Consumer decision making in mobile-banking service selection

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This paper reports on the findings of a study of 267 consumers on the first order selection criteria within a decision making model that utilizes the Analytic Hierarchy Process (AHP) to evaluate mobile banking service selection. The AHP analysis of the first order selection criteria for the full data sample identified 'Time Saving' as the highest ranked factor followed by 'Control' then 'Any Place' and lastly 'Cost'. The survey also reports on consumer usage patterns for internet and mobile services as well as exploring their experiences with mobile banking services.

INTRODUCTION

M-business refers to the use of mobile telecommunications networks by firms in any part of their business whilst m-commerce refers to the buying/selling (the commerce) aspects and encompasses a variety of services accessed via a user's mobile phone handset including internet access to obtain information; making online transactions and utilising location based services which are based on knowledge of the consumer's geographic location. As mobile phone handsets become increasingly sophisticated then their versatility may make them more attractive for users such that they become their preferred means of accessing and using various services to support their lifestyles.

Mobile-banking is a service that involves payments and financial transactions via a consumer's mobile phone handset which they can access anytime and anyplace. Currently, there is great interest in consumer attitudes to accessing banking services through different channels and their decision making processes (Yousafzai and Yani-de-Soriano, 2012). The approach taken in this paper to examine consumer value perceptions is to utilise the hierarchical approach of analytical hierarchical process (AHP), as well as consumer mobile phone usage patterns in an integrative manner. Further, the use of 'Key Cards' is examined to see whether consumers view this as an enhancement of secure mobile payments (Kanniainen, 2010). 'Key cards' are an additional security measure often used by banks which are small

handheld devices (like a calculator) that provide a unique PIN in real time. Users read the PIN from their device and use it when accessing their bank account and/or making a financial transaction.

The objective of this research is to examine the attitudes and concerns of consumers with regard to the use of their mobile phone handset to access their bank account and conduct mobile banking transactions. Consumer's perceptions of this mobile service will depend on their lifestyle and individual preferences (De Coster and Albesher, 2013) and thus questions were included to examine user's profiles (demographics and internet usage levels). The increasing trend of mobility in consumer's lifestyles justifies the need to study consumer's mobile service behaviours and service perceptions. Further, in many Developing Countries the mobile phone service dominates the telecommunications sector and is seen as an important communications method by many consumers.

LITERATURE REVIEW

The theoretical background to this study is derived from the literature areas of e-commerce and value provision as well as innovation theory concerning consumer adoption. Specifically, this research is focused on the m-banking sector as the extant literature on the adoption of e-technology focuses on the factors influencing behavioural intentions rather than consumer decision making based on an assessment of the perceived 'value' of a service.

Value creation involves designing and producing products/services with our customers in mind and what is of value to them. However, before we start designing the product (or service) we need a means of establishing what is of value to the customers and end users? In this study we will utilise a means for establishing what customers 'value' in terms of mobile-banking service selection. Value needs to be viewed from the customer perspective in terms of what is of value for the user (Anderson et al, 2009, p5 and Khalifa, 2004), rather than the organisational perspective of what can be produced.

The extant literature on marketing and value management examines value for customers which can be expressed as equations where each item is of monetary value. The fundamental value equation which recognizes that customer value typically involves a trade-off between what the customer receives (in terms of quality; benefits; worth etc…), and what he or she gives up to acquire and use a product or service (i.e. the price and the foregone alternative). The fundamental value equation is essentially the monetary difference in Value (which represents the monetary amount that would be paid for the firm's offering) to Price (the monetary amount being asked). However, it is not a straight forward matter to actually determine the monetary amounts involved since it is affected by the end users' perceptions of value.

The fundamental value equation shows that customer value is perceived by the customers rather than the vendor or supplier. This view has been extended by Heskett et al. (1997 cited in Walters and Rainbird, 2007, p45) to include the value of the business processes where "the

customer value equation = [Results produced for the customer + Process quality] less [Price to the customer + Costs of acquiring the product]". This identifies the benefit that a customer receives when acquiring a product from a firm that utilizes a high standard of business processes such as manufacturing processes or other core processes. Further, the customer value equation recognizes that the cost part of the value equation should also include the costs of acquiring the product (or solution) which in the case of enterprise products (or solutions) can be substantive. It also highlights that the cost to the customer comprises two elements of which the second element concerns the total cost of ownership.

