



## A Meta Analysis on Adoption of Mobile Financial Services

**Rajanish Dass  
Sujoy Pal**

**W.P. No. 2011-01-05**  
January 2011

The main objective of the working paper series of the IIMA is to help faculty members, research staff and doctoral students to speedily share their research findings with professional colleagues and test their research findings at the pre-publication stage. IIMA is committed to maintain academic freedom. The opinion(s), view(s) and conclusion(s) expressed in the working paper are those of the authors and not that of IIMA.



**INDIAN INSTITUTE OF MANAGEMENT  
AHMEDABAD-380 015  
INDIA**

## A Meta Analysis on Adoption of Mobile Financial Services

**Rajanish Dass**  
rajanish@iimahd.ernet.in

**Sujoy Pal**  
sujoypal@iimahd.ernet.in

Indian Institute of Management, Ahmedabad

### *Abstract*

During the last decade, there has been tremendous growth in mobile penetration in many countries across the globe including a number of developing countries. The total number of mobile subscription 5 billion by the end of 2010 and is further expected to grow multi-folds. On the other hand, around 2.5 billion adults worldwide do not have a savings or credit account with either a regulated bank or alternative financial institution (such as a microfinance institution). Around one billion people in emerging markets have a mobile phone but no access to banking services. This scenario has opened immense opportunities for organizations including banks, insurance companies and telecom operators to strengthen their customer base and increase revenue by providing various financial services to the consumers through mobile technology. Hence, it becomes very important to understand the factors that would act as drivers or inhibitors towards the adoption of mobile financial services (MFS). Quite a few studies have been conducted across the globe to determine the factors affecting adoption of MFS. This paper provides a Meta analysis of the existing academic literature on MFS and determines the strength of the factors and their linkages through a scoring model based on the type of publication. The findings of the study would be beneficial for further research in understanding the dimensions to be considered for developing adoption model for MFS. The findings can also be used by the practitioners involved in MFS in understanding the factors affecting demand for such services.

### *Keywords*

Mobile banking, mobile payment, m-banking, m-payment, adoption of m-banking, demand for m-banking, mobile enabled financial services.

---

### *Acknowledgements:*

"The authors are thankful to UK India Education and Research Initiative for extending support for the research"

## 1. Introduction

Globally, banking and financial industry has shown tremendous growth in volume and complexity (Leeladhar, 2006) during last few decades. Noticeably, the outreach of the banking sector has been found to vary across countries (Beck, Demirguc-Kunt, & Peria, 2007). The Financial Access Initiative (FAI), a research consortium based at New York University, has identified that 2.5 billion adults worldwide do not have a savings or credit account with either a traditional (regulated bank) or alternative financial institution (such as a microfinance institution) (Chaia, et al., 2009). This scenario has also emerged because of the high cost of maintaining bank branches and low volume of transactions in the rural areas, given their distance from nearest urban centers and the low population density, making branch based banking in such areas unviable. On the other hand, penetration of mobile technology has been substantial in the past few years and is expected to increase in the future. Although the actual data may vary across regions, but this has emerged as the global phenomenon as the mobile penetration is increasingly deepening in developing and poorer nations, where a large percentage of the global population resides. Financial institutions, which have had difficulty providing profitable services through traditional channels to poor clients, see opportunity in mobile banking (m-banking) as a form of 'branchless banking' (Ivatury & Mas, 2008), which lowers the costs of serving low-income customers for the banks. In countries like Kenya, Philippines and Indonesia mobile payments (m-payments) has been a success story in terms of providing affordable and convenient remittance and other financial services to all different sections of the population. Similarly, m-payments has also been able to extend affordable debit/credit services to the poor, which was otherwise only available through credit/debit cards.

In emerging markets across the globe, formal banking reaches about 37 percent of the population, compared with a 50 percent penetration rate for mobile phones. About one billion people in emerging markets have a mobile phone but no access to banking services; by 2012 this population will reach 1.7 billion (Beshouri & Gravrák, 2010). It is said that low-cost banking and financial services can bring into its fold a considerable group of consumers who formerly could be served only at too high a cost (Datta, Pasa, & Schnitker, 2001). On the contrary, studies have shown that there had been bottlenecks in the rate of adoption in MFS in various parts of the world. For countries like Taiwan where the rate of adoption of mobile phones had been very high, the rate of adoptability for m-banking was quite slow till 2003 when only one percent of the banking transactions happened through mobile handsets (Luarn & Lin, 2005). Prospective customers around the world during the initial phase seemed slow in embracing mobile banking (Kleijnen, Wetzels, & Ruyter, 2004; Suoranta & Mattila, 2004), although there may be a geographical discrepancy in its acceptance level (N. Mallat, Rossi, & Tuunainen, 2004).

With these facts, it becomes very interesting to understand the factors and their linkages that are emerging out of the existing literature on MFS adoption. Around forty-four countries have already gone ahead with the launching of mobile banking and mobile payments. Interestingly enough, we have not heard success stories like that of m-Pesa in Kenya to be repeated in other countries. Even in a country like Tanzania, a next door neighbor to Kenya, replicating the m-Pesa model was an uphill task (CGAP, 2009). With highly populated countries like India and China also towing similar lines, it becomes critical to understand the drivers and inhibitors of adoption of such services. With a better understanding of these factors, it will be beneficial to the ecosystem

players of the mobile financial services (like telecom firms, banks, handset manufacturers as well as m-banking and m-payment service providers, regulators and policy makers) to appreciate the critical factors to be looked at for adoption of such services. Moreover, the findings from this paper seem to be critical in the area of context setting of future research in this area.

Given this background, the development and the criticality of the subject, it becomes necessary to collate the existing findings in the area of mapping the drivers and inhibitors and understand the critical aspects of the same. This paper is a meta-analysis of the existing literature focused on determining the drivers and barriers of MFS adoption that had been studied and also understand the extent by which these factors were found to significantly determine the adoption, keeping in mind the geographies and time period in which these studies were conducted. While working on this paper, the authors have considered both m-banking and m-payments into its fold and had been termed as *Mobile Financial Services (MFS)*, keeping in mind the similarity in execution and implication of these services. In the following section of the paper, the authors have first provided the background and concept of MFS which includes the definition of m-banking and m-payments which were clubbed to define the term MFS, and various research models that were used to study the adoption of MFS. This is followed by a methodology section (in section 3) that explains the way in which the factors of MFS and their linkages for MFS adoption had been determined. Section 4 describes the findings of the meta-analysis of the existing literature based on the calculated scores of linkages between the researched factors of MFS adoption. Finally, section 5 includes discussion and conclusion of the findings and suggests the implication of the same in future research.

## 2. Mobile Financial Services (MFS)

The term “Mobile Financial Services” (MFS) encompasses a broad range of financial activities that consumers engage in or access using their mobile phones. MFS can be divided into two distinct categories: mobile banking (m-banking) and mobile payments (m-payments) (Boyd & Jacob, 2007). Mobile banking is defined as “a channel whereby the customer interacts with a bank via a mobile device, such as a mobile phone or personal digital assistant (PDA)” (Barnes & Corbitt, 2003). Mobile banking can also be considered as the convergence of mobile technology and financial services (Chung & Kwon, 2009). m-banking is a subset of banking as it allows everyone easy access to their banking activities via mobile handsets (Yu & Fang, 2009). With the improvement of mobile technologies and devices, mobile banking has been considered as a salient system because of such attributes of mobile technologies as ubiquity, convenience and interactivity (Turban, King, Viehland, & Lee, 2006). Mobile payments on the other hand are defined as the use of a mobile device to conduct a payment transaction in which money or funds are transferred from a payer to a receiver via an intermediary, or directly without an intermediary (Niina Mallat, 2006). Mobile devices can be used in a variety of payment scenarios, such as payment for digital content (e.g., ring tones, logos, news, music, or games), tickets, parking fees and transport fares, or to access electronic payment services to pay bills and invoices. Payments for physical goods are also possible, both at vending and ticketing machines, and at manned point-of-sale (POS) terminals (Tomi Dahlberg, Mallat, Ondrus, & Zmijewska, 2008).

The terms “mobile banking” and “mobile payments” describe distinct but in some cases overlapping sets of products. Some m-banking platforms provide services, such as money

transfers, that are considered forms of mobile payment, while some m-payments products are so closely linked to bank accounts as the source of funds that they assume m-banking functions (Boyd & Jacob, 2007). MFS refer collectively to a set of applications that enable people to use their mobile telephones to manipulate their bank account, store value in an account linked to their handsets, transfer funds, or even access credit or insurance products (Donner & Tellez, 2008). Ultimately, under-banked consumers may benefit most from platforms that integrate both m-banking and m-payments features to provide a truly comprehensive financial services solution (Boyd & Jacob, 2007). However, mere presence of the technology or even enrolling the consumers for the service may not serve the ultimate cause. There had been cases where even a large number of enrollments had failed to translate into actual usage (Krugel, et al., 2010).

### 3. MFS Adoption

The existing literature on determining the adopters of m-banking are mainly based on theories like technology adoption model (TAM), theory of planned behavior, and theory of diffusion of innovation.

