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# South Asian Journal of Management Research (SAJMR)

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## C O N T E N T

# Users Intention Towards Digital Financial Service Adoption in Ethiopia

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**ABSTRACT:** In recent times, mobile money services have become a fashioned services following to the rapid development of mobile technologies and increasing demand for cashless business transactions. Such demand has also ushered a new era to the banking industry and bank users. However, the bank users' intensions to adopt the services, particularly in Ethiopia, were not studied yet. To fill this study gap, data was collected from 384 users of banks branching in Addis Ababa and analyzed by integrating the modified extended unified theory of acceptance and use of technology (UTAUT2) and with the structural equation model. According to the path analysis, the study found performance expectancy, effort expectancy, facilitation conditions, hedonic motivation and price value to be a positive and strong predictor of the bank user's behavioral intension to adopt the mobile money services followed by the exogenous predictors such as perceived security and trust on the technology. Another interesting finding is that the users' behavioral intention to adopt such services is significantly transformed in to actual behavior. But, none of the moderating variables have significant effect on the users' behavioral intension to adopt the services and they are excluded from the path. Based on the finding, the study advices the mobile money service providers to use an aggressive approach to strengthen positive trust drivers, eliminate insecurity dimensions, and design aesthetically appealing services with a state-of-the-art technology which have multi-purpose operational interfaces.

**Keywords:** Mobile Money, UTAUT2, Users Intension, Banking in Ethiopia

**Background information**

Now a days, digital financial services and the technologies that power them are becoming the new normal. The banking industry is also changing for good. A study by Pazarbasioglu, et al. (2020) points out that innovative and disruptive technologies from new startups are changing the financial services industry. Realizing this, different countries are developing and customizing their regulations to allow small startup Fintech's companies.

Particularly, the mobile money (MM) has ushered a new era and been growing phenomenally over the banking industry globally and it has become an integral banking channel alongside Internet banking, ATMs, and POS terminals. As an innovative banking service, MM enables users to undertake financial transactions such as saving, credit, payment, transfer, mobiletop-up, etc using smartphones, mobile devices, biometric devices, tablets, and any other digital system anytime and anywhere where there is an internate connectivity. MM is also better digital alternative than the other traditional bank channels such as ATMs, internet banking and physical branches (Puschelet al, 2010).

Ethiopia, with its significant population size and significantly limited formal financial services, represents a big opportunity for existing financial institutions or new Fintech companies who could provide MM services. Unfortunately, the adoption MM in Ethiopia is at its infancy. According to a market scoping study by the World Bank Group in 2019, the state of Ethiopia's digital financial ecosystem is characterized by poor adoption. In contrast, eastern African countries like Kenya, Uganda, and Tanzania have excelled in the use of digital financial services. A study by Bereket and Hwang, (2020) confirms that although 22% of the population in Ethiopia have bank accounts and most of them uses mobile phones but the MM adoption rate is very poor.

Another assessment by world bank conducted in 2019 has also claimed that the current state of MM adoption in Ethiopia is poor. Similarly, the National Bnak of Ethiopia's (NBE) financial inclusion strategy showed that Ethiopia has very limited financial inclusion percentages that could be significantly improved by the use of digital financial services NBE (2017). Although, NBE's strategy has identified the use of MM services as a major pillar, it potential, however, has not been realized due to the lack of technology and innovation, enabling government policy and regulatory environment, and infrastructure improvements are the key catalysts for advancing financial inclusion (Ndiwulira, 2017).

In line with global trends, new trends are being observed in Ethiopia. First, NBE who has so far been accused of not supporting the adoption with proper regulatory framework has issued a new directive at the end of March – Licensing and Authorization of Payment Instrument Issuers Directive No. ONPS/01/2020 and is on the verge of issuing a second directive that promotes the use (NBE, 2020). Second, the Ethiopian House of Peoples' Representative has approved the Electronic Transaction Proclamation ('the Proclamation) in its session of 29th May 2020 (Alemu, 2020). On contrast, user behavioural intensions to adopt MM in Ethipia was not studied yet and was begged to be researched.

