

# DETERMINANTS OF INTENTION TO USE MOBILE VALUE ADDED SERVICES: THE CASE OF WOMEN-OWNED MICRO ENTERPRISES IN FIJI

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## Abstract

*We investigate the factors influencing the intention to use of mobile value added services in the Pacific island of Fiji. Technology adoption literature suggests that perceived usefulness and perceived ease of use influence intention to adopt new technology. However, behavioral research suggests that intention to adopt is influenced by social norms. We investigate the impact of these three constructs on behavioral intention to use mobile value added services in Fiji – a country which has some unique characteristics such as the culture of ‘sharing’ and ‘reciprocity’. We surveyed 74 women micro entrepreneurs and found that the predominant driver of intention to adopt of technology in collectivist societies such as Fiji is social influence. It was found that social influence also impacts perceived usefulness and perceived ease of use and through these the intention to adopt. Accordingly, in societies such as Fiji, policy makers and industry need to engage social organizations/networks for advancement of technology adoption.*

*Keywords: mobile value added services, Fiji, women micro entrepreneurs, adoption*

# 1. INTRODUCTION

Mobile value added services (MVAS) includes all services provided to the end customer beyond standard voice calls (Deloitte 2011). The six prevalent themes in MVAS are: M-infotainment (entertainment), M-connectivity (communication related applications), M-health (health related issues), M-education (educational content), M-enterprise (business-related applications), and M-commerce (retail, banking and transactions over mobile phones). Prior studies by the IMF in Africa have found that MVAS contributed significantly to economic growth (Andrianaivo & Kpodar 2011). With mobile cellular subscriptions per 100 people in Fiji having touched 98 (World Bank 2013), there is enormous scope to offer and adopt MVAS. Despite the high penetration rate of mobile phones, their use is predominantly restricted to voice calls. The Fijian government acknowledges that much greater use of mobile technologies is essential for the country's social and economic development where poverty has risen from 7% to 35% over the last four decades (GOF 2006). The delivery of M-banking and M-enterprise services to women is particularly important for improving broader social welfare as well as inclusive growth and development. Such programs 'facilitate poverty reduction through promotion of sustainable livelihoods and bring about women's empowerment through social and collective action at the grassroots' (SIDBI 2008). Though the rapid uptake of MVAS is important from micro-enterprises growth perspective, to our knowledge, there is limited research on the relative importance of factors which influence intention to adopt such services. Consequently, a deeper understanding of drivers of intention to adopt MVAS is necessary.

Existing research by organizations such as the Global Systems for Mobile Association (GSMA), Goldman Sachs, Vodafone, and Nokia suggests that 'mobile services are being utilized by women to empower their lives and improve their businesses' (CBFW 2012). Studies in countries such as Indonesia, Egypt and Nigeria demonstrated that 'nearly 88 per cent of the women interviewed desired MVAS to grow their business' (CBFW 2012). AusAID (2012) study in Fiji found that nearly a quarter of the country's adult population had access to mobile money wallets, which was making a significant difference, in particular, to the lives of rural entrepreneurs who otherwise had to travel long distances even for basic banking services such as cashing a cheque. The study, however, did not specifically examine women micro entrepreneurs (WMEs) and the challenges they face. Though many studies have explored the factors that influence adoption of technology including mobile phone technology (for example, Davis 1989; Rogers 2003; Lu et al. 2005, Biljon & Kotze 2007; Choong et al. 2010; Motiwalla 2007; Akturan & Tezcan 2012, Al-Jabri & Sohail 2012; Yu 2012, Al-Hinai 2007), there is limited research on MVAS in particular. Although abundant research on the technology side of mobile commerce has been published, there exists very limited research on the strategies and applications of M-commerce (Gunasekaran & Ngai 2003). Furthermore, researchers such as Kim et al. 2009; Laukkanen 2007; Laforet & Li 2005 found that use of mobile is still restricted to voice calls and the internet continues to be the leading channel, for example, in electronic banking. Despite the importance of MVAS in growing businesses and economy and providing livelihood to women micro-entrepreneurs, little is known about the important determinants of implementing MVAS or for further development thereof.

The research on intention to adopt technology by users has so far 'focused predominantly on instrumental beliefs such as perceived usefulness and perceived ease of use as drivers of usage intentions' (Lu et al. 2005). However, Ajzen & Fishbein 1980; Klonglan & Coward 1970; Triandis 1971; 1980, demonstrate that constructs from behavioural science and psychology such as social norms, enjoyment, uncertainty and flow are equally important and need to be investigated in future IS studies. Few researchers have addressed the issue and identifying the pre-adoption criteria remains a critical issue in IS research (Lu 2005). It is particularly critical in the context of MVAS which are at early initial stages of implementation through the 3G and 4G mobile phones (for example, recent introduction of Nokia Life Tools which provide farmers in Indian villages real time agricultural prices data).