Kothari and Lackner (2006) argue that there are a number of dimensions beyond the provision of the goods or product for customer value. They argue that "customer value = (Product + Access + Experience – Cost)" where the four categories of product; access; experience and cost must be considered from the customer perspective. More recent studies into value management and its delivery by organisations take this further by recognising the various internal organisational factors required for service delivery (Dumond, 2000 and Eng, 2008).

Measurement factors

The measures selected for the first level of the hierarchy are drawn from the literature concerning technology acceptance in general as well as the more focused literature on e-commerce and also that of m-banking. It should be recognised that consumer's perceptions of m-services are in part influenced by contextual factors which are likely to differ for various m-services (Rao and Troshani, 2007).

The first factor of 'Cost' was included as a measure as it has arisen in previous consumer research including comments being made during qualitative research (Luarn and Lin, 2005) where perceived financial cost was defined "as the extent to which a person believes that using mobile banking will cost money".

The factor 'Any Place' is the second measure in this study as Mobility is recognised as a factor in user's perceptions of the benefits of m-services. A survey into m-ticketing for users of local transportation by Mallat et al (2009) identified mobility as the second benefit (after 'usefulness' which refers to efficiency improvements for users) where mobility includes "time and place independent service access, reduced queuing, and substituting for other services".

The factor 'Control' is the third measure and according to Bhatti (2007) "is composed of elements of individual constraints that are related to the individual user's economy, experience, and skill in using a service". In the case of banking services this refers to the ability of consumers to access their financial details, to access their bank accounts and conduct payments and other financial transactions.

The factor 'Time saving' is the last measure which is well recognised in the e-commerce sector where large numbers of consumers use services such as that of Amazon for the time

saving benefits of ordering books and other items online. This has also been the experience of many online grocery stores where busy consumers seek the convenience of home deliveries.

RESEARCH APPROACH

Various models are employed when studying customer perceptions of new services and technologies such as the Technology Acceptance Model (TAM) which was introduced by Davis in 1986 and has been widely used to assess user's attitudes towards e-technologies (Wang et al, 2006; Cheng et al, 2006). This is based on the premise that two primary attributes have to be examined: perceived 'usefulness' and perceived 'ease of use' in respect of others variables, such as positive or negative attitude to using technologies which influence behavioural intention and actual use. However, although this approach is widely used this is not the approach used in this study as the focus here concerns consumers and their decision making.

Studies into adoption behaviours concerning high technology products and services that take a value based approach are likely to involve assessment of a number of factors that address the potential benefits (for the user) versus the costs as well as the likely risks (Faroughian et al, 2012). In contrast, traditional studies into consumer adoption focus on factors likely to affect their behaviour intentions such as perceived 'ease of use' as well as some personal factors which are often considered including attitudes to risk (Luarn and Lin, 2005).

For the purposes of this study into mobile banking a hierarchical approach was utilised to study consumer value perceptions utilising Woodruff's (1997) Customer Value Hierarchy model which comprises three levels starting with 'Customer's Goals and Purposes', secondly, 'Desired Consequences in Use Situations' and lastly, 'Desired Product Attributes' and 'Attribute Preferences'. Each of these three levels is utilised in the consumer survey in this research. The approach taken for this study is that of Analytical Hierarchy Protocol (AHP) which is perhaps more usually associated with business decision making rather than consumer decision making (Cheng and Li, 2001).