The adoption of digital technologies like MM displays different behaviors in different contexts. Several models and frameworks have been developed to explain user adoption of new technologies and these models introduce factors that can affect user acceptance. Some of the popular models are Theory of Reasoned Action Fishbein and Ajzen, (1975), Theory of Planned Behavior (Ajzen, 1985), Technology Acceptance Model (Davis, 1986), Unified Theory of Acceptance and Use of Technology (Venkatesh, et al., 2003) and Diffusion of Innovation theory (Rogers, 2003). Theory of Reasoned Action is the broader theory from which theory of planned behavior has emanated however, these theories are better suited for behavioral changes and health research.

Despite the model's limited number of determinants, perceived usefulness, and perceived ease of use, the Technology Acceptance Model (TAM) however is the most popular and most frequently used theoretical framework in new technology adoption research (Lai, 2017). Another framework used to explain the adoption of technology is the unified theory of acceptance and use of technology (UTAUT) which suggests four core constructs (performance expectancy, effort expectancy, social influence and facilitating conditions) are direct determinants of behavioral intention and ultimately behavior, and that these constructs are in turn moderated by gender, age, experience, and voluntariness of use (Venkatesh et al., 2003).

However, these models were not without limitations. The adoption of MM in Ethiopia could be determined by many other factors other than the above four core constructs. Other insinuating or causing factors like trust and security could also be a major factor. Accordingly, Venkatesh et al., (2012) has developed UTAUT2 which is an extension of UTAUT to allow the analysis of users intension to adopt MM in a voluntary setting with the integration of the users demographic characterstics (age, gender and experience) as a moderating factors. To demonstrate the stability UTAUT2 and test hypothesizes, this study has applied structural equation modele (SEM).

## 2. Theoretical Framework and Hypothesis Development

The adoption of digital technologies like digital financial technologies shows different behaviors in different contexts. Several models and frameworks have been developed to explain user adoption behavior of new technologies. Some of the popular models are Theory of Reasoned Action Fishbein and Ajzen, (1975), which is an extension to the Theory of Planned Behavior, (Ajzen, 1985), Decomposed Theory of Planned Behavior,(Taylor and Todd, 1995); Technology Acceptance Model, (Davis, 1986), Technology Acceptance Model2(Venkatesh and Davis, 2000), and Unified Theory of Acceptance and Use of Technology, UTAUT (Venkatesh et al,. 2003). UTAUT model is relatively new model which is developed by aggregating eight theoretical

models including above models and other model such as Triadis's Model of PC Utilization, (1979), Rogers' Diffusion of innovations, (1983), Deci & Ryan's Motivational Model, (1985), and Bandura's Social Cognitive Theory, (1989).

According to (Venkatesh et al,. 2003), UTAUT model is composed of four core constructs of usage such as performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitation conditions (FC)significantly predict intention. Factors such as PE, EE, and SI have a direct effect on behavioral intention of using new technology (Mobile Money service (MM services) hereafter), while FC is direct determinant of usage behavior of MM services. These factors are moderated by demographic constructs such as sex, age, experience, and voluntariness of use.

PE is the strongest predictor of attitude toward behavioral in tension of using technology (Venkatesh et al,. 2003). In this study, this extrinsic element can show the degree to which the bank customers expect that using the adopt MM services will help them to attain some gains in job performance. The variable includes fitness to the purpose (job-fit), perceived usefulness, and outcome expectation, which are used to describe the extent to which users perceive the use of the adopt MM services to help the work. In theory, gender, age and experience can influence the relationship between performance expectancy and behavioral intention to adopt adopt MM services.

Effort Expectancy (EE) is considered as an intrinsic element which determines individuals' perception in relation to easiness to use new technology. In our context, it measures the amount of effort that the bank customers expect to invest in using the MM services. On the other side, SI directly determines effect of social factors such as friends, colleagues, family members on an individuals' intention to adopt new technology. UTAUT recognizes the importance of considering social elements into the model. In this study, strong relationship between using the adopt MM services and early stages of user experience is expected. This is because many studies have demonstrated a positive and significant relationship between SI and a behavioral intention adopt new technology (Alshehri, Rutter and Smith, 2019). Finally, the FC is connected to the technical infrastructure, including adopt MM services (Venkatesh et al,. 2003). In this context, it is the bank customer's perception of how well the internet and Fintech provides support in using the adopt MM services.