We attempt to advance the theoretical understanding of the antecedents of early adoption of MVAS by WMEs and specifically investigate (a) to what extent ‘important others’ exert influence on perceived usefulness (PU) and perceived ease of use (PEU) and (b) the correspondence between PU, PEU and social influence (SI) and the behavioural intention (BI) to use MVAS by WMEs. By focusing on women and micro entrepreneurs, the study provides new insights to the technology adoption literature. These segments have not received specific attention in the literature. Gefen & Straub (1997) find that women and men differ in their perception towards information systems. Furthermore, women entrepreneurs may typically experience shortage of resources compared to male (e.g. Lerner et al. 1997). Huyer & Sikoska (2003) observed that there is a need to narrow the gender digital divide to empower women. Antonio & Tuffley (2014) state that two-thirds of the world’s population do not have access to the internet, many of whom are women. The digital divide continues to persist even today. The annual technology report of the World Economic Forum (2014) found that despite the increasing availability of ICTs, the question of access and usage remains important especially for developing countries, given their need to narrow the digital divide. Improving women’s access to technology has the potential to spur their economic advancement and stimulate broader economic growth (ICRW 2010). Microenterprises provide a unique setting. In such enterprises, the decision making process is highly concentrated. These are typically owner-managed, family run small businesses such as a day care centre, take-away restaurants, and vegetable or fruit vendors. MVAS has the potential to provide a cost-effective alternative for such enterprises. ‘Mobiles have relatively low physical infrastructure requirements and can reach remote areas in a more cost-effective fashion than other ICTs such as the Internet or fixed phone lines. In some places, mobile devices are simply the only option available, and mobile phones require only basic literacy, making the barriers to entry much lower than with other modern ICTs’ (UNDP 2012). Furthermore, as a country, Fiji provides a unique context. It is a remote Pacific Island country comprised of over 300 small islands of which about one-third are inhabited. A particular challenge is to reach out to the poor people thinly spread in these islands. The Fijian government emphasizes that ICT technologies such as MVAS have a big role to play in this unique situation. Another feature of Fiji, as compared to western advanced countries, is its population composition—Melanesians make up 54% and Indo-Fijians 38% while the rest are Chinese, Europeans and others. Despite the ethnicity diversity, the ‘collectivist’ paradigm pervades social norms such that ‘important others’ exercise a strong influence on the intention to adopt an innovation such as MVAS. There is also an important aspect of ‘power distance’ as the national culture in Fiji is hierarchal and reinforces unequal distribution of power and resources (Schwartz 2004). Though understanding the intention to adopt of technology in this unique setting makes the study particularly worthwhile, it has received limited attention in the literature so far. We address this gap. We find that the drivers of adoption of MVAS, in remote island countries such as Fiji, are SI, PU and PEU. Besides the theoretical contribution, the study provides insight to providers of MVAS into the strategies to manage the enormous potential that MVAS offers. Policy makers may also consider framing policies/regulations that would create an enabling environment for rapid uptake of MVAS by WMEs.

Our central research question was: what are the determinants of intention to adopt of MVAS by WMEs in Fiji? For the purpose, we conducted semi-structured interviews of 74 respondents’ selected by systematic random sampling from a sampling frame of 522 WMEs. It was analysed by structural equation modelling (SEM) with partial least squares (PLS). We found that SI was a dominant construct impacting BI to use MVAS. It also impacted positively and significantly the other two constructs: PU and PEU, which in turn influenced BI. We conclude that in ‘collectivist’ societies such as Fiji, SI is the dominant paradigm influencing BI and policy makers and industry need to focus on social networks if rapid uptake of technology is the objective.

The study is organized as follows. Section 2 provides information about the country context. Section 3 presents the theoretical framework and the hypotheses. Section 4 is about data and method and also presents results, section 5 discusses the results and section 6 concludes with the theoretical and practical implications of the findings, limitations, and recommendations for future research.

## **2. BACKGROUND: MOBILE COMMUNICATION AND MVAS IN FIJI**

The population of Fiji was 899,000 with a per capita income of USD 4,669 (DFAT 2014). Fiji's economic progress in the last decade has been mixed due to political instability, including four coup d'états in the last three decades. Economic growth, which averaged less than 1 percent over the 2007–2010 period (Prasad 2012) has picked up since 2011 but remains unsustainable as it is consumption driven. Nearly, 35% Fijians lives below the basic needs poverty line of A\$3.30 a day (DFAT 2012).

Fiji has, however, made significant progress in providing mobile services to the population. According to the World Bank (2013), 98 out of 100 people in Fiji had mobile cellular subscriptions. These are 'subscriptions to a public mobile telephone service using cellular technology which provide access to the public switched telephone network'. Despite this, similar to other developing countries, limited use is made of mobile for business purposes. Data about the use of MVAS in Fiji are not available but it is generally opined that many policy and infrastructure barriers hinder the growth of this industry.