During the past decade, a considerable amount of research on mobile finance services has emerged. Majority of these studies applied research models and frameworks traditionally used within the IS literature (Hoehle & Huff, 2009). A substantial amount of academic research is focused on examining the determinants of computer technology acceptance and its utilization (F. D. Davis, 1989; L. D. Davis, Bagozzi, & Warshaw, 1989; Mathieson, 1991; Moore & Benbasat, 1991; Taylor & Todd, 1995). Among the different models that have been proposed, the Technology Acceptance Model (TAM) (F. D. Davis, 1989; L. D. Davis, et al., 1989), adapted from the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), appears to be the most widely accepted among information systems researchers. The main reason for its popularity is perhaps its parsimony, as well as its wealth of recent empirical support (Agarwal & Prasad, 1999). While the TRA is a general theory of human behavior, the TAM is specific to IS usage (Mathieson, Peacock, & Chin, 2001). The TAM posits that a user's adoption of a new information system is determined by that user's intention to use the system, which in turn is determined by the user's beliefs about the system. The TAM further suggests that two beliefs – perceived usefulness and perceived ease of use – are instrumental in explaining the variance in users' intentions. As Davis (1989) noted, future technology acceptance research must address how other variables affect usefulness, ease of use and user acceptance. Therefore, perceived ease of use and perceived usefulness may not fully explain behavioral intentions towards the use of mobile banking, necessitating a search for additional factors that can better predict the acceptance of mobile banking.

Many authors used the TAM and various extended versions of TAM to research consumer acceptance of mobile banking applications (Chung & Kwon, 2009; Gu, Lee, & Suh, 2009; Kleijnen, et al., 2004; Luarn & Lin, 2005; Yu & Fang, 2009). Adding perceived cost, system quality and social influence to the original TAM constructs, one study confirmed that these constructs were positively associated with consumer intentions to use mobile banking services (Kleijnen, et al., 2004). Other studies repeatedly listed mobile device attributes like tiny displays, slow data connection, weak usability, and associated cost as inhibitors of mobile banking services (Laukkanen & Pasanen, 2007; N. Mallat, et al., 2004). The effect of trust has also been identified along with other dimensions on the adoption of mobile finance services (Gu, et al., 2009; Luarn & Lin, 2005). "Trust" had been added as a construct to the TAM in an online shopping context

(Gefen, Karahanna, & Straub, 2003a). Studies also successfully introduced a trust-related construct, perceived credibility, as a new TAM factor to reflect the user's security and privacy concerns in the acceptance of online banking (Wang, Wang, Lin, & Tang, 2003). Considering the context similarity between Internet banking and mobile banking, another study extended TAM by adding perceived credibility to the model (Luarn & Lin, 2005). Another study found initial trust to have an impact on the usage intentions of mobile banking and found relative benefits, personal propensity and structural assurance to support initial trust (G. Kim, Shin, & Lee, 2009).

However, the TAM has been criticized for not fully capturing why mobile phone users do not adopt mobile commerce, which in the present case is mobile banking (T. M. Lee & Jun, 2007). Researchers have noted that the TAM omits variables that may be important predictors of IT/IS usage (Mathieson, et al., 2001). The TAM is also limited in assuming that peoples' willingness and determination to adopt technology for a specific purpose is sufficient for adoption (Luarn & Lin, 2005). (T. M. Lee & Jun, 2007) argued that TAM should also be able to analyze factors affecting adoption intentions beyond perceptions of usefulness, ease of use, and social norms. Theory of planned behaviour (TPB) includes constructs that do not appear in the TAM. It had been suggested that subjective norms and perceived behavioral control overlap only minimally within the TAM's constructs (Mathieson, 1991; Taylor & Todd, 1995). However, TPB is not specific to IS usage and is less parsimonious than the TAM. Also, TPB requires unique operationalizations in each situation in which it is used (Mathieson, et al., 2001). Prior studies found that the TAM appeared to be superior to TPB in explaining behavioral intention to use an IS, and that the decomposed TPB, which integrates the TPB and TAM, is better than the TAM but the difference is not substantial (Chau & Hu, 2001).

Diffusion of innovation theory (Rogers, 1995) was used by some researchers (Brown, Cajee, Davies, & Stroebel, 2003; Luarn & Lin, 2005; Niina Mallat, 2006; Niina Mallat, Rossi, & Tuunainen, 2008) for determining the characteristics for adoption of MFS. Rogers identifies five distinct adopter categories: Innovators, Early Adopters, Early Majority, Late Majority and Laggards. Innovators and Early Adopters represent those among the first to adopt an innovation. Moreover, while a typical member of a social system falls in between Early Majority and Late Majority, Laggards represent the last in a social system to adopt an innovation. Rogers argues that differences between earlier and later adopters of innovations are related to socio-economic status, personality variables and communication behaviour. A review of the existing literature in electronic banking in general indicates that young age (Al-Ashban & Burney, 2001; Black, Lockett, Ennew, Winklhofer, & McKechnie, 2002; Howcroft, Hamilton, & Hewer, 2002; KarjaluoMattila, Mattila, & Pento, 2002b; Polatoglu & Ekin, 2001; Rugimbana & Iversen, 1994), high level of education (Al-Ashban & Burney, 2001; KarjaluoMattila, et al., 2002b), occupation (KarjaluoMattila, et al., 2002b; Rugimbana & Iversen, 1994) and higher earnings (Al-Ashban & Burney, 2001; KarjaluoMattila, et al., 2002b; Lockett & Littler, 1997; Polatoglu & Ekin, 2001) are variables differentiating users from nonusers of electronic channels in banking. In one study, age and education was found to have a major influence on the use of the mobile phone in banking services (Suoranta, 2003). While, gender and age were found to be the main differentiators in another study (Laukkanen & Pasanen, 2007).

#### 4. Methodology

In order to determine the factors affecting the adoption of MFS that has been studied so far, twenty nine papers of academic nature were found in total. The reviewed literature included fourteen journal articles, twelve conference papers, two magazine articles and one working paper (refer table 1). Nine of these literatures were related to mobile banking, sixteen with mobile payments, three with mobile commerce and one with self service banking study. Based on the frequency of the factors appearing in the papers, the extent for which these factors were probed was determined. Further, the linkages among these factors were evaluated based on the degree of research that had been conducted for proving the validity of these linkages.

**Table 1: Year-wise Publication**

Journal/Conference/Magazine Name	Year										Total
	02	03	04	05	06	07	08	09	10		
Computers in Human Behavior				1					1		2
CyberPsychology and Behavior								2			2
Decision Support Systems									1		1
Electronic Commerce Research and Applications									1		1
Expert Systems with Applications								1			1
Information Systems Journal								1			1
International Journal of Bank Marketing				1							1
International Journal of Information Management		1									1
International Journal of Mobile Communications							1				1
Journal of Financial Services Marketing			1								1
Journal of information Privacy & Security				1							1
Journal of Information Technology Theory and Application	1										1
Academy of World Business, Marketing & Management Development					1						1
Americas Conference of Information Systems (AMCIS)			1		1						2
Australasian Conference on Information Systems						1					1
Biennial Conference			1								1
Bled eCommerce Conference. Bled, Slovenia	1										1
European Conference on Information Systems					1						1
IADIS International E-Commerce			1								1
IADIS WWW/Internet			1								1
International Conference on Mobile Business		1									1
World Congress on Engineering and Computer Science								1			1
Communications of the ACM		1	1								2
Helsinki Mobility Roundtable					2						2
<b>Total</b>	<b>2</b>	<b>3</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>5</b>	<b>3</b>		

In order to determine the validity and depth of research for each of the links between the factors, a scoring matrix was developed. Three different dimensions were considered based on the type of literature reviewed and significance for scoring the identified links between factors. The scores were generated by providing weights to the publication type in the power of 3 (i.e.  $3^1$ ,  $3^2$ ,  $3^3$ ,...) and multiplying the same with the type of model in which the links were found (i.e. proposed model or tested model). The weights used for the dimensions used for scoring is mentioned in table 2. A scoring matrix generated by multiplying the values of the dimensions are given in table

3, while table 4 show a normalized scoring matrix that was generated by dividing the values of the scoring matrix in table 3 by the maximum score (i.e. 162 in this case).

**Table 2: Weights for Validity and Rigor of Linkages between Factors**

Validity		Rigor	
Publication Type	Weight	Model Type	Weight
Journal Article	81	Tested Model	2
Conference Paper	27	Proposed Model	1
Magazine Article	9	No Model	0
Working Paper	3		

**Table 3: Non-normalized Scoring Matrix**

Publication Type	Tested Model	Proposed Model
Journal Article	162.00	81.00
Conference Papers	54.00	27.00
Magazine Article	18.00	9.00
Working Papers	6.00	3.00

**Table 4: Normalized Scoring Matrix**

Publication Type	Tested Model	Proposed Model
Journal Article	1.00	0.50
Conference Papers	0.33	0.17
Magazine Article	0.11	0.06
Working Papers	0.04	0.02

The logic of developing the scoring matrix is based on the assumption that if an empirically tested model appears in a journal article, it would get a highest score pointing to the fact that the hypotheses proposed in the model had been tested on a representative sample. This would be followed by publications with untested proposed models in an academic journal, followed in importance by the models that were either tested or were published in conference proceedings, magazine articles and working papers. In cases of papers that had not proposed any model but had reported factors, either from a qualitative or a quantitative study, affecting the adoption, were considered to be equivalent to the papers, corresponding to their outlet (whether it is a journal paper, conference paper, magazine article or working paper) in the category where a model has been proposed, but not tested.