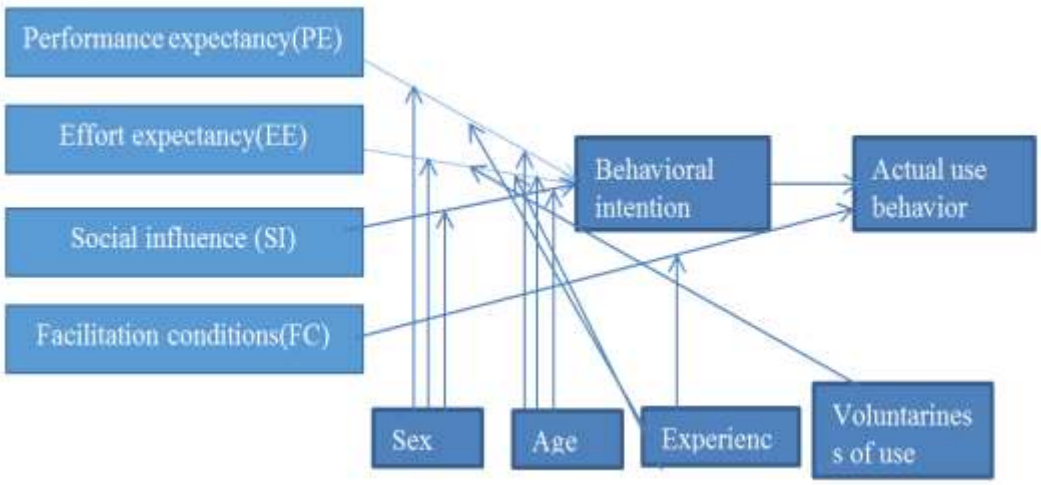


**Figure 1. General UTAUT mode.**

However, the adoption of adopt MM services could also be determined by many other factors other than these aforementioned core determinant factors. Other insinuating or causing factors like trust and security could also be a major factor. Moreover, the model has been criticized by many researchers. Because it is based on an organizational settings and built estimate adoption of technology among employees(Ooi & Tan, 2016; Venkatesh et al., 2012).Another studies also argues that technology adoption behaviour outside organizational setting or work environment differs on various dimensions such as differences in kinds of tasks and complexity of communications(Brown et al., 2006; Ooi & Tan, 2016).

As a result, Venkatesh et al., (2012) has developed UTAUT2 which is an extension of UTAUT to allow the analysis of users intension to adopt technology in a voluntary setting with the integration of the users demographic characterstics (age, gender and experie) as a moderating factors. The extended model incorporates three more constructs into UTAUT: hedonic motivation, price value, and habit. The inclusion these new constructs have produced produced a substantial improvement in the variance explained in behavioral intention and technology use (Chang, 2012). The effect of these constructs on user intentions to adopt technology are hypothesized to be moderated by age, gender, and experience.

Hedonic motivation (HM) refers to pleasure or enjoment derived from using a technology, and it plays an important role in defining technology acceptance and use (van der Heijden 2004; Thong et al 2006, Brown and Venkatesh 2005). Another study also shows that hedonic motivation is among the critical determinants of consumer intentions to use mobile shopping services (Yang, 2010).