## **3. THEORETICAL FRAMEWORK AND RESEARCH MODEL**

Theories that have explored the determinants of adoption of technology include the Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM, TAM2) and Unified Theory of Acceptance and Use of Technology (UTAUT). Fishbein & Ajzen (1975) proposed the TRA which postulates that various constructs such as beliefs, attitudes, norms, intention and behaviours of individuals are inter-connected. In the mid-eighties, Rogers (1983) developed the diffusion of innovation theory which posits that characteristics such as relative advantage, compatibility, complexity, trialability and observability impact diffusion of innovation. Meanwhile, Ajzen & Driver (1991) extended the TRA by adding the construct 'perceived behavioural control' and labelled the revised model, the TPB and argued that people's behaviour is influenced by factors beyond their control. Davis (1989) proposed the TAM to determine what motivates users to adopt technology and found that PU, PEU and attitude towards using the system were the major determinants of user acceptance. Venkatesh & Davis (2000) included in TAM2, social influence processes (such as image, subjective norm) and also cognitive instrumental processes such as output quality, relevance to job or task at hand. As MVAS is still in the early stages of adoption in Fiji, we focus on intention to use rather than its actual use. We begin by presenting our research model elaborating the theoretical constructs used followed by testable hypotheses.

As stated earlier, we focus on the antecedents of early adoption but unlike prior studies begin with SI. Prior studies (for example, Venkatesh et al. 2003; Crabbe et al. 2009; Riquelme & Rios 2010) found that cultural and social norms have significant influence on PU and PEU. SI becomes particularly important in the context of Fiji, since in the Melanesian culture, 'sharing' is the basis of all practices and behaviour, which according to Hofstede (2001) would fall in the 'collectivist' group. Similarly, Hofstede classifies the Indian culture as 'collectivist' as well. In 'Individualist' societies, people are deemed to look after themselves and their direct family only. In 'Collectivist' societies, people belong to 'in groups' that takes care of individuals in exchange for loyalty (Hofstede 2001). As individual decisions in 'Collectivist' cultures are largely influenced by cultural and social norms. Interestingly, prior studies on adoption that emanated from non-Western cultures have ignored this important aspect. The centrality of SI on the intention to adopt MVAS, propose by us is a unique feature and a major contribution to the literature. Accordingly, we posit that SI will not only influence PU and PEU but would also directly influence intention to use MVAS. The focal antecedent of the BI construct – the dependent variable – is the Theory of Reasoned Action (Fishbein & Ajzen 1975). Gibbons et al. (2005) state that virtually all health-

behaviour theories include some version of the construct BI as a proximal antecedent to action. Accordingly, by starting at SI in our model and how it influences PU and PEU, we demonstrate that it is social networks that providers and policy makers need to focus on if rapid uptake of MVAS is the goal. Though the BI would be influenced by social networks in the ‘Collectivist’ context of Fiji, whether to be influenced by what the ‘important others’ think is itself an individual decision. In ‘Collectivist’ societies the influence could be quite large. We measure these constructs following the extant literature.