For models that had been empirically tested, the hypothesis of a factor affecting another factor would be either found to be significant or insignificant. In case a linkage is found to be insignificant, the corresponding normalized score for the link was multiplied by minus one in order to convert the score to negative, thus representing an insignificant linkage. All the normalized scores related to a corresponding link were then added up in order to come up with final scores for each link.

For example, if a link between two factor “A” and “B” is found to be significant in tested models of one journal article and two conference papers, while insignificant in a tested model of conference paper, the score for the link would be calculated as follows:

$$\text{Score for link A} \rightarrow \text{B} = (1.00) + (0.33 \times 2) - (0.33) = 1.33$$

The support for each link in terms of their occurrence as significant or insignificant was also considered for analyzing the validity of linkages between the factors affecting the adoption of



MFS. In addition to this, parameters like type/importance of journals and conferences, and recency of publication could also have been considered as contributors towards calculation of the scores. However, such parameters being difficult to quantify for a single paper and also being controversial had been discarded from the analysis.

## 5. Findings

Analyzing the dimensions present in the existing literature, total thirty-four dimensions were determined. Out of these twenty-nine papers that were referred, perceived ease of use / complexity (in a negative sense) was found to be the most frequently used dimension appearing in twenty papers. This was followed by perceived usefulness, which was mentioned in seventeen studies as factor affecting the adoption of MFS. The high amount of frequency of these two constructs can be explained, as they are the core dimensions in the TAM. These two dimensions are followed by perceived financial cost, relative benefits and security, all appearing in nine studies each. Compatibility was found in eight papers followed by perceived risk and convenience both appearing in seven studies each. The factor of trust, which contributes as a dimension of trust based TAM, was found in six articles while social influence and perceived self-efficacy appeared in five papers each. Rest of the dimension were found in the studies related to MFS appeared very infrequently. Definition for each of these dimensions is provided in table 5 and a concept matrix depicting the frequency of each of these dimension and their corresponding papers is shown in table 6. A year-wise country-wise distribution of the studies can be found in table 8.

Table 5: Definition of Dimensions

Dimension	Definition
Accessibility	Easy to reach, approach or obtain ( <a href="http://dictionary.reference.com/browse/Accessibility">http://dictionary.reference.com/browse/Accessibility</a> )
Attitude towards MFS	The degree to which using a technology is positively or negatively valued by an individual (F. D. Davis, 1989; L. D. Davis, et al., 1989).
Banking needs	The variety of banking products and services required by an individual (Tan & Teo, 2000).
Behavioral Intention	A cognitive plan to perform a behavior or action, created through a choice/decision process that focuses on beliefs about the consequences of the action. ( <a href="http://www.marketingpower.com/_layouts/dictionary.aspx">http://www.marketingpower.com/_layouts/dictionary.aspx</a> )
Compatibility	The degree to which an innovation is viewed as being consistent with the existing values of users (Agrawal & Prasad, 1997).
Convenience	The extent to which the prospective user perceives that mPayment increases convenience in the payment process (L. D. Chen, 2006)
Expressiveness	Expressiveness defined as the degree to which a user perceives a mobile service as suitable for expressing his or her emotions and social or personal identity (Goeke & Pousttchi, 2010)
Facilitating conditions	The extent of technology and other external support (e.g. government support) in the environment (Tan & Teo, 2000).
Firm reputation / Familiarity with the bank	A firm's reputation reflects its reliability in business engagements. It increases customers' recognition, plays a role in forming their initial confidence and helps to maintain their confidence in future transactions (K. Kim & Prabhakar, 2004).
Initial trust	People's initial trust reflects their willingness to take risks in order to fulfill their needs (K. Kim & Prabhakar, 2004).
Innovativeness	Inclination of an individual to try out any new information systems (C. Kim, Mirusmonov, & Lee, 2010).
Interpersonal relationship	Interpersonal relationship refers to the strength of personal bonds that develop between customers and their service provider (Cheong, Park, & Hwang, 2004).
Mobile experience	Prior experience of using a similar class or type of technology (Tan & Teo, 2000).
Mobility	Mobility refers to the system being available anytime, anywhere (Agnieszka Zmijewska, 2005).
Network externalities	Payment systems exhibit network externalities as the value of a payment system to a single user increases when more users begin to use it (Niina Mallat, 2006)

Dimension	Definition
Perceived credibility	Perceived credibility is defined as the extent to which a person believes that the use of mobile banking will have no security or privacy threats. (Luarn & Lin, 2005; Wang, et al., 2003)
Perceived ease of use / Complexity	Perceived ease of use refers to the degree to which a person believes that using a particular stem would be free of effort (F. D. Davis, 1989). Complexity refers to the degree to which an innovation is considered relatively difficult to understand and use (Taylor & Todd, 1995).
Perceived financial cost	Perceived financial cost is defined as the extent to which a person believes that using mobile banking will cost money (Luarn & Lin, 2005).
Perceived risk	The perceived sense of risk concerning disclosure of personal and financial information (Tan & Teo, 2000).
Perceived self-efficacy	An individual's self-confidence in his or her ability to perform a behavior (Taylor & Todd, 1995).
Perceived usefulness	Perceived usefulness is defined here as the degree to which a person believes that using a particular system would enhance his or her job performance (F. D. Davis, 1989).
Privacy	The extent to which the prospective user is concerned about the following privacy aspects relevant to m-payment (L. D. Chen, 2006).
Relative benefits/advantage	Relative benefits are realized when a new service offers greater value to customers than existing ones in such ways as improvements in economic benefits, personal image, convenience and satisfaction (Rogers, 1995; Taylor & Todd, 1995).
Security	The extent to which the prospective user is concerned about the authentication, confidentiality, Non-Repudiation and data integrity relevant to m-payment (L. D. Chen, 2006).
Situational normality	Situational normality is referred to "how normal or customary the situation appears to be" (Baier, 1986; Gefen et al., 2003a; Lewis & Weigert, 1985).
Speed of transaction	The extent to which the prospective user perceives that m-payment improves the speed of transaction (L. D. Chen, 2006).
Structural assurance	Structural assurances refer to "safety nets such as legal resource, guarantees, and regulations existed in a specific context" (Gefen et al., 2003a; McKnight et al., 1998; Shapiro, 1987).
Subjective norm / Social influence	Social influence is defined as "a person's perception that most people who are import to him think he should or should not perform the behavior in question" (Fishbein & Ajzen, 1975).
System quality	System quality is defined as the degree to which individuals perceive that the system is satisfying, in terms of transfer speed and reliability (Kleijnen, et al., 2004)
Technology anxiety	An individual's tendency to be uneasy, apprehensive, or fearful about the current or future use of a technology (C.-P. Lee, Warkentin, & Choi, 2004)
Trialability	The extent to which users would like an opportunity to experiment with the innovation prior to committing to its usage (Agarwal & Prasad, 1997).
Trust	Trust is a psychological expectation that a trusted party will not behave opportunistically (Bunduchi, 2005; Rousseau, Sitkin, Burt, & Camerer, 1998).

Table 6: Concept Matrix

Paper <sup>1</sup>	Perceived ease of use / Complexity	Perceived usefulness	Perceived financial cost	Relative benefits/advantage	Security	Compatibility	Perceived risk	Convenience	Trust	influence	Perceived self-efficacy	Facilitating conditions	Privacy	Mobility	Speed of transaction	Attitude towards MFS	System quality	Technology anxiety	Familiarity with bank/firm	Mobile experience	Initial trust	Structural assurance	Network externalities	Innovativeness	Perceived credibility	Triability	Banking needs	Situational normality	Expressiveness	Mobile Payment Knowledge	Accessibility	Need interaction	Interpersonal Relationship	Awareness				
P1	1	1										1								1																		
P2	1	1	1								1														1													
P3	1	1							1	1	1	1					1		1			1					1											
P4	1	1	1							1							1																					
P5	1	1	1		1				1																													
P6	1	1	1						1					1																1								
P7	1	1			1	1	1	1						1		1																						
P8	1	1			1			1						1		1																						
P9	1			1	1																																	
P10	1		1	1		1	1		1														1															
P11	1		1				1																1															
P12	1	1				1	1	1	1	1																												
P13	1			1		1	1				1	1								1						1	1											
P14			1		1			1																														
P15				1															1		1																	
P16				1																																		
P17				1																																		
P18				1																																		
P19																																						1
P20						1											1	1																				
P21	1	1	1	1	1			1																														
P22	1	1				1		1						1											1						1	1						
P23	1	1	1	1								1				1																				1		
P24	1	1			1	1	1	1					1		1																							
P25	1	1			1	1				1				1		1																						
P26	1	1					1				1					1		1																	1			
P27					1								1																									
P28	1	1								1															1													
P29		1					1		1		1										1	1																
Freq.	20	17	9	9	9	8	7	7	6	5	5	4	4	3	3	3	3	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1		