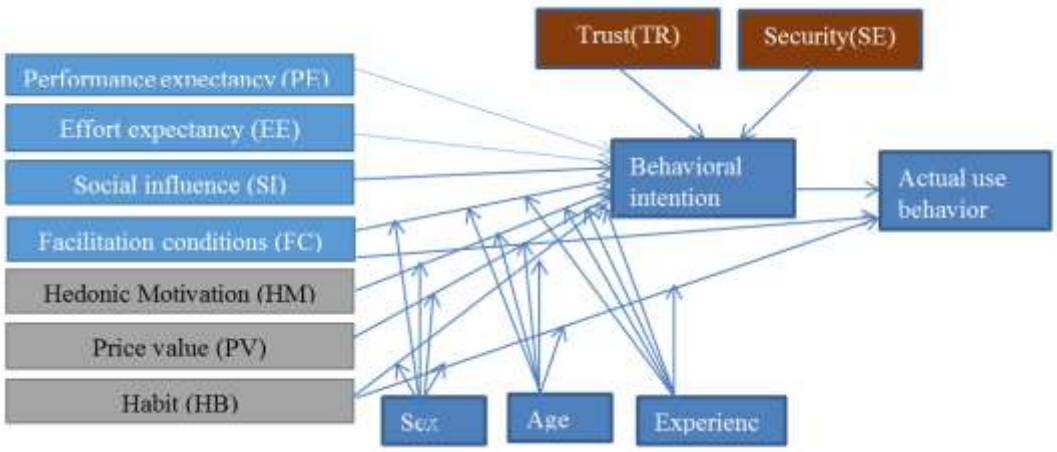


**Figure 2. An extended UTAUT model.**

Price Value (PV) refers to the monetary cost and pricing structure of using technology which may have a significant impact on consumers' technology use. Venkatesh et al. (2012)have define cognitive as a trade-off between the perceived benefits of using new technology and the monetary cost of using it. A study byMallat, et al., (2006) have also shown that Price Value plays a crucial role in shaping customers' willingness to adoped new technology.

Habit(HB) is defined as an extent to which people have a tendency to to perform behaviors automatically because of learning (Limayem et al. 2007). It is aslo defined as an extent to which an people or individuals believes the behavior to be automatic ( Kijsanayotin et al. 2009).

Likewise, the inclusion of demographics moderators in the framework can add another imperative value to the model. Many studies have also prized the model as most appropriate model in scholarly studies in relation to information system adoption and technology acceptance.

In addition to the above critical variable, researchers, e.g. Cheng et al., (2011) and Qasim & Abu-Shanab, (2016) advises the need to amend the model to accommodate behavioral differences between countries. In this regard, the researcher propose the incorporation of "trust on the MM services" and "perceived security in using MM services". User's trust on the MM services is a critical construct that is closely associated with financial transactions. Likewise, trust becomes extremely essential factor when it is associated with monetary transactions performed through a wireless network (Qasim & Abu-Shanab, 2016). Given that the MM services involves monetary transactions that are mobile phone-based among users, trust is considered vital. Moreover, many researches, e.ge.Loh et al., (2020) and Ooi & Tan, (2016) has proven that trust is a salient predictor of user intentions to adopt technology.

Based on the above conceptual framework, the following hypothesis are developed:

Hypothesis 1 (H1): PE has a positive influence on user intensions to adopt MM services
Hypothesis 2 (H2): EE has a positive influence on user intensions to adopt MM services
Hypothesis 3 (H3): SI has a positive influence on user intensions to adopt MM services
Hypothesis 4 (H4): FC has a positive influence on user intensions to adopt MM services
Hypothesis 5 (H5): HM has a positive influence on user intensions to adopt MM services
Hypothesis 6 (H6): PV has a positive influence on user intensions to adopt MM services
Hypothesis 7 (H7): HB has a positive influence on user intensions to adopt MM services
Hypothesis 8(H8): TR has a positive influence on user intensions to adopt MM services
Hypothesis 9(H9): TR has a positive influence on user intensions to adopt MM services
Hypothesis 10(H10): SE factor significantly affects user intensions to adopt MM services
Hypothesis 11 (H11): Users' behavioral intension has a positive influence on User actual behavior to use MM services

## 3. Research Materials and Methods

The use of the extended unified theory of acceptance and use of technology (UTAUT2) offers a structured approach with a tentative hypothesis as well as offers a chance to incorporate a new variable like 'trust' and 'Security'. With this in mind, this research was designed as an explanatory (casual) research.

The choice of a research approach also emanates from the philosophy adopted. This research borrows a post-positivist lens to explain the topic at hand. The accepted approach to research by post-positivists is that it begins with a theory, collects data that either supports or refutes the theory, and then makes necessary revisions and conducts additional tests. Accordingly, the data was collected from customers of fifteen commercial banks branching in Addis Abbab and providing MM services in Ethiopia. However, the number of the service users was unknown and the researcher used a the maximum sample size of 384 as suggested by Krejcie and Morgan (1970) for unknown population. Due the non-availablity of the sampling frame, the study uses convenience sampling was be used.