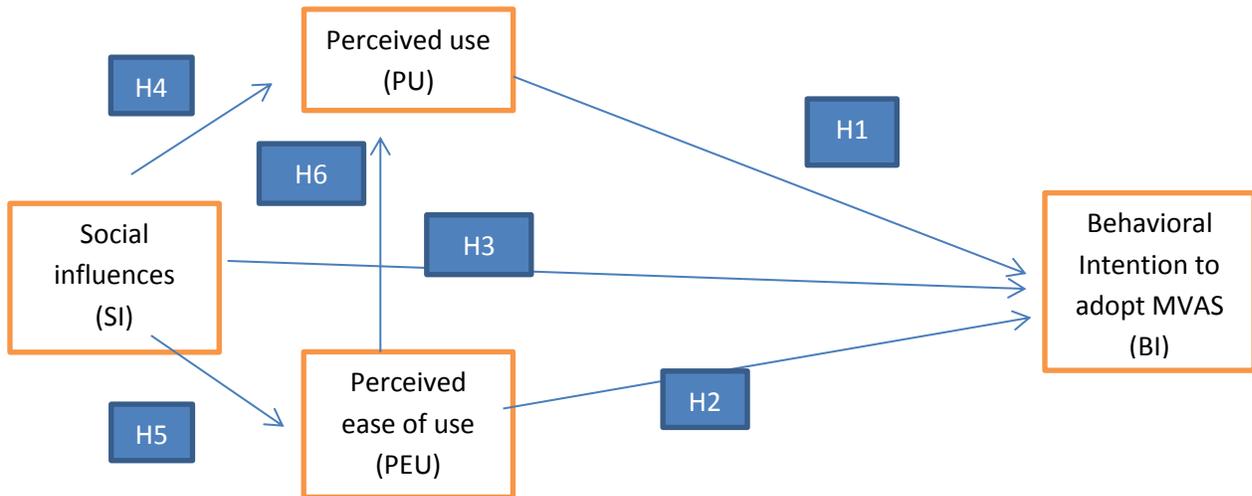


Figure 1: Research model

### 3.1 Perceived usefulness of MVAS

According to Lu et al. (2008), PU is a measure of the individual’s subjective assessment of the utility offered by technology. PU was found to have a direct influence on the BI to use (Lu et al. 2003). When customers perceive clear usefulness or advantages offered by mobile banking, they are more likely to have a positive attitude toward adopting (or continue using) mobile banking (Lin 2011). It applies to both banking and non-banking services offered via mobile phones. Prior studies on technology adoption have shown that PU has a significant and positive association with BI to use the technology. Jeyaraj et al (2006) found that in 26 out of 29 technology adoption studies from 1992-2003, PU was a significant driver of BI to use technology. Many studies in the area of technology adoption have found PU to be a significant predictor of intention to adopt (see for example, Davis 1989; Davis et al. 1989; Gefen et al. 2003; Venkatesh & Morris 2003). Recent studies by Pikkarainen et al. (2004) in Finland, Celik (2008) in Turkey and Bhatti (2007) and Kim et al. (2007) confirm that PU is a significant predictor of online banking adoption. However, despite the high penetration of mobile phones in Fiji, use thereof beyond voice calls was found to be limited, for example, in our study we found that only 26% of the respondents had internet access on mobile phone. At the same time, 59% of the respondents indicated they would like to use MVAS if suitable applications are available. Accordingly, we hypothesize as follows:

H1: Perceived usefulness of MVAS has a positive association with intention to use MVAS in Fiji

### 3.2 Perceived ease of use of MVAS

A related construct to PU is PEU of MVAS. Lin (2011) defines PEU as the degree to which a technology such as mobile banking is perceived as easy to understand and operate. Rogers (1995) states that complexity of technology can be an inhibitor to use. As users are already familiar with the use of mobile

phones for voice calls, an 'add-on' service in the suite of MVAS would be easier to adopt. Prior studies such as Chang (2004) on adoption of intranet, Wang et al. (2003) on online banking and Lu et al. (2003) and Shih & Fang (2004) in respect of wireless internet adoption have found PEU as a significant predictor of BI to use technology. Venkatesh & Morris, (2003) state that customers may find it hard to adopt M-banking services when the system is not easy to learn and easy to use. Riquelme and Rios (2010) found that PEU exercises stronger influence on decision of women to adopt technology compared to men for whom PU is a stronger driver. However, Pikkarainen et al. (2004) and Eriksson et al. (2005) could not find that PEU significantly influenced adoption of online banking. In the case of Fiji, considering that MVAS is in early stage of development, PEU would have direct influence on the BI to adopt. Accordingly, we formulate the following hypotheses:

H2: Perceived ease of using MVAS has a significant positive association with the intention to use MVAS in Fiji.

H6: Perceived ease of using MVAS has a significant positive association with perceived usefulness of MVAS in Fiji.

### **3.3 Social influence (SI)**

Oyserman et al. (2002) state that in 'Collectivist' cultures, societal groups (including family groups) bind and mutually obligate individual members. In such structures, social context, situational constraints, and social roles figure prominently in personal perception and causal reasoning (Miller, 1984; Morris & Peng, 1994). SI is a construct derived from the UTAUT. Venkatesh et al. (2003) defines SI as the degree to which an individual perceives that 'important others believe' (for example, family and friends) they should use the technology. Taylor & Todd (1995) define SI as the effect of other people's opinion, superior influence, and peer influence. Lu et al. (2008) suggest that social pressures to perform or not perform a particular behaviour might also influence BI. Mobile users are often in socially pre-disposed situations. The opinion of others about mobile phones influences their PU of the mobile and their perceptions about PEU especially when they find that other societal group members are using mobile phones. Many individuals in China switched to mobile phones to be with the latest trends and to advance or maintain their social status (Lu et al. 2008). Hsu & Lu (2004) point out that several theories suggest that SI is crucial in shaping user behaviour. Crabbe et al. (2009) found that M-banking adoption in Ghana was influenced by social and cultural factors. Riquelme and Rios (2010) found that social norms significantly influenced BI to adopt m-banking among female respondents compared to their male counterparts in Singapore. To test these possibilities, we propose the following hypotheses:

H3: Social influence has a significant association with intention to use MVAS in Fiji.

H4: Social influence has a significant association with perceived usefulness of MVAS in Fiji.

H5: Social influence has a significant association with perceived ease of use of MVAS in Fiji.

## **4. METHOD AND RESULTS**

We surveyed 74 of the 522 registered WMEs in Suva and surrounding region from the list made available to us by the South Pacific Business Development (SPBD). Respondents were selected by systematic random sampling to validate the research model (figure 1). The SPBD is a network of microfinance institutions in Fiji which assists poor women to start, grow and maintain sustainable micro enterprises.