<sup>1</sup> Reference to the papers is provided in Table 7

Table 7: Reference to Papers in Concept Matrix

Paper	Reference	Country of Study
P1	(Chung & Kwon, 2009)	Korea
P2	(Luarn & Lin, 2005)	Taiwan
P3	(Gu, et al., 2009)	Korea
P4	(Kleijnen, et al., 2004)	USA
P5	(A. Zmijewska, Lawrence, & Steele, 2004a)	Japan
P6	(A. Zmijewska, Lawrence, & Steele, 2004b)	Japan
P7	(L. D. Chen, 2006)	USA
P8	(Dewan & Chen, 2005)	USA
P9	(Yu & Fang, 2009)	Taiwan
P10	(Niina Mallat, 2006)	Finland
P11	(Heijden, 2002)	Sweden and Netherlands
P12	(T. Dahlberg & Oorni, 2006)	Finland
P13	(Brown, et al., 2003)	South Africa
P14	(Pousttchi, 2003)	Germany
P15	(G. Kim, et al., 2009)	Korea
P16	(Anckar & D'Incau, 2002)	Finland
P17	(Y. Lee & Benbasat, 2003)	---
P18	(Looney, Jessup, & Valacich, 2004)	---
P19	(Laforet & Li, 2005)	China
P20	(C.-P. Lee, et al., 2004)	South Korea and USA
P21	(Viehlend & Leong, 2007)	Newzeland and USA
P22	(C. Kim, et al., 2010)	Korea
P23	(Cheong, et al., 2004)	Korea
P24	(L.-d. Chen, 2008)	USA
P25	(Schierz, Schilke, & Wirtz, 2010)	Germany
P26	(Rose & Fogarty, 2006)	Australia
P27	(Linck, Pousttchi, & Wiedemann, 2006)	---
P28	(Barati & Mohammadi, 2009)	---
P29	(Luo, Li, Zhang, & Shim, 2010)	USA

Table 8: Year-wise Country-wise Frequency of Studies

Country	Year									
	02	03	04	05	06	07	08	09	10	Total
Australia					1					1
China				1						1
Finland	1				2					3
Germany		1							1	2
Japan			2							2
Korea			1					3	1	5
Netherlands	1									1
Newzeland						1				1
South Africa		1								1
South Korea			1							1
Sweden	1									1
Taiwan				1				1		2
USA			2	1	1	1	1		1	7

After the factors used in the existing studies for determining adoption of MFS were identified, the significance of effect of one factor over other was analyzed. Figure 1 presents the linkages between all the factors found out from the secondary research. The figure shows the complex web of relationships

coming out from this meta-analysis on the linkages between various drivers and inhibitors for adoption of MFS. The figure shows linkages between different factors that were found with the score on the linkages. The notation in the figures 1 through 5 shows factors and their linkages as follows: the decimal value on the link denotes the total score of the link, while the two values separated by a comma mentioned within a bracket shows total number of papers in which the link was found significant and insignificant respectively. The value specified in bracket inside each factor states the total number of papers in which the factor was found to be mentioned (which may or may not contribute towards the significance or insignificance of a link to some other factor).

For example, the factors *perceived ease of use* and *perceived usefulness* have occurred in 20 and 17 studies respectively. However, the linkage between *perceived ease of use* and *perceived usefulness* has a linkage score of 5.33 (6,0). This would signify that out of the total set of papers referred to, 6 papers had stated this to be of significance and the cumulative score is very strong, signifying that the linkage between these two factors for adoption of MFS has been accepted significantly based on proposed models in which the linkage was not only proposed, but also tested in international journal of repute. On the other hand, the linkage between the factors *perceived ease of use* and *behavioral intention to use* has a linkage score of 4.7 (9,1) signifying high linkage score between these two factors, however out of the 10 studies in which this had been proposed, one study had found the linkage to be insignificant. Similarly, the linkage between *trust* and *behavioral intention to use MFS* has a linkage score of 0.04 (2,1) signifying that out of the 3 studies that have reported linkages between trust and behavioral intention to use MFS, one of the studies had found the linkage to be insignificant, although 2 studies had found it to be significant. However, given the overall low score, this was not found from a study published in an international journal in which the proposed model was tested out. In similar lines, the linkage between *compatibility* and *perceived usefulness* of the MFS has a linkage score of 0 (1,1) signifying that the linkage is still in an undetermined state as out of the two studies that had reported these linkages, one of them had found that these factors were positively linked, whereas the other study had found the linkage to be insignificant. Linkages having negative values clearly signify that the referred studies had found that them to be insignificant.

Given this complex web of linkages, it was felt that for a proper understanding of the significant and the insignificant factors, it would be necessary to separate them out accordingly. Hence, the linkages between various factors found in the studies were first categorized into four types based on the calculated scores that show the strength of significance of the associated link. The linkages having scores more than one was considered as the strong determinants (figure 2), while the second category, which includes linkages having scores equal to one, had been termed as potential determinants (figure 3). In the third category, which is named as weak determinants (figure 4), the linkages having positive scores less than one were considered. Linkages with negative scores were put in the fourth category, which is called insignificant determinants (figure 5).

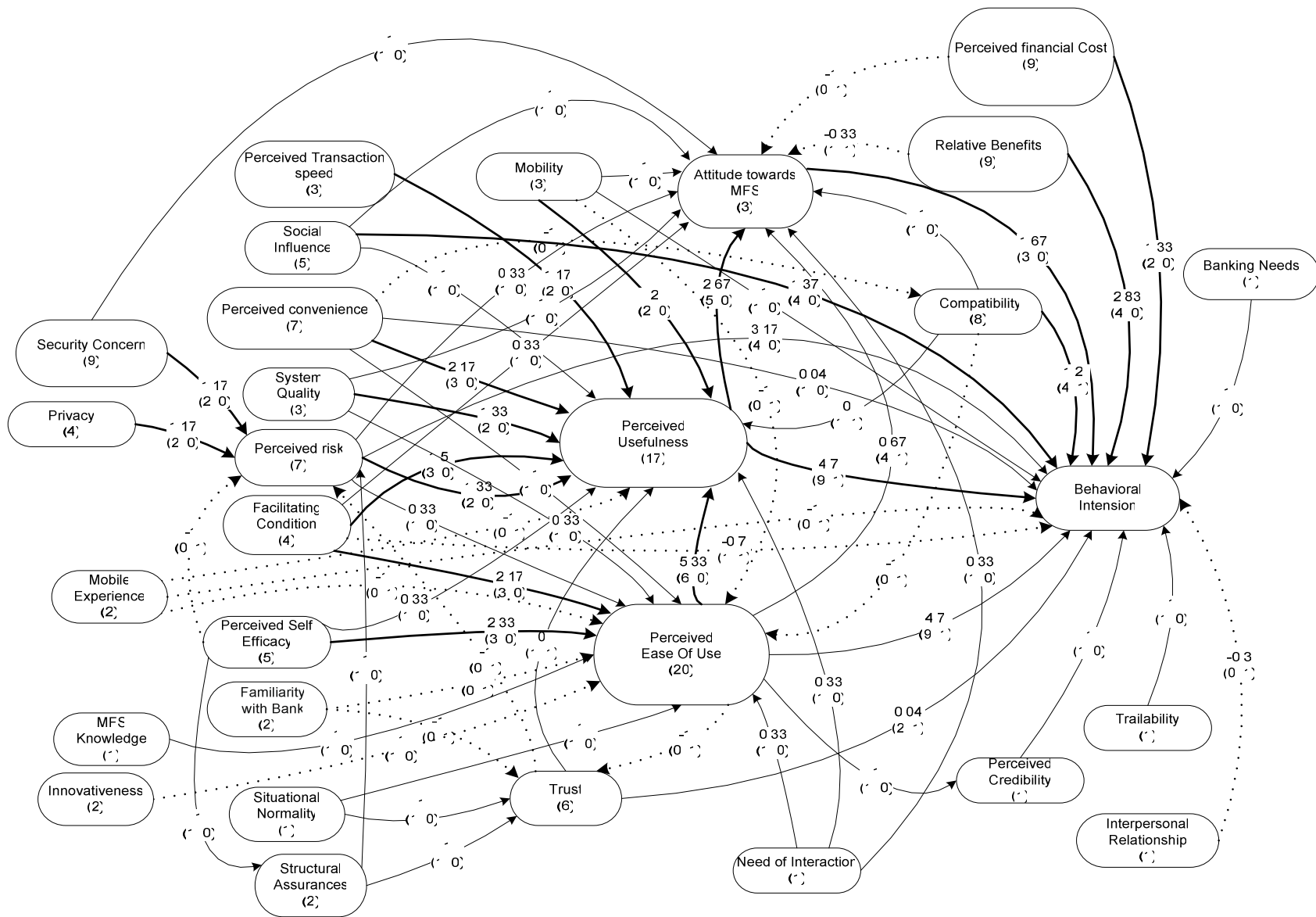
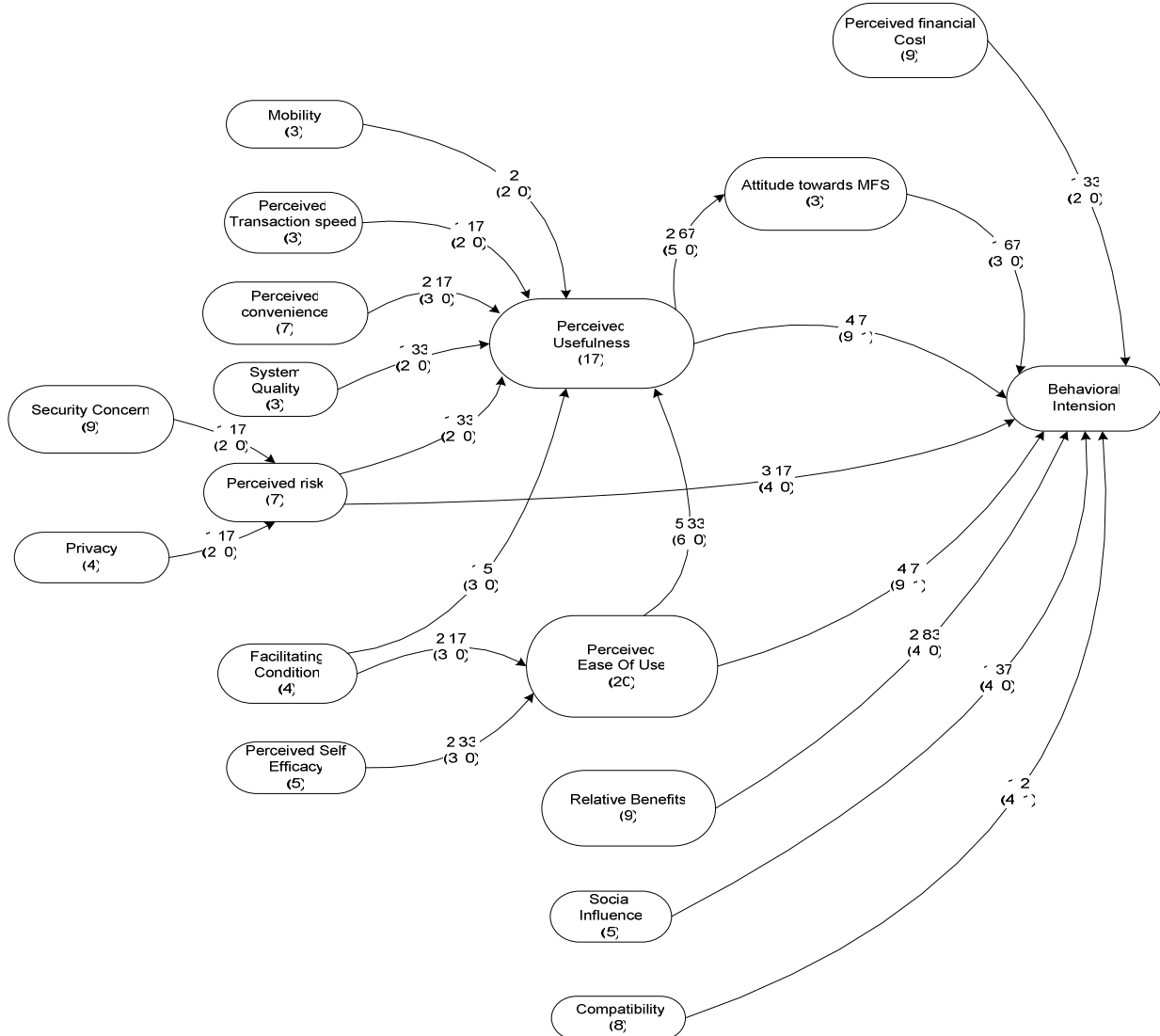