Analytical Hierarchy Protocol (AHP)

The technique adopted here is that of Analytical Hierarchy Protocol (AHP) which can be used to understand how customers make decisions when deciding on which product to purchase (Saaty, 1990). Vaidya and Kumar (2006) reviewed 150 papers in which they examined the main application areas using AHP for which the majority were industrial and management situations with a limited number of social and personal areas. The finding of their review concerning AHP uses was the following: Selection; Evaluation; Decision Making and Resource Allocation. The justification for using AHP in this paper is that it is examining consumer decision making concerning their evaluation (of mobile banking as a service); decision making (factors) and resource allocation (expenditure) which has also been

the approach used in a recent study of mobile phone buying behaviour of consumers (Zameer et al, 2012). Further, this study examines the impact of previous e-banking and m-banking experiences on customers' perceptions of value when making decisions concerning mobile-banking service selection.

Population, sampling and data collection

Previous studies into the willingness of consumers to utilise m-services include a survey by Laukkanen and Pasanen (2005) that showed that age and gender are the main differentiating variables between users and non users of m-services. Thus, this survey aimed to collect responses across different age range ranges. The data sample comprises an international data set that was based on post graduate students taking a London based course including Managing Technology and Innovation (MTI). The majority of these students have engineering or technical undergraduate degrees and are studying for an MSc in the management area either on a Full-Time or Distance Learning basis. The sample was developed in a convenience and snow ball manner since the students undertaking coursework on the MTI option were asked to complete the survey themselves and also obtain responses from three (or more) other people. Guidance was given that the responses should be obtained from people who were not themselves studying on the course and that ideally a range of ages should be obtained.

The international nature of the cohort of students has led to a diverse data set being collected and analysed. Of the responses a few were rejected as they were either incomplete or not properly completed (for example, the pair wise comparisons were inappropriate such that weightings could not be sensibly obtained). Data gathering might be biased towards the technologically literate as the survey was administered by postgraduate students in the School of Engineering and Design who are likely to be inherently positive in attitude towards the adoption of new technologies and services.

A total of 267 responses were obtained (after discarding unsuitable responses) during this study with ages ranging from 18 to 21 (13.3%), from 22 to 29 (46.8%) which is the largest group, from 30 to 39 (23.2%), from 40 to 49 (10.6%) while the minority (6.8%) reported to be aged 50 or over. With regard to their internet usage, the majority indicated they have been using the internet for three to four hours per day with a small group using it for five or more hours per day. The minority of the sample have indicated they have been using internet services less with around a quarter using it for one to two hours per day and very few using it less than one hour per day.

RESEARCH RESULTS

The results from the study are presented which comprise firstly, services used by respondents, secondly, the Relative Weightings of the four factors and lastly views on the use of 'Key cards'. The results are followed by a discussion on the managerial implications which are based on the perspective of both product managers and operations managers within the banking community.

Usage results

The survey asked consumers to indicate the level of usage of various services in terms of 'Do Not Use' to 'Occasional Use' to 'Use Regularly' and 'Use Frequently'. The services ranged from accessing existing services (such as e-mail) to M-services which are defined as "enhanced information services accessed while mobile" (Mort and Drennan, 2007). The results for the top two usage categories are shown in Figure 1 and indicate that the majority of respondents were accessing E-mail (77.2%) and Social Networking (72.3%) via their mobile phone handset. Thirdly, (perhaps surprisingly) were Location Based Services (48.7%) with nearly half of respondents using these services. The remaining services were used less frequently with News including sports results (38.2%), Mobile Banking (37.8%), Wireless trading (34.1%) and lastly Price comparison sites (22.1%).