### **4.1 Construct operationalization**

To ensure content validity, the items for each construct as used in prior studies were adapted keeping in mind the Fijian context. The structured interview schedule was pilot tested with five field researchers

who had conducted similar field studies. Luarn and Lin (2005) also advise the use of items for each construct as used in prior research to increase content validity. We had 22 items altogether—each construct consisted of six indicators except BI to use which had four indicators (see Appendix A). The sources of the indicators are as follows: PU of MVAS: Davis (1989), Pikkarainen et al. (2004), Jaruwachirathanakul & Fink (2005), Tan and Teo (2000), Shih & Fang (2004), Jahangir & Begum 2008. PEU: Davis, (1989), Pikkarainen et al. (2004) Jahangir & Begum (2008), Amin (2009), Shih & Fang (2004), Eriksson et al. (2005). SI: Venkatesh et al. (2003), Venkatesh & Zhang (2010), Foon & Fah (2011), Sripalawat et al. (2011) Davis et al., (1989); Matheison, (1991); Taylor & Todd, (1995). Cowan (2010). BI: Davis (1989), Moon & Kim (2001), Jaruwachirathanakul & Fink (2005), Pikkarainen et al. (2004), Tan & Teo (2000).

## 4.2 Data analysis and results

The data were analysed using Stata 11.0 for Windows. Of the 74 women respondents, 56% were below the age of 40; 64% were in retail business, 14% in hospitality, 1% in social services and the rest in other business. Forty-five per cent of the firms were less than three years old, 32 between three to five and the rest more than five. Sixty-eight per cent of firms had two or less employees. Of the total respondents, 71% had secondary education, and 15% primary.

As already stated, we used the PLS (SmartPLS software version 3.2.1) method of estimation (PLS–SEM) (Wold 1982, 1985; Lohmoller 1989). This method is preferred over the covariance–based SEM (CB–SEM) method of estimation with modestly sized samples such as ours. PLS–SEM works efficiently with small sample size and complex models and the requirements regarding the sample size and the distribution of variables are less stringent than the alternative method of estimation. PLS estimates the structural model using an iterative OLS regression like procedure, which aims to explain the variance in the dependent variable. To recap, the dependent variable is BI to use MVAS, and latent constructs are: PU, PEU and SI, where PU is a measure of the individual’s subjective assessment of the utility offered by technology; PEU is defined as the degree to which mobile banking is perceived as easy to understand and operate; and SI is defined as the degree to which an individual perceives that ‘important others believe’ (for example, family and friends) they should use MVAS. Further, a number of indicators were used to measure each of the formative and reflective constructs (see Appendix A for details).

### 4.2.1 Validity and reliability

The first validity criterion of PLS is internal consistency reliability. To do this, we use composite reliability, which varies between 0 and 1, with higher values indicating higher levels of reliability, interpreted generally in the same way as Cronbach’s alpha (Hair et al. 2014). As Table 1 shows, our composite reliability scores fall between 0.82 and 0.92, indicating high construct reliability.

	Composite reliability	Mean	Standard Error	T Statistics
BI	0.870	0.867	0.030	28.535
PEU	0.828	0.822	0.048	17.078
PU	0.865	0.860	0.042	20.655
SI	0.928	0.924	0.024	38.385

Table 1: Composite reliability

To measure the extent to which indicators of one construct correlated positively with alternative measures of the same construct, we considered both the outer loadings of the indicators and the average variance extracted (AVE). Table 2 reports the results of the outer loadings and Table 3 reports the AVE results. Known also as the indicator reliability, higher and significant outer loadings on a construct indicate that the associated indicators have much in common, which is captured by the construct. Outer loadings greater than 0.708 indicate an adequate individual item reliability of respective construct, implying that more than 50% of the variance in the observed variable is shared with the construct (Chin, 1998). Where this threshold was less than 0.708, the relevant indicator was systematically removed to increase the composite reliability scores, for example, PU3, PU5 and PU6 were omitted (see Table 2).

	Loading	Mean	Standard Error	T Statistics
PU1 ← PU	0.794	0.778	0.091	8.715
PU2 ← PU	0.888	0.887	0.030	29.698
PU4 ← PU	0.790	0.794	0.068	11.633
PEU1 ← PEU	0.808	0.810	0.067	12.054
PEU5 ← PEU	0.873	0.859	0.072	12.074
SI2 ← SI	0.837	0.835	0.060	13.846
SI3 ← SI	0.769	0.755	0.092	8.351
SI4 ← SI	0.886	0.882	0.041	21.567
SI5 ← SI	0.865	0.860	0.042	20.488
SI6 ← SI	0.883	0.882	0.048	18.505
BI1 ← BI	0.801	0.790	0.060	13.412
BI2 ← BI	0.819	0.812	0.080	10.257
BI3 ← BI	0.805	0.804	0.065	12.373
BI4 ← BI	0.737	0.739	0.077	9.597

Table 2: Factor loadings

AVE provides a good measure of convergent reliability. The AVE of 0.50 or higher indicates that, on average, the construct explains more than half of the variance of its indicators. Conversely, AVE of less than 0.50 indicates that, on average, more errors remain in the items than the variance explained by the construct (Hair et al. 2014). AVE of each of the four constructs satisfies the accepted threshold of 0.5, implying that on average, the construct explains more than half of its indicators (see Table 3).