Figure 1: Cumulative Model for MFS Adoption Derived from the Existing Literature

### Strong Determinants

The linkages that are mentioned in figure 2 have a score greater than one, which states that the linkages were found to be significant in more than one paper. Further analyzing the linkages, it could be seen that, the linkages with top four scores, are between the attributes that are core attributes of TAM which includes perceived ease-of-use, perceived usefulness, perceived risk and behavioral intention. Out of these attributes, perceived ease-of-use was studied in twenty papers, while, perceived usefulness was found in seventeen papers that were studied. The link showing the impact of perceived ease-of-use on perceived usefulness was found to be significant in six papers (five journal papers and one conference paper), which resulted in a total score of 5.33. Similarly, perceived usefulness and perceived ease-of-use were found to be strong determinants of behavioral intention towards adoption of MFS with scores 4.7 each. Each of the two linkages was found significant in nine studies, while insignificant in one study. Perceived risk, relative benefits, perceived financial cost, attitude towards MFS, social influence and compatibility were found to be other strong determinants of behavioral intention towards adoption of MFS.

Figure 2: Strong Determinants - Linkages between Factors having Score Greater than One



Relative benefits and perceived financial cost were discussed as factors affecting adoption of MFS in nine studies each followed by compatibility which was found a mention in eight studies. Perceived self-efficacy and facilitating condition that were mentioned in five and four studies respectively were found to be strong determinants of perceived ease-of-use with link score of 2.33 and 2.17 respectively. Facilitating condition, perceived risk, system quality, perceived convenience, perceived transaction speed and mobility were found to be strong determinants of perceived usefulness. On the other hand, security concern privacy that was found in nine and four studies respectively is the strong determinants of perceived risk with link score of 1.17 each.

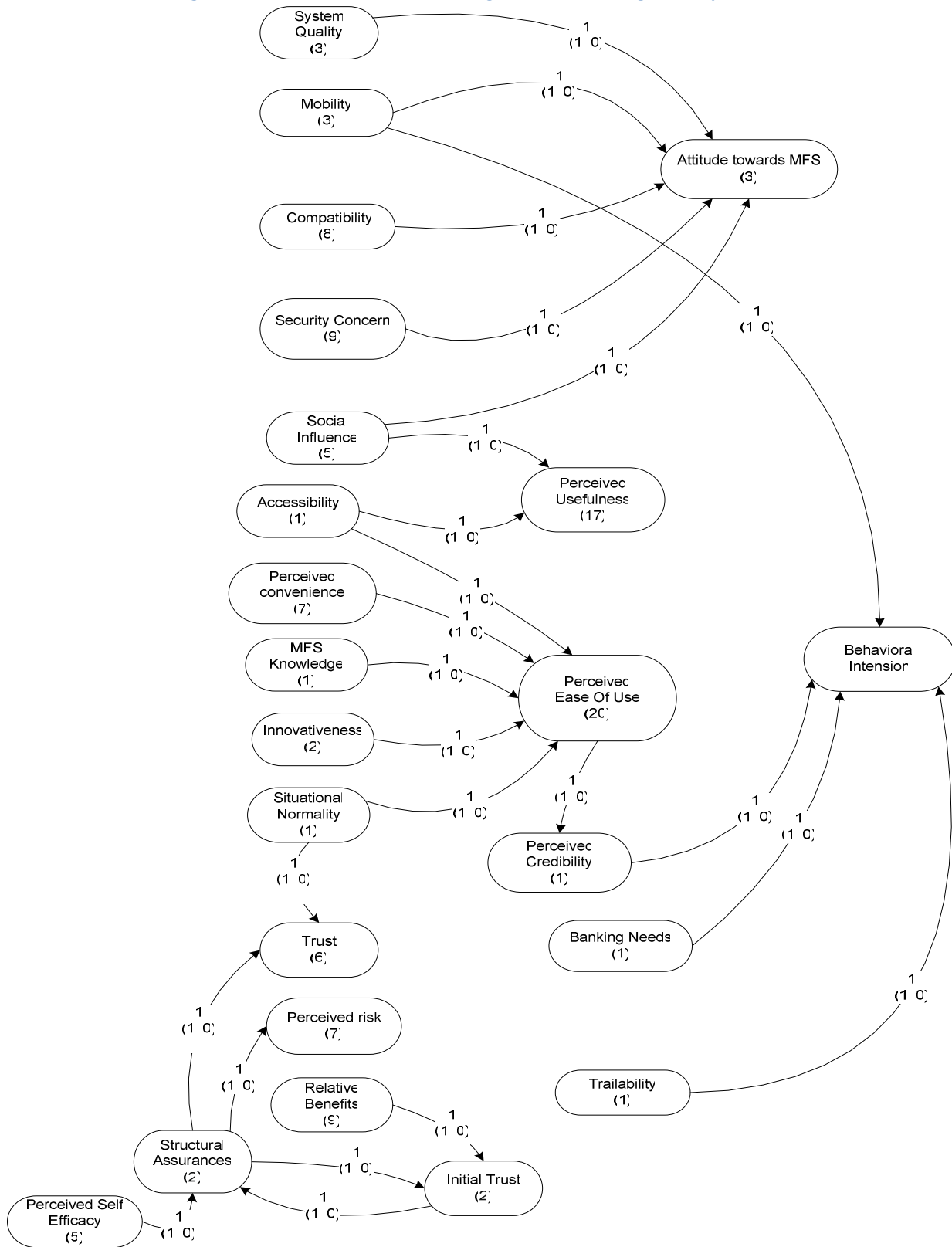
### **Potential Determinants**

In all, twenty four links were found between twenty three factors with a score equal to one as shown in figure 3. The value 1 for the score signifies that the link was tested and found significant in exactly one journal paper. Mobility, perceived credibility, trialability and banking needs were found to be potential determinants for behavioral intention towards MFS. Perceived credibility was found to be influenced by perceived ease-of-use. The potential determinants of attitude towards MFS were identified as security concern, compatibility, social influence, mobility and system quality. Out of these factors, security concern, compatibility and social influence were discussed in nine, eight and five studies respectively, while mobility and system quality were found in three studies each. Social influence and accessibility were found to be potential influencers to perceived usefulness, while accessibility, perceived convenience, MFS knowledge, innovativeness and situational normality were found to be potential determinants of perceived ease-of-use. Out of these factors, perceived convenience was found to be more frequent compared to the rest as it was used in seven studies while innovativeness in two and the rest of the factors were found in one study each. Trust was found to be influenced by situational normality and structural assurance, while initial trust was influenced by structural assurance and relative benefits. Structural assurance on the other hand was found to be affected by initial trust and perceived self-efficacy.