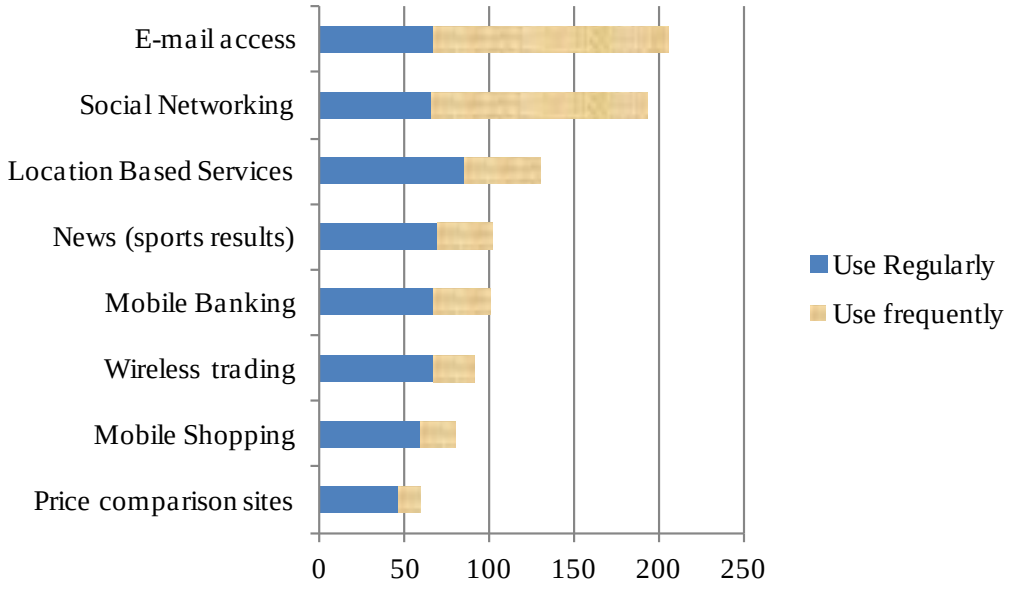

Figure 1. Results of mobile phone usage by survey respondents

Surveys by telecoms industry market research groups indicate that a broad range of mobile services are available and being used by consumers as highlighted by Anckar and D'Incau's conference paper (2002). Further, in terms of the age profile of the take-up of m-services from their survey they reported that "although the youngest users are likely to form the primary customer group for most m-services, especially entertainment-related applications, the observed m-willingness was, relatively speaking, surprisingly high even in the older age groups". This trend is perhaps unsurprising since e-business for consumers has been described as "ubiquitous" for over a decade (Parasuraman and Zinkhan, 2002).

Factor results

To obtain the Relative Weightings consumers were asked to give the relative importance of each the four factors (which are the first order selection criteria). The questionnaire utilised asked them to make a pair wise comparison against all the possible combinations (for 4 factors this is 6 pairs) as shown in Figure 2.

	More Important							**Equal**								**More Important**	
Factor A	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Factor B**
Factor A	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Factor C**
Factor A	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Factor D**
Factor B	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Factor C**
Factor B	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Factor D**
Factor C	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Factor D**

Figure 2. Questionnaire template for pair wise comparison of four factors

As shown the Respondent selects Factor A versus Factor B of 6: they regard Factor A as more important than Factor B. However, Factor A versus Factor D is an example of where the first factor is seen to be less important so we use the reciprocal of the answer (i.e. 1/5 or 0.2). Respondent selects Factor A versus Factor D of 0.2: they regard Factor A as less important than Factor D. The survey results are plotted in a matrix as shown in Figure 3 where, Factor BA is the reciprocal of Factor AB (i.e. 1/AB) and similarly for the other pairings. To calculate the Relative Weighting we first calculate the total for each column. To calculate the Relative Weighting for a factor we take each cell value for a Row and divide it by the Column Total. These are then averaged (Summed and divided by the number of them).

Factors	A	B	C	D	Relative Weighting
A	1	AB	AC	AD	W_A
B	BA	1	BC	BD	W_B
C	CA	CB	1	CD	W_C
D	DA	DB	DC	1	W_D
Column Total:	∑ Col A	∑ Col B	∑ Col C	∑ Col D	

Figure 3. Matrix template to calculate relative weightings of four factors

For the survey in this study the individual respondents results were combined by taking the average of the survey results (the Relative Weighting) for each factor and then ranking the results. The AHP analysis of the first order selection criteria for the full data sample identified 'Time Saving' as the highest ranked item followed by 'Control' then 'Any Place' and lastly 'Cost'. These results are the average weightings for the whole sample are shown in Figure 4. The results were examined for the different age ranges and had similar rankings with the main exception of the 50+ group that gave a lower weighting to 'Time Saving' (ranking it in third place). Further, the age group of 22 to 29 ranked 'Any Place' above 'Control' which may reflect the reduced needs of students to regularly handle their finances.