	AVE	Mean	Standard Error	T Statistics
PU	0.681	0.679	0.073	9.391
PEU	0.707	0.702	0.067	10.561
SI	0.721	0.716	0.067	10.739
BI	0.626	0.624	0.060	10.509

Table 3: Average variance extracted (AVE)

The discriminant validity can be measured in two ways: (i) using the Fornell-Larcker criterion; and (ii) using cross loadings of the indicator (Hair et al., 2014). We provide evidence based on both approaches. Using the Fornell-Larcker criterion—the more conservative approach, which compares the square root of the AVE (average variance extracted) with the inter-construct correlation, discriminant validity is said to be present if the square root of each construct's AVE is greater than its highest correlation with any other construct. The results are provided in table 4.

In the table, the diagonal shows the square root of each construct's AVE; the rest are inter-construct correlations. As the table shows, the numbers in red font are clearly greater than the rest. For example, column 1 (BI): the square root AVE for BI is 0.791, while the inter-correlation BI-PEU is 0.547, BI-PU

is 0.650, and BI–SI is 0.696. As  $0.791 > 0.547$ ,  $0.791 > 0.650$ , and  $0.791 > 0.696$  the discriminant validity is established for BI. The same is applicable to other constructs (PEU, PU, and SI).

	<b>BI</b>	<b>PEU</b>	<b>PU</b>	<b>SI</b>
<b>BI</b>	0.791			
<b>PEU</b>	0.547	0.841		
<b>PU</b>	0.650	0.557	0.825	
<b>SI</b>	0.696	0.458	0.654	0.849

*Table\_4\_:* Discriminant validity using the Fornell-Larcker criterion

Using the cross loadings of indicator, discriminant validity is established if an indicator's outer loadings on the associated construct, for example, BIs on BI are greater than all of its loadings on other constructs (i.e. cross loadings). Again, as table 5 shows this is well established

	<b>BI</b>	<b>PEU</b>	<b>PU</b>	<b>SI</b>
<b>BI1</b>	0.801	0.445	0.645	0.598
<b>BI2</b>	0.819	0.550	0.533	0.560
<b>BI3</b>	0.805	0.443	0.449	0.478
<b>BI4</b>	0.737	0.265	0.395	0.559
<b>PEU1</b>	0.311	0.808	0.474	0.406
<b>PEU5</b>	0.585	0.873	0.465	0.369
<b>PU1</b>	0.498	0.373	0.794	0.357
<b>PU2</b>	0.644	0.493	0.888	0.670
<b>PU4</b>	0.444	0.501	0.790	0.544
<b>SI2</b>	0.530	0.489	0.627	0.837
<b>SI3</b>	0.504	0.283	0.482	0.769
<b>SI4</b>	0.634	0.306	0.563	0.886
<b>SI5</b>	0.601	0.438	0.515	0.865
<b>SI6</b>	0.674	0.406	0.579	0.883

*Table\_5\_:* Discriminant validity using cross loading of indicators

## 5. RESULTS

Results of the path coefficients are reported in Table 6 and Figure 2. All relationships are positive; however, not all are significant. The strongest effect appears to be from SI to PU (H4) and is significant at 1% level, indicating that there might indeed be a strong relationship between SI and BI to use MVAS. SI appears to be positive and significant in all three relevant hypotheses (H3, H4 and H5)—SI might also be positively and significantly correlated with PU (H4) and PEU (H5) of MVAS.

	Original Sample	Sample Mean	Standard Error
H1: PU → BI	0.246	0.240	0.166
H2: PEU → BI	0.209	0.195	0.133
H3: SI → BI	0.440**	0.449	0.159
H4: SI → PU	0.505***	0.514	0.111
H5: SI → PEU	0.458***	0.466	0.102
H6: PEU → PU	0.326**	0.310	0.113

Note: \* = significant at 10%; \*\* = significant at 5%; \*\*\* = significant at 1%

Table 6: Path coefficients

Our conjecture that PEU might be positively and significantly related to PU is also confirmed by the results (H6) but our expectation that PU (H1) and PEU (H2) might also have similar association was not confirmed. Overall, together PU, PEU and SI appear to explain 58% of the variance of the endogenous construct BI ( $R^2 = 0.580$ ) (Figure 2). Though a number of variables used to measure each of the reflective constructs have been dropped (see Appendix A), the decision was based on technical and theoretical judgement—indicators that had a factor loading of less than 0.7 were dropped. Even so, the remaining indicators do provide a reasonable understanding of the relationships between the constructs.

