity and access is still a problem. In addition

and specifically in the cases of the attributes of “*relative advantage*” and “*perceived usefulness*” the organizations in this case universities, that make use of websites for marketing purposes (De Jager & Du Plooy, 2010) would have a competitive advantage if these are regularly updated given that many students who seek these attributes rely heavily on them. Attempts to simplify browsing and usage of web pages should also be considered in order to benefit in a competitive market. This is important as the complexity of using the internet might be seen as a threat for potential users. On the other side the majority of respondents agreed that one relatively quickly gets used to the internet if the person is literate. Trialability of new technology is thus an initial important factor but individuals’ quickly gets used to it through experience. Although perceived risk will always be a challenge for internet usage, the offering of available virus protection programs can limit these concerns. In conclusion, the use of effective communication in reducing the use of internet challenges and emphasizing the beneficial components thereof should be utilized in an attempt to secure a growing market share.

Opportunities for further Research: Although the Rogers (1962-2003) framework for evaluating the perceived attributes of an innovation is a useful starting point, other issues emerged which need to be considered, namely societal pressures and the sense of personal safety literacy and unexpected interruptions by way of loss of connectivity. While societal pressures could have a positive effect on adoption, the latter issues of personal safety, need for literacy skills and reduced accessibility and interruptions seem to have a negative effect. Future research is needed to shed more light on all these issues.

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Data Tables

Table 1: Relative Advantage of the Internet

	STATEMENTS	SD	%	D	%	N	%	A	%	SA	%
Economic benefits	a. Using the Internet is the fastest way to get any information	3	1.00	5	1.67	17	5.67	74	24.67	201	67.00
	b. Connecting to the Internet is affordable	7	2.33	41	13.67	108	36.00	84	28.00	60	20.00
	c. Using the Internet services is time-saving	3	1.00	10	3.33	67	22.33	129	43.00	91	30.33
Convenience	d. I can connect to the Internet anywhere	22	7.33	34	11.33	73	24.33	79	26.33	92	30.67
	e. I know many ways to connect to the Internet	6	2.00	24	8.00	96	32.00	99	33.00	75	25.00
	f. The Internet is available anytime without interruption	32	10.67	73	24.33	107	35.67	52	17.33	35	11.67
Service level	g. I perform my tasks faster and safely when using the Internet	6	2.00	15	5.00	86	28.67	127	42.33	66	22.00
	h. Using the Internet features is convenient	6	2.00	11	3.67	78	26.00	124	41.33	81	27.00
	i. The Internet offers current and updated information	4	1.33	8	2.67	37	12.33	119	39.67	132	44.00

SD= strongly disagree; D= disagree; N= neutral; A= agree; SA= strongly agree

Table 2: Perceived Risk of the Internet

	STATEMENTS	SD	%	D	%	N	%	A	%	SA	%
Functional Risk	a. Viruses can be very harmful to my personal data	17	5.67	11	3.67	21	7.00	75	25.00	176	58.67
	b. A possible computer dysfunction can be risky for my personal data	11	3.67	10	3.33	56	18.67	101	33.67	102	40.67
Security Risk	c. My personal details and/or data can be hacked	13	4.33	21	7.00	74	24.67	106	35.33	86	28.67
	d. My privacy is not guaranteed	23	7.67	35	11.67	82	27.33	98	32.67	62	20.67
Service level	e. There are lots of sexual prowlers on the Internet	13	4.33	12	4.00	68	22.67	86	28.67	121	40.33
	f. A low self-esteem can make an Internet user vulnerable to sexual prowlers online (e.g. paedophile)	13	4.33	18	6.00	85	28.33	91	30.33	93	31.00

SD= strongly disagree; D= disagree; N= neutral; A= agree; SA= strongly agree