Given the fact that the potential determinants represent the linkages between various factors of MFS adoption, which were studied and found significant only in one study, would need to be studied further before they can be considered as strong determinants. Factors like trialability, banking needs, accessibility, MFS knowledge and situational normality which were found in one study each along with factors like innovativeness, structural assurance and initial trust which were studied in a couple of instance would require further research before their contribution towards adoption of MFS can be ascertained.



Figure 3: Potential Determinants – Linkage for Factors having Score Equal to One



### Weak Determinants

Factors categorized as weak determinants are linked to each other with non-negative score less than one as shown in figure 4. The strongest among the links mentioned in figure 4 is the link between perceived ease-of-use and attitude towards MFS with a score of 0.67. Perceived ease-of-use was found to significantly influence attitude towards MFS in one journal article, while it was found insignificant in another journal article. The link was however found significant in two other conference papers. The effect of compatibility and trust over perceived usefulness was found to be significant in one study while insignificant in another that were published as journal articles and hence leading to a score equal to zero. Links having very low positive score of 0.04 was found generating from trust and perceived convenience to behavioral intention. The effect of trust over behavioral intention was studied in three cases out of which it was found significant in two while insignificant in one instance. On the other hand the impact of perceived convenience over behavioral intention was found significant only in one working paper. Hence, both trust and perceived convenience can be attributed as very weak determinants of behavioral intention. Rest of the links including effects of perceived self efficacy over behavioral intention; perceived self efficacy and need of interaction over perceived usefulness; need of interaction, system quality and perceived risk over perceived ease-of-use; and need of interaction, perceived risk and facilitating condition over attitude towards MFS.

### Insignificant Determinants

The linkages having negative score values have been categorized as insignificant determinants as shown in figure 5. The effect of facilitating condition over behavioral intention had been found to be significant in a conference paper, while insignificant in a journal article contributing to a score of -0.7. The impact of interpersonal relationship over behavioral intention and relative benefits over attitude towards MFS was found insignificant in one conference paper leading to a score of -0.33 for each. All other links in figure 4 had been found to be insignificant in journal articles leading to a score of -1. Such links include effect of perceived financial cost over attitude towards MFS; compatibility, mobility, familiarity with bank and mobile experience over perceived ease-of-use; mobile experience on perceived usefulness; mobile experience and familiarity with bank over behavioral intention; perceived convenience over compatibility; familiarity of bank over trust and initial trust; and perceived ease-of-use over trust.

Figure 4: Weak Determinants – Linkages for Factors having Score Greater than or Equal to Zero but Less than One

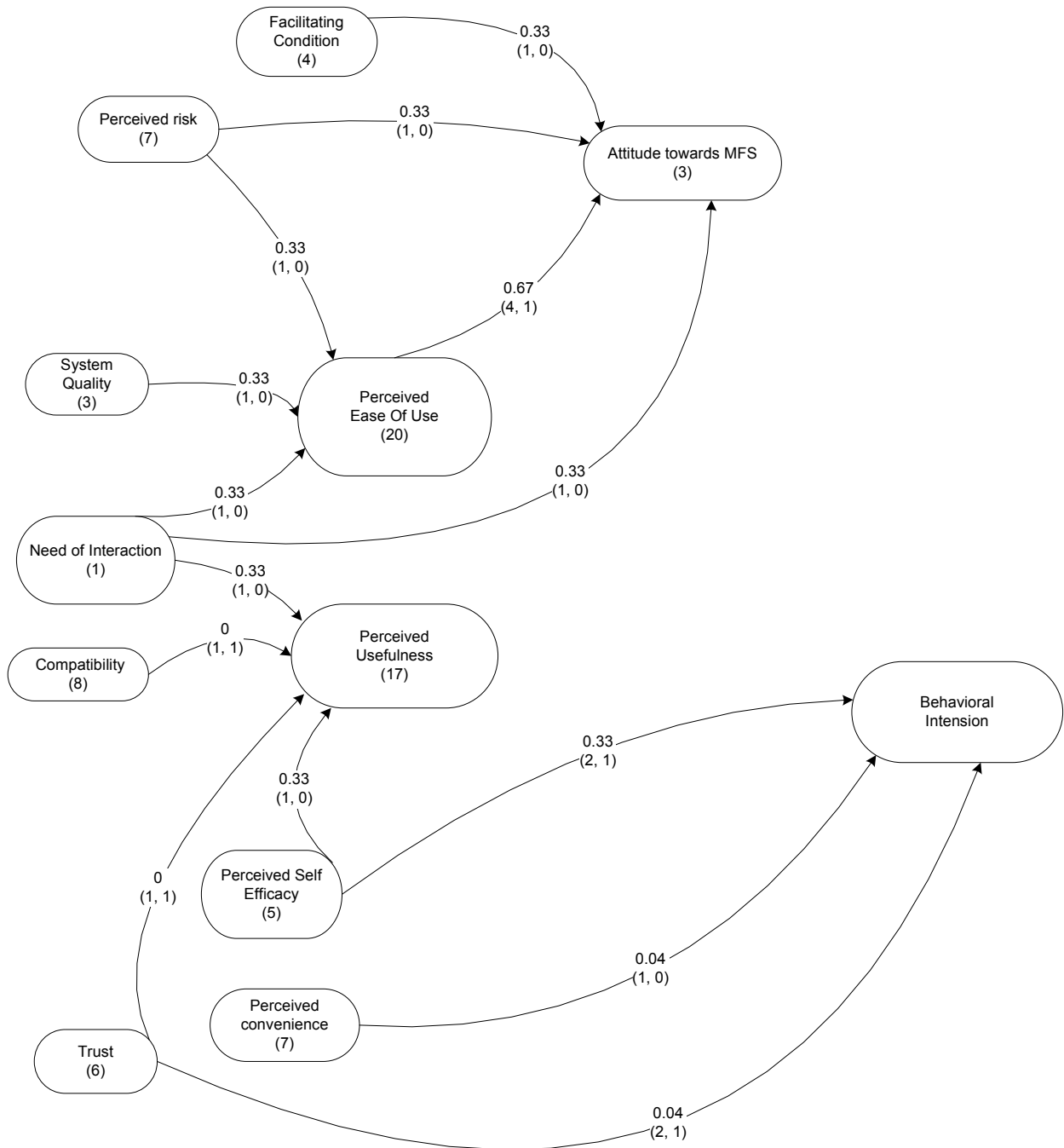
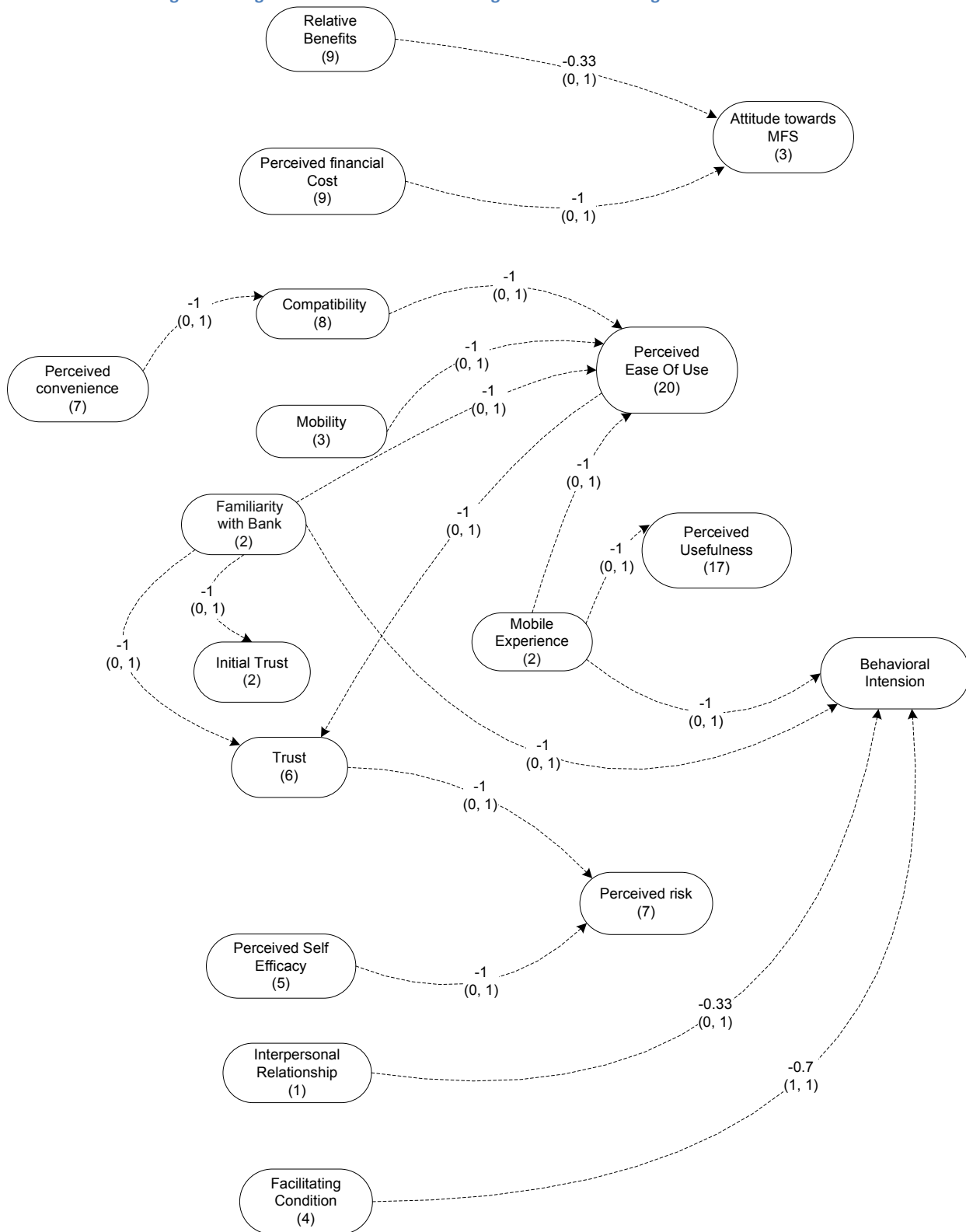