We are also interested in how each of the constructs might ultimately influence the key target variable BI via mediating variables. As indicated in the equations below, total effect is the sum of the direct and indirect effects and the ratio of indirect to total effect ( $n$ ) indicates the extent of mediated effect, such that:  $n < 0.20$  = no mediated effect;  $0.20 < n < 0.80$  = partially mediated effect; and  $0.80 < n$  = fully mediated effect. Relevant results are provided in Table 7. As the Table shows, two indirect effects are worth mentioning: SI to BI and SI to PU, with both showing only partial mediation effect.

$$\text{Total Effect} = \text{Direct Effect} + \text{Indirect Effect}$$

$$\text{Indirect Effect}_{A \rightarrow B \rightarrow C} = \text{Path Coef}_{A \rightarrow B} \times \text{Path Coef}_{B \rightarrow C}$$

$$n = \frac{\text{Indirect Effect}}{\text{Total Effect}}$$

Outcome	Direct Effect	Indirect Effect	Total Effect	N	Mediation
SI → BI	0.440***	0.256**	0.696***	36.78%	Partial
SI → PU	0.505***	0.149**	0.654***	22.78%	Partial

Note: \* = significant at 10%; \*\* = significant at 5%; \*\*\* = significant at 1%

Table 7: Mediated effects

## 6. DISCUSSION

The above results demonstrate that our empirical data supports the research model. The construct social influence (SI) had the strongest association with intention to use MVAS by WMEs in Fiji (H3). It also has significant positive association with the constructs PU and PEU (H4, H5). However, the latter two constructs didn't exercise a significant impact on BI to use (H1, H2), though there was positive association. It appears that in collectivist societies like Fiji, social influence is the prime driver of

intention to use and individual's perceptions about PU and PEU are guided by the perceptions of 'important others'. Consequently, when that is captured directly by the inclusion of the construct SI, it appears to dilute the disparate contribution of the PU and PEU.

The validated model based on empirical data was found to have identified the forces that impact women micro entrepreneurs' BI to adopt MVAS. Our results are different from prior TAM studies in as much as the strong impact of social influence which was not brought out in prior studies has been conspicuously brought forward in our study. Prior TAM studies were conducted mostly in developed countries where 'individualistic' culture pervades. Our study demonstrates that the general TAM model is not applicable as is in 'collectivist' cultural societies which are mostly found in developing countries. We believe this is a major contribution of our study.

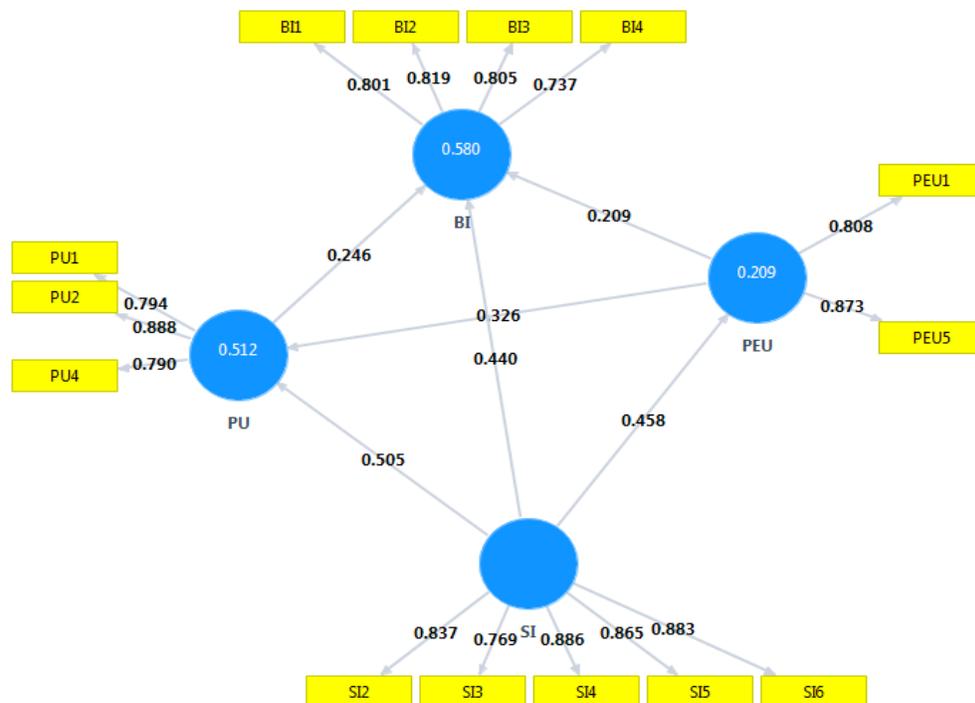


Figure 2: Variance measures of intention to use

The positive association found between SI and PU supports (H4) prior studies (for example, Gefen & Keil, 1998, Venkatesh & Davis, 2000, Lu et al. 2005). Support was also found for H5. Similar to prior studies (for example, Karahanna & Straub, 1999, Lu et al. 2005, Shen et al. 2006), SI has a positive association with PEU. Finally, we examined whether PEU has a significant positive association with PU and found that it was supported.

As already stated, SI is a construct that has not been examined separately in the TAM literature. Studies that have examined the impact of this construct on adoption have found mixed results. Like us, Hartwick & Barki (1994); as well as Taylor & Todd (1995), found the impact to be significant and positive. Authors such as Davis et al (1989) and Matheison (1991) found that it had no effect. In this study, we proposed that the impact of SI on intention to adopt technology gets transmitted through other constructs

such as PU and PEU. It was found that all these constructs were positively and significantly impacted by social networks (such as family and friends). A possible explanation for our results could be that WMEs are influenced by fellow WMEs. Furthermore, if in the value chain other members are adopting MVAS, it influences a WME to adopt MVAS as it has ready access to information about the use of MVAS, its risks, cost and benefits. It signifies that application providers should focus on associations/federations of WMEs and demonstrate to them the usefulness of MVAS if a rapid diffusion thereof is to be ensured.