To analyse both interesnsic and exterensic factors that influence bank user intensions to adopt the MM services a theoretical model of UTUAT2 model were employed. The model claims that seven core constructs (performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit) by incorporating 'trust' as 'security' as additional constructs. To evaluate the measurement model fit, a data analysis were performed through confirmatory factor analysis (CFA) and to evaluate the hypothesized relationships, structural equation modeling (SEM) is employed. Using the SEM enables to explore the path and significance of causal relations between latent variables. Considering that the model is sensitivitive to data multicollinearity, normality, and systematic missing data diagnostic tests were performed (Chen and Chang, 2012),.

## 4. Data Analysis and Discussion

Following to the suggestion by Krejcie and Morgan (1970) for unknown population, 384 questionnaires were distributed to potential respondents but only 356 questioners were returned. This response rate is 92.3% of the sample which is higher than the minimum acceptable survey response rate of 50%. As shown in table 4.1 below, the sample was dominated by male respondents (58.4%) while 41.6% were females. Regarding age, the highest distribution (55.9%) is between 18 and 30 years old which are relatively youngsters while the remaining are 34.4%, 7.6% and 1.7% are between 34 and 40, 41 and 50, and above 50 years old respectively. With reference to the respondent's educational level, the most prominent educational level (42.1%) was the first degree followed by Certificate (29.5%) and second degree and above (19.9%).

In relation to the experience in using MM services, it was noticed that the great mass of respondents (53.9%) were observed to have an experience ranging from one year up to 3 years but 29.5% of respondents also have less than one year of experience which is significant proportion comparing with those who have above 5years experience (7.9%) in using the service. About the type of MM service that the respondents uses, 61% of the respondents uses CBE-Birr while the remaining uses Amole Wallet, Hello cash, H-Birr, M-Birr, and/or Telebirr services. However, most of them (54.5%) use the service occasionally 7.9 % have never used the service (only registered). Additionally, a majority of the respondents reported a monthly income ranging between Birr 5,000 and Birr 20,000 (72.2%).

**Table 1. Respondents' profile.**

| Table 4.1. Respondent's demographic data | | | |
|---|---|---|---|
| **Variable** | **Category** | Frequency | Relative percentage (%) |
| Sex | Males | 208 | 58.4 |
| | Females | 148 | 67.4 |
| Age (year) | 18-30 | 199 | 55.9 |
| | 31-40 | 124 | 34.8 |
| | 41-50 | 27 | 7.6 |
| | >50 | 6 | 1.7 |
| Level of education | High school or below | 30 | 8.4 |
| | Certificate | 105 | 29.5 |
| | First Degree | 150 | 42.1 |
| | Second degree or above | 71 | 19.9 |
| Experience (year) | Less than one year | 105 | 29.5 |
| | From 1 up to 3 years | 192 | 53.9 |
| | From 4 up to 5 years | 31 | 8.7 |
| | above 5years | 28 | 7.9 |
| Occupation | Government Employee | 129 | 36.2 |
| | Private employee | 144 | 40.4 |
| | NGO employee | 21 | 5.9 |
| | Self-employed | 36 | 10.1 |
| | Unemployed | 26 | 7.3 |
| Type of MM service | CBE-Birr | 217 | 61.0 |
| | Amole Wallet | 11 | 3.1 |
| | Hello Cash | 7 | 2.0 |
| | H-Birr | 5 | 1.4 |
| | M-BIRR | 4 | 1.1 |

| | | | |
|---|---|---|---|
| | Telebir | 17 | 4.8 |
| | Other two and more services | 95 | 26.6 |
| Monthly Income | <=3000 | 24 | 6.7 |
| | 3001-5000 | 36 | 10.1 |
| | 5001-1000 | 134 | 37.6 |
| | 10001-20000 | 123 | 34.6 |
| | >=20000 | 39 | 11.0 |
| Frequency | Occasionally | 194 | 54.5 |
| | Very often | 134 | 37.6 |
| | Never (only registered) | 28 | 7.9 |

Source: own survey, 2022

**Reliability and Validity of the Constructs**

When we employ SEM for testing and evaluating multivariate causal relationships, it is essential to measure reliability and validity of the instruments used in the survey. Accordingly, Cronbach's alpha is computed for establishing the consistency of the constructs and the result shows alpha is greater than 0.7 for all constructs used in the model except for facilitating conditions (0.657) which is a good indicator of reliability according to Henseler, Ringle & Sinkovics (2009). The factor loadings (λ) for all the items under each constructs also found to be higher than 0.50. This was estimated to evaluate the correlation between the indexes and it satisfies the convergent validity criteria as per Byrne (2016). It is also shown that, the value of average variance extracted (AVE) and the coefficient of composite reliability (CR) are greater than 0.4 and 0.7 for all the constructs, respectively. According to Hair (2010), AVE's value is recommended to be above 0.5 and all construct are above this cute-off except for effort expectancy, facilitating conditions and actual use behavior which are above 0.4.