Figure 5: Insignificant Determinants – Linkages for Factors having Score Less than Zero



## 6. Discussion

Meta analysis of the factors and their linkages available from the existing literature of MFS adoption shows that the strong determinants to be prominent as they are well tested in multiple studies. Even within the strong determinants, the effect of factors like perceived ease-of-use and perceived usefulness on behavioral intention towards adoption of MFS stands much stronger than the rest. This is a clear indication about the fact that TAM had been well tested and found to be valid in case of MFS adoption. The presence of factors like mobility, perceived convenience and relative benefits among the strong determinants show the importance of factors that can prove MFS to be more beneficial for the consumers when compared to the existing channels of accessing financial services. Perceived financial cost and perceived risk (which includes privacy and security concerns) about MFS were found to be the major barriers towards its adoption. Facilitating condition and perceived self-efficacy were found to be the factors that determined how easy people found the use of MFS. Social influence was found to have a place among the strong determinants of behavioral intention towards adoption of MFS.

Comparing the strong determinants, the potential determinants and the weak determinants, a surprising fact was determined about the factor trust (which is a core dimension of trust based TAM). Though trust was found mentioned in six papers including two journal articles, three conference papers and one working paper, its total score towards behavioral intention and perceived usefulness was found to be 0.04 and 0 respectively which shows trust to have very little contribution towards adoption of MFS. Other factors like accessibility, MFS knowledge, innovativeness, situational normality, banking needs and trailability were found to be potential determinants of MFS adoption. As these factors were tested only once and found significant, more attempts would be required before they can be testified as strong determinants of MFS adoption. Looking at the weak determinants, need of interaction was found to be the only factor that was found in this category which was missing among the strong and potential determinants. Trail

The findings of this study can be beneficial for practitioners as well as researchers working in the area of MFS adoption. The factors and linkages for the strong determinants (as shown in figure 2) can be considered for increasing adoption and hence potential demand for MFS within a set of population. However, the factors and linkages mentioned as weak determinants can be used with caution and more rigorously tested for validity while designing a model. Insignificant determinants shown in figure 5 can be either discarded while model designing or tested for validity with due care if there are traces of such factors or linkages is found to be significant through some exploratory study in a scenario which is different from that being studied in the existing literature. Factors like familiarity with bank and mobile experience had been found only among the insignificant determinants and were found mentioned in only in two literatures each. This gives a clear indication to the fact that these factors can be discarded upfront while designing a model for MFS adoption. However, if the context of study is substantially different from the ones that were considered in the existing literature, the insignificant determinants can also be tested and considered for model development.

## 7. Further Research

Various other facts surfaced out of the analysis of the existing literature. One is that, though the studies conducted on the adoption of MFS had been quite extensive, the samples considered in each of these studies have had adequate access towards alternative channels of banking. Hence, the category of determinants emerging out of these studies can be highly considered for the banked population. However, further research needs to be conducted in order to check whether the same categorization of determinants hold good for the under-banked and unbanked population as well. Another fact that emerges is that though mobile financial services have been implemented in more than forty-four nations, studies on determining the factors affecting adoption of MFS have been concentrated on only twelve countries (refer table 8), in which interestingly, there has been no study on the adoption characteristics of m-Pesa of Kenya which has been showcased by various entities globally. Moreover, maximum number of these studies (seven studies) had been conducted in USA, followed by Korea, which had five studies. It is clearly evident that there is a serious lack of literature on studies in developing and under-developed countries. This fact also generates a huge opportunity for further research that could look into the extent of validity for the existing models in the context of developing and under-developed economies. None of the studies have however looked into the cultural aspects and its impact on adoption of MFS leaving open a wide area of research in adoption of MFS. Moreover, looking at the linkage scores of potential, weak and insignificant determinants, it is seen that there exists a huge need of academic research in better understanding the linkages between these various factors as majority of the linkages have been determined only from a couple of studies, interestingly, in a number of cases, the linkages appear only because of one existing study, which cannot help determine the linkages between these factors with sufficient confidence. Furthermore, the effect of culture on the adoption of MFS has not yet been studied so far which might provide a whole new dimension to the existing models of MFS adoption. Studies can also be conducted in understanding the way in which the perceptions about MFS have changed among the population of various countries and regions and what had been the triggers for such a change and determination of such other factors.

## REFERENCES

- Agarwal, R., & Prasad, J. (1999). Are individual differences germane to the acceptance of new information technologies? *Decision Sciences*, 30(2), 361-391.
- Agrawal, R., & Prasad, J. (1997). The role of innovation characteristics, and perceived voluntariness in the acceptance of information technologies. *Decision Sciences*, 28(3), 557-582.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. NJ: Prentice-Hall.
- Al-Ashban, A. A., & Burney, M. A. (2001). Customer adoption of tele-banking technology: The case of Saudi Arabia. *International Journal of Bank Marketing*, 19(5), 191-200.
- Ankar, B., & D'Incau, D. (2002). Value creation in mobile commerce: findings from a consumer survey. *Journal of Information Technology Theory and Application*, 4, 43-64.
- Barati, S., & Mohammadi, S. (2009). *An Efficient Model to Improve Customer Acceptance of Mobile Banking*. Paper presented at the World Congress on Engineering and Computer Science.
- Barnes, S. J., & Corbitt, B. (2003). Mobile banking: concept and potential. *International Journal of Mobile Communications*, 1(3), 273-288.
- Beck, T., Demirguc-Kunt, A., & Peria, M. S. M. (2007). Reaching out: Access to and use of banking services across countries. *Journal of Financial Economics*, 85, 234-266.
- Beshouri, C. P., & Gravråk, J. (2010). Capturing the promise of mobile banking in emerging markets *McKinsey Quarterly*. Retrieved from [http://www.mckinseyquarterly.com/Telecommunications/Capturing\\_the\\_promise\\_of\\_mobile\\_banking\\_in\\_emerging\\_markets\\_2539](http://www.mckinseyquarterly.com/Telecommunications/Capturing_the_promise_of_mobile_banking_in_emerging_markets_2539)
- Black, N. J., Lockett, A., Ennew, C., Winklhofer, H., & McKechnie, S. (2002). Modelling consumer choice of distribution channels: An illustration from financial service. *International Journal of Bank Marketing*, 20(4), 161-173.
- Boyd, C., & Jacob, K. (2007). *Mobile financial services and the underbanked: opportunities and challenges for mbanking and mpayments*. Chicago, IL: The Center for Financial Services Innovation.
- Brown, I., Cajee, Z., Davies, D., & Stroebel, S. (2003). Cell phone banking: predictors of adoption in South Africa - an exploratory study. *International Journal of Information Management*, 23, 381-394.
- Bunduchi, R. (2005). Business relationships in internetbased electronic markets: the role of goodwill trust and transaction costs. *Information Systems Journal*, 15, 321-341.
- CGAP (2009). *Mobile Banking in Tanzania: Can Kenya's success be replicated next door?* : CGAP: Consultative Group to Assist the Poor.
- Chaia, A., Dalal, A., Goland, T., Gonzalez, M. J., Morduch, J., & Schiff, R. (2009). Half of the world is "unbanked" - new global estimate reveals 2.5 billion adults worldwide lack savings or credit account. Retrieved from <http://financialaccess.org/node/2373>
- Chau, P. Y. K., & Hu, P. J. H. (2001). Information technology acceptance by individual professionals: A model comparison approach. *Decision Sciences*, 32(4), 699-719.
- Chen, L.-d. (2008). A model of consumer acceptance of mobile payment. *International Journal of Mobile Communications*, 6(1), 32-52.
- Chen, L. D. (2006). *A theoretical model of consumer acceptance of mpayment*. Paper presented at the 12th Americas Conference on Information Systems (AMCIS), Acapulco, Mexico.
- Cheong, J. H., Park, M.-C., & Hwang, J. H. (2004). *Mobile payment adoption in Korea: switching from credit card in* Paper presented at the 15th Biennial Conference.
- Chung, N., & Kwon, S. J. (2009). The effect of customers' mobile experience and technical support on the intention to use mobile banking. *CyberPsychology and Behavior*, 12(5), 539-543.