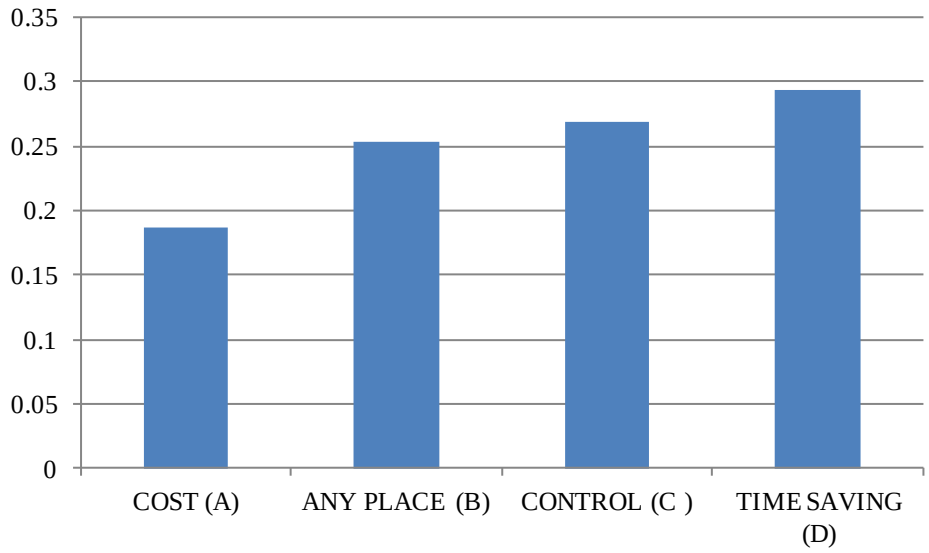

Figure 4. Results of relative weightings for whole data sample

A closer examination was made of the results where consumers had indicated that the 'Cost' factor was of highest importance. This showed that for this group of consumers more than

half of them (59%) weighted 'Cost' as over 0.5 which indicates that for these people it's a very significant factor. This is supported by the finding of Luarn and Lin (2005) in their survey who reported that "financial cost is also a significant barrier for users of mobile banking."

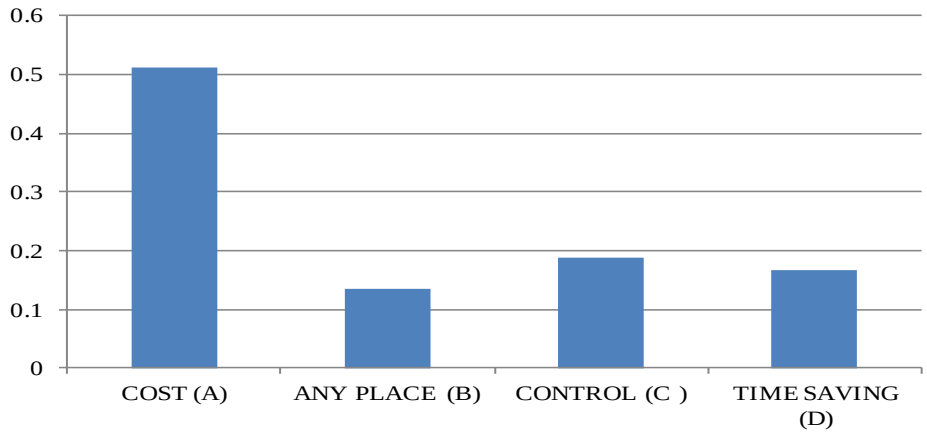

Figure 5. Results of relative weightings for cost conscious consumers

Key card results

Trust is a recognised concern for consumers who are considering mobile banking with the literature identifying that "both personal and institutional attributes are influential in determining clients' initial trust in an innovative service" (Kim et al, 2009). A paper by Gu et al (2009) argues that "to increase trust, mobile banks need to make users free from fearfulness when they transact with banks through mobile banking. In addition, to reduce fraud, uncertainties and potential risks and to facilitate transaction in mobile banking, mobile banks need to develop structural assurances". Hence, in this study we asked consumers about the use of 'Key cards' which are a highly visible approach by banks to reassure consumers that their mobile banking service is a secure one. The results are shown in Figures 6 and 7 which indicate that nearly half of the respondents are familiar with 'Key Cards' and the majority view m-banking as a safer service with the use of 'Key Cards'.