**Table 2. Reliability and Validity of the Constructs**

| Construct | Item | Factor loading(λ) | Cronbach's α value | CR | AVE |
|---|---|---|---|---|---|
| Effort expectancy(EE) | EE1 | .765 | 0.754 | 0..822 | 0.481 |
| | EE2 | .776 | | | |
| | EE3 | .629 | | | |
| | EE4 | .805 | | | |
| | EE5 | .674 | | | |
| Performance expectancy (PE) | PE1 | .861 | 0.803 | 0.840 | 0.641 |
| | PE2 | .746 | | | |
| | PE3 | .721 | | | |
| | PE4 | .723 | | | |
| | PE5 | .746 | | | |
| Socialinfluence (SI) | SI1 | .684 | 0.797 | 0.812 | 0.592 |
| | SI2 | .788 | | | |
| | SI3 | .674 | | | |
| | SI4 | .626 | | | |
| Facilitatingconditions(FC) | FC1 | .615 | 0.657 | 0.701 | 0.392 |
| | FC2 | .702 | | | |
| | FC3 | .737 | | | |
| | FC4 | .704 | | | |
| | FC5 | .629 | | | |

| Construct | Item | Factor loading(λ) | Cronbach's α value | CR | AVE |
|---|---|---|---|---|---|
| Hedonic Motivation (HM) | HM1 | .765 | 0.772 | 0.784 | 0.565 |
| | HM2 | .820 | | | |
| | HM3 | .815 | | | |
| Price Value (PV) | PV1 | .714 | 0.801 | 0.822 | 0.612 |
| | PV2 | .669 | | | |
| | PV3 | .628 | | | |
| Habit(HT) | HT1 | .845 | 0.750 | 0.764 | 0.496 |
| | HT2 | .677 | | | |
| | HT3 | .704 | | | |
| Trust (TR) | TR1 | .890 | 0.755 | 0.770 | 0.511 |
| | TR2 | .771 | | | |
| | TR3 | .775 | | | |
| | TR4 | .698 | | | |
| | TR5 | .687 | | | |
| Security(SE) | SE1 | .639 | 0.756 | 0.778 | 0.534 |
| | SE2 | .648 | | | |
| | SE3 | .684 | | | |
| | SE4 | .585 | | | |
| | SE5 | .562 | | | |
| Behavioral Intention to use | BI1 | .712 | 0.781 | 0.794 | 0.590 |
| (BI) | BI2 | .792 | | | |
| | BI3 | .811 | | | |
| | BI4 | .831 | | | |
| | BI5 | .794 | | | |
| Actual use behavior(UB) | UB1 | .724 | 0.701 | 0.717 | 0.414 |
| | UB2 | .695 | | | |

Source: own survey, 2022

**Structural equation model analysis**

To validate the extended UTAUT model presented in chapter two, and to test the research hypotheses, SEM was employed using AMOS23. Because, it is much realistic and powerful model than the standard multivariate statistics and multiple regression models. Moreover, AMOS23 is relatively new, powerful and graphical, easy-to-use software for structural equation modeling and to present the in an intuitive path diagram in a way that can show relationships among variables. Moreover, it is widely used software to get confirmative and interpretive results.

**Structural model fit test**

The initial assessment of the model showed that the model fit between the data and UTUAT2 wasn't satisfactory. In order to improve the model fit statistics, modification index values were reviewed and possible covariance among constructs was formed (see diagram 4.1). Following to the covariance adjustment, the statistics showed satisfactory fit of the model to the data as per the desirable range recommended by several scholars such as Hair et al., (2010) and Schreiber et al(2006) and Anderson and Gerbing, 1988. Because, all indices were found to be above the cut-points (desirable ranges) as shown in table 3 below.