As per the TAM model, adoption of technology is significantly influenced by consumer perception of usefulness thereof. Prior studies on adoption of cell banking or internet banking too find PU as one of the deciding drivers of eventual adoption. Consequently, banks and other providers need to consider how their services or application could 'add value' to the consumers. It is important to understand what the consumers are after. As already indicated, we also asked the WMEs what challenges they faced and what applications they are after so that rapid adoption of MVAS could take place. The WMEs ranked access to credit, access to insurance access to capital/savings, access to market and logistical arrangements as the top five challenges faced by them. 59% respondents felt that if these challenges could be addressed medium to large increase in their business could be possible. 62% of the respondents stated that if there were a mobile application that could address the challenges identified as being most significant, they would be willing to use it. Access to business training, access to business networks, access to business resources, and access to business tools would be the challenges that the WMEs would like to address if suitable applications on mobile phones become available. Access to business mentorship and access to training were the top two applications that the WMEs were looking for. Perceived usefulness is known to impact intention to use technology. In this study, as expected, we found a positive significant association between perceived usefulness and the intention to use MVAS. Perceived usefulness was in-turn impacted by social influence and perceived ease of use positively and significantly. These results are similar to prior studies already cited above.

The construct perceived ease of use was found to have significant association with perceived usefulness (H6). We proposed that perceived ease of use impacts adoption decisions through the mediating variable perceived usefulness. The latter encompasses perceived ease of use. Shroff et al. (2011) found that perceived ease of use (PEU) had the strongest significant influence on perceived usefulness (PU). The results are in line with the TAM model which asserts that perceived ease of use is a factor driving intention to adopt of technology.

## **7. CONCLUSIONS AND IMPLICATIONS**

We investigated the association between social influences, perceived usefulness and perceived ease of use on the intention to use MVAS. We interviewed 74 women entrepreneurs in Fiji in the second-half of 2013 and analysed the data using structural equation modelling with PLS.

Social influences were found to significantly impact individual perceptions about usefulness and perceived ease of use of technology and have a significant positive association with the intention to use. Consequently, policy makers and industry need to focus on social networks for rapid spread of MVAS. The study makes important contributions to theory and practice. It demonstrates that where a technology is already in use (mobile phone) and only an enhancement or 'add-on' to the technology is attempted, the most important driver is social influence which also impacts perceived usefulness and perceived ease of use and through these the intention to use. Consequently, in areas which involve extension of technology a reduced form model of TAM, as above, is the relevant model where the most significant influence is that of 'important others'.

Besides the theoretical contributions as above, other stakeholders such as banks, National Centre of Small and Medium Enterprises Development, SPBD and mobile network operators such as Vodafone and Digicel could also focus on highlighting perceived usefulness of MVAS through social networks for rapid uptake thereof. There are several ways in which these stakeholders would benefit by spread of MVAS. It would reduce cost of delivery, make transactions more secure, will have a record of transactions, would facilitate anywhere any time delivery of services. When we presented interim results, Vodafone and SPBD agreed to provide business mentoring program application over the mobile phone. Such initiatives could be expanded further. The findings of the study could also be useful to other Pacific Island Countries and / or remote and hilly regions or islands in other parts of the world where the major issue is how to reach out to communities that are spread far and wide.

## Appendix A

Variables used to measure the formative and reflective constructs

Behavioural intention to use MVAS (formative)	
BI 1	I intend to use MVAS when the service becomes widely available
BI 2	Whenever possible, I intend to use mobile Internet.
BI 3	I intend to use mobile Internet if it is inexpensive.
BI 4	I intend to use mobile Internet regardless of the price.
Perceived usefulness of MVAS (reflective)	
PU1	The MVAS enables me to accomplish tasks more quickly.
PU2	The MVAS has improved my quality of work.
PU3	The MVAS makes it easier to do my job.
PU4	The MVAS has improved my productivity.
PU5	The MVAS gives me greater control over my job.
PU6	The MVAS enhances my effectiveness on the job.
Perceived ease of use of MVAS (reflective)	
PEU1	My interaction with the MVAS has been clear and understandable.
PEU2	Overall, the MVAS is easy to use.
PEU3	Learning to operate the MVAS was easy for me.
PEU4	I rarely become confused when I use the MVAS.
PEU5	I rarely make errors when using the MVAS.
PEU6	I am rarely frustrated when using the MVAS.
Social Influence on use of MVAS (reflective)	
SI1	People who influence my behaviour think I should use the MVAS.
SI2	People who are important to me think I should use the MVAS.
SI3	My immediate supervisor thinks I should use the MVAS.
SI4	My close friends think I should use the MVAS.
SI5	My peers think I should use the MVAS.
SI6	People whose opinions I value prefer that I use the MVAS in my work.

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