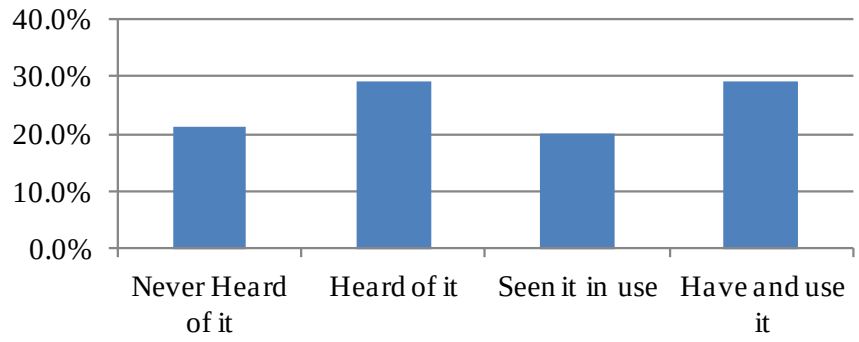

Figure 6. Results of familiarity of m-banking service usage of 'Key Cards'

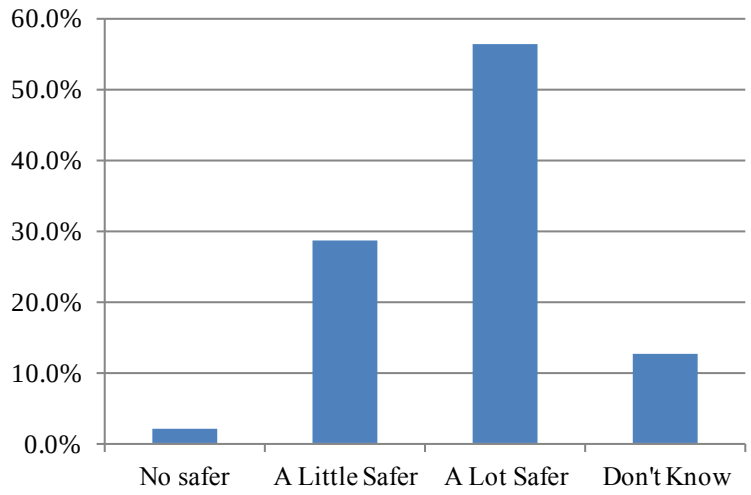

Figure 7. Results of views of improved m-banking service safety with 'Key Cards'

Managerial implications

Our findings can provide guidance to both product managers and operations managers within the banking community, noting that some aspects will be useful to more than one category of management. The implications for operations managers will include delivery aspects of the product portfolio topics discussed, together with a number of other items. These will include understanding mobile-specific technical issues and constraints, such as mobile-optimised pages and user interface. In addition the variable quality of mobile data transmission, including dropped calls, needs to be taken into account when designing the support systems. It is clearly important that the operational aspects of mobile banking products and services are thoroughly thought through (Pawar et al, 2009), otherwise the services will become hard to use or unreliable with consequent negative impact on customer value perception.

Many product managers will wish to know which features of their product portfolio are perceived as valuable by their target customers, and what are the relative values of the top two or three items. Our results show that 'Time saving' is perceived by customers as the most important benefit, where the time saving is achieved by elimination of visits to the bank branch. This suggests that product managers should review their product portfolio to identify all items which could be offered to a mobile banking customer and where 'Time saving' would be a key component of the offer. The review needs to be undertaken in partnership with Subject Matter Experts from their operations departments and from their mobile network partners in order to ensure that opportunities are recognised and that technical and operational constraints are recognised at the earliest opportunity.