**Table 3. Structural Model fit test**

| Fit indices | Indicator | Desirable range |
|---|---|---|
| $\chi 2$ (CMIN)/df | 2.356 | 1.0 ≤CMIN/df≤3.0 |
| TLI | 0.924 | ≥0.8～0.9 |
| CFI | 0.944 | ≥0.8～0.9 |
| RMSEA | 0.62 | ≦0.08 |
| GFI | 0.889 | ≥0.8～0.9 |
| AGFI | 0.863 | ≥0.8～0.9 |
| NFI | 0.930 | ≥0.8～0.9 |

Source: own survey, 2022

**Structural path analysis**

After proving that the model fit index satisfies all acceptance criteria, the estimated path analysis of the SEM were then examined to explore the path and significance of causal relationships between latent variables and thereby to appraise the hypotheses. As shown in figure 1 and table 4.4, the result shows that the bank user's behavioral intention to adopt MM services (BI) was positively and significantly influenced by PE (β =0.207), EE (β =0.122), FC(β =0.344), HM (β =0.052), PV (β =0.067), TR (β =0.194) and SE (β =0.741) statistically at less than 0.001 probability level. The bank user's actual MM adoption behavior (UB) was also affected by BI (β =0.046) positively and significantly at less than 0.001 probability level.

Likewise, FC (β =-0.028) and HT (β = 0.035) affects the UB negatively and positively, respectively but only HT statistically significant at less 5% probability level.

**Table 4. Regression Weights**

| | | | Estimate | Std. Error | t-Value | p-Value | Label |
|---|---|---|---|---|---|---|---|
| BI | <--- | EE | .122 | .272 | .448 | *** | |
| BI | <--- | PE | .207 | .073 | 2.828 | *** | |
| BI | <--- | SI | .308 | .715 | .432 | .291 | |
| BI | <--- | SE | .741 | .529 | 1.400 | *** | |
| BI | <--- | HM | .052 | .216 | .242 | *** | |
| BI | <--- | PV | .067 | .047 | 1.407 | *** | |
| BI | <--- | TR | .194 | 1.532 | .126 | *** | |
| BI | <--- | HT | -.654 | 2.106 | -.310 | .184 | |
| BI | <--- | FC | .344 | .770 | .447 | *** | |
| UB | <--- | BI | .046 | .112 | .414 | *** | |
| UB | <--- | FC | -.028 | .067 | -.421 | .213 | |
| UB | <--- | HT | .035 | .078 | .452 | .045** | |

Source: own survey, 2022

**Results hypothesis testing**

The outcome of all hypotheses testing, as shown in Table 4.5 below, demonstrates that the estimation have supported 10 out 12 of the hypotheses. FC influence on users UB of MM services negatively and HT affects users BI to adopt MM. Even though, both results are contrary the researcher's hypothesis, their effect on the respective variables is not statistically significant even at 10% probability level.

**Table 5. Results of Hypotheses Testing**

| Hypothesis | Supported |
|---|---|
| Ha1: PE has a positive influence on users BI to adopt MM | Yes |
| Ha2: EE has a positive influence on users BI to adopt MM | Yes |
| Ha3: SI has a positive influence on user BI to adopt MM | Yes |
| Ha4: FC has a positive influence on user BI to adopt MM | Yes |
| Ha5: HM has a positive influence on user BI to adopt MM | No |
| Ha6: PV has a positive influence on user BI to adopt MM | Yes |
| Ha7: HB has a positive influence on user BI to adopt MM | Yes |
| Ha8: TR has a positive influence on user BI to adopt MM | Yes |
| Ha9: TR has a positive influence on user BI to adopt MM | Yes |
| Ha10: Users' BI has a positive influence on user UB of MM services | Yes |
| Ha11: FC has a positive influence on user UB of MM services | No |
| Ha12: HT has a positive influence on user BI to adopt MM | No |

Source: own survey, 2022

**Discussion, Conclusions and Practical Implications**

In this study, the researcher has empirically validated the theoretical research model, UTUAT2, developed by Venkatesh et al., (2012) by integrating with users perceived security and trust on the MM services. According to the inferential results presented above, it seems obviously that the