- Dahlberg, T., Mallat, N., Ondrus, J., & Zmijewska, A. (2008). Past, present and future of mobile payments research: A literature review. *Electronic Commerce Research and Applications*, 7, 165-181.
- Dahlberg, T., & Oorni, A. (2006). *Understanding changes in consumer payment habits - do mobile payments attract consumers?* Paper presented at the Helsinki Mobility Roundtable, Helsinki, Finland.
- Datta, A., Pasa, M., & Schnitker, T. (2001). Could mobile banking go global? *The McKinsey Quarterly*, 71-80.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 318-339.
- Davis, L. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982-1003.
- Dewan, S. G., & Chen, L. D. (2005). Mobile payment adoption in the USA: a cross-industry, cross-platform solution. *Journal of Information Privacy & Security*, 1(2), 4-28.
- Donner, J., & Tellez, C. A. (2008). Mobile banking and economic development: linking adoption, impact, and use. *Asian Journal of Communication*, 18(4), 318-332.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. MA: Addison-Wesley.
- Gefen, D., Karahanna, E., & Straub, D. W. (2003a). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27(1), 51-90.
- Goeke, L., & Pousttchi, K. (2010). *A scenario-based analysis of mobile payment acceptance*. Paper presented at the 2010 Ninth International Conference on Mobile Business.
- Gu, J. C., Lee, S. C., & Suh, Y. H. (2009). Determinants of behavioral intention to mobile banking. *Expert Systems with Applications*, 36, 11605-11616.
- Heijden, H. v. d. (2002). *Factors affecting the successful introduction of mobile payment systems*. Paper presented at the Fifteenth Bled eCommerce Conference, Bled, Slovenia.
- Hoehle, H., & Huff, S. (2009). *Electronic banking channels and task-channel fit*. Paper presented at the Thirtieth International Conference on Information Systems.
- Howcroft, B., Hamilton, R., & Hower, P. (2002). Consumer attitude and the usage and adoption of home-based banking in the United Kingdom. *International Journal of Bank Marketing*, 20(3), 111-121.
- Ivatury, G., & Mas, I. (2008). *The early experience with branchless banking*. Washington, DC: CGAP.
- Karjaluoto-Mattila, H., Mattila, M., & Pentto, T. (2002b). Factors underlying attitude formation towards online banking in Finland. *International Journal of Bank Marketing*, 20(6), 261-272.
- Kim, C., Mirusmonov, M., & Lee, I. (2010). An empirical examination of factors influencing the intention to use mobile payment. *Computers in Human Behavior*, 26, 310-322.
- Kim, G., Shin, B., & Lee, H. G. (2009). Understanding dynamics between initial trust and usage intentions of mobile banking. *Information Systems Journal*, 19, 283-311.
- Kim, K., & Prabhakar, B. (2004). Initial trust and the adoption of B2C e-commerce: The case of internet banking. *Database for Advances in Information Systems*, 35(2), 50-64.
- Kleijnen, M., Wetzels, M., & Ruyter, K. (2004). Consumer acceptance of wireless finance. *Journal of Financial Services Marketing*, 8(3), 205-217.
- Krugel, G., Desai, S., Solin, M., Leishman, P., Davidson, N., Tellez, C., et al. (2010). *Annual Report 2010*. London: GSM Association.
- Laforet, S., & Li, X. (2005). Consumers' attitudes towards online and mobile banking in China. *International Journal of Bank Marketing*, 23(5), 362-380.
- Laukkanen, T., & Pasanen, M. (2007). Mobile banking innovators and early adopters: How they differ from other online users? *Journal of Financial Services Marketing*, 13(2), 86-94.



- Lee, C.-P., Warkentin, M., & Choi, H. (2004). *The role of technological and social factors on the adoption of mobile payment technologies*. Paper presented at the 10th Americas Conference of Information Systems(AMCIS), New York, USA.
- Lee, T. M., & Jun, J. K. (2007). The role of contextual marketing offer in Mobile commerce acceptance: comparison between Mobile Commerce users and nonusers. *International Journal of Mobile Communications*, 5(3), 339-356.
- Lee, Y., & Benbasat, I. (2003). Interface design for mobile commerce. *Communications of the ACM*, 46, 49-52.
- Leeladhar, V. (2006). Taking banking services to the common man-financial inclusion. *Reserve Bank of India Bulletin*.
- Linck, K., Pousttchi, K., & Wiedemann, D. G. (2006). *Security Issues in Mobile Payment from the Customer Viewpoint*. Paper presented at the 14th European Conference on Information Systems.
- Lockett, A., & Littler, D. (1997). The adoption of direct banking services. *Journal of Marketing Management*, 13(8), 791-811.
- Looney, C. A., Jessup, L. M., & Valacich, J. S. (2004). Emerging business models for mobile brokerage services. *Communications of the ACM*, 46, 71-77.
- Luarn, P., & Lin, H. H. (2005). Towards an understanding of the behavioral intention to use mobile banking. *Computers in Human Behavior*, 21, 873-891.
- Luo, X., Li, H., Zhang, J., & Shim, J. P. (2010). Examining multi-dimensional trust and multi-faceted risk in initial acceptance of emerging technologies: An empirical study of mobile banking services. *Decision Support Systems*, 49, 222-234.
- Mallat, N. (2006). *Exploring Consumer Adoption of Mobile Payments - A Qualitative Study*. Paper presented at the Helsinki Mobility Roundtable, Helsinki, Finland.
- Mallat, N., Rossi, M., & Tuunainen, V. (2008). An empirical investigation of mobile ticketing service adoption in public transportation. *Pers Ubiquit Comput*, 12, 57-65.
- Mallat, N., Rossi, M., & Tuunainen, V. K. (2004). Mobile Banking Services. *Communications of the ACM*, 47, 42-46.
- Mathieson, K. (1991). Predicting user intentions: Comparing the technology acceptance model with the theory of planned behavior. *Information Systems Research*, 2(3), 173-191.
- Mathieson, K., Peacock, E., & Chin, W. W. (2001). Extending the technology acceptance model: The influence of perceived user resources. *Database for Advances in Information Systems*, 32(3), 86-112.
- Moore, G. C., & Benbasat, I. (1991). Development of instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, 2(3), 192-222.
- Polatoglu, V. N., & Ekin, S. (2001). An empirical investigation of the Turkish consumers' acceptance of Internet banking services. *International Journal of Bank Marketing*, 19(4), 156-165.
- Pousttchi, K. (2003). *Conditions for acceptance and usage of mobile payment procedures*. Paper presented at the Second International Conference on Mobile Business (ICMB), Vienna, Australia.
- Rogers, E. (1995). *Diffusion of Innovation* (4th ed.). New York, USA: Free Press.
- Rose, J., & Fogarty, G. (2006). *Determinants of perceived usefulness and perceived ease of use in the technology acceptance model: senior consumers' adoption of self-service banking*. Paper presented at the Academy of World Business, Marketing & Management Development.
- Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: a cross-discipline view of trust. *Academy of Management Review*, 23, 393-404.
- Rugimbana, R., & Iversen, P. (1994). Perceived attributes of ATMs and their marketing implications. *International Journal of Bank Marketing*, 12(2), 30-35.
- Schierz, P. G., Schilke, O., & Wirtz, B. W. (2010). Understanding consumer acceptance of mobile payment services: An empirical analysis. *Electronic Commerce Research and Applications*, 9, 209-216.

- Suoranta, M. (2003). Adoption of mobile banking in Finland. *Jyväskylä Studies in Business and Economics*, 28.
- Suoranta, M., & Mattila, M. (2004). Mobile banking and consumer behavior: new insights into the diffusion pattern. *Journal of Financial Services Marketing*, 8, 354-366.
- Tan, M., & Teo, T. (2000). Factors influencing the adoption of Internet banking. *Journal of the Association for Information Systems*, 1(5), 1-42.
- Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, 6(2), 144-176.
- Turban, E., King, D., Viehland, D., & Lee, J. (2006). A managerial perspective. New Jersey: Pearson Education. *Electronic commerce*.
- Viehland, D., & Leong, R. S. Y. (2007). *Acceptance and Use of Mobile Payments*. Paper presented at the 18th Australasian Conference on Information Systems.
- Wang, Y. S., Wang, Y. M., Lin, H. H., & Tang, T. I. (2003). Determinants of user acceptance of internet banking: An empirical study. *International Journal of Service Industry Management*, 14(5), 501-519.
- Yu, T. K., & Fang, K. (2009). Measuring the post-adoption customer perception of mobile banking services. *CyberPsychology and Behavior*, 12(1), 33-35.
- Zmijewska, A. (2005). *Evaluating Wireless Technologies in Mobile Payments – A Customer Centric Approach*. Paper presented at the International Conference on Mobile Business.
- Zmijewska, A., Lawrence, E., & Steele, R. (2004a). *Towards a successful global payment system in mobile commerce*. Paper presented at the IADIS International E-Commerce, Lisbon, Portugal.
- Zmijewska, A., Lawrence, E., & Steele, R. (2004b). *Towards understanding of factors influencing user acceptance of mobile payment systems*. Paper presented at the IADIS WWW/Internet, Madrid, Spain.