As an illustration, the combination of Location information (from the mobile network) and knowledge of the customer profile might facilitate or expedite services which require a branch visit. For example, if a customer enquires about foreign currency exchange [ForEx]

then the service might use location information to determine whether the customer is close enough to a branch to offer immediate pick-up of the currency ordered. Organisationally this requires integration with the bank's systems to verify currency holdings at nearby branches and to transmit the order to the branch, and there will be operations implications associated with the service offer. The customer value delivered by such a service translates to a parallel set of values to the bank (not necessarily identical). Offering a location-based ForEx service translates to time saving for the branch - because the currency is pre-ordered and can thus be made up by back-office staff - and to customer retention for the bank as a whole. Similarly product offerings that address the 'Control' value perception can be created, providing that all potential operational issues are considered during the formulation of the offer.

The 'Any Place' value is inherently delivered by use of a mobile platform, provided that the underlying application and systems support can deliver the service across a sufficiently wide range of handset capabilities. Note that the successful M-PESA mobile banking system deployed by Safaricom in Kenya is delivered to entry-level handsets and does not require a smartphone. [http://www.safaricom.co.ke/index.php?id=323].

The 'Cost' value is in some ways more complex. The evidence suggests that cost had a low impact on adoption for the majority of customers, but this must be contrasted with the view of the minority that cost was a priority concern. This suggests the existence of a threshold effect, which in turn suggests that introduction of fees and charges for mobile-enabled services, is likely to be counter-productive unless the charges are very small.

LIMITATIONS AND FUTURE RESEARCH

This research has several limitations that need to be considered when interpreting the results. For this study we chose students with a technical background as participants along with their network of contacts which may limit the generalisability of our findings. However, it could be argued that these student's opinions are appropriate to the younger generation who are increasingly comfortable with computer based applications and e-technologies. Future research may examine whether the reported measurable (with 'Time Saving' as the highest ranked item followed by 'Control' then 'Any Place' and lastly 'Cost') as well as 'Key Cards' are significant factors for consumers when making service selection decisions concerning m-business and m-banking in particular.

Future studies may research the implications for companies in terms of the best way to promote these services (Talke and Snelders, 2013), given the results obtained from this study which gave insights into consumer decision making. Further, customer views and acceptance of m-services such as m-banking will depend on cultural and geographic customs (Cheng et al, 2006). Hence, a more detailed examination of differences from consumers across different countries may be beneficial given that the availability of m-services may be limited in Developing Countries.

CONCLUSIONS

The AHP analysis of the first order selection criteria for the full data sample identified 'Time Saving' as the highest ranked item followed by 'Control' then 'Any Place' and lastly 'Cost'. The factor of 'Time Saving' being ranked highest reflects the convenience of mobile banking as (in a similar manner to internet banking) it's faster for consumers than going to a bank branch in person saving in travel time and cost. The factor of 'Control' is also valued by consumers being ranked second as it makes it easy for them to manage their finances as they are able to find the status of their bank account and arrange for payments and transfers at a time of their convenience (and are not limited to getting to a home based PC or a bank branch).

The results from the AHP analysis in this study suggest that adoption behaviour of consumers is similar across the different age ranges with the exception of the 50+ group that gave a lower weighting to 'Time Saving' (ranking it in third place). 'Cost' has a low impact on adoption behaviour of the majority of the consumers surveyed, however for cost conscious consumers the weighting was above 0.5 for over half of this group indicating that for this group it is of primary concern.

The survey also reports on user usage patterns for internet and mobile services as well as exploring their experiences with mobile banking services. The overriding comment regarding their experiences is that consumers value the convenience of mobile banking as they can access their bank account balance in real time and make transactions anywhere and at anytime. Further, the use of 'Key Cards' is examined to see whether consumers view this as an enhancement of the secure mobile payments. The majority of respondents did perceive an improvement in m-banking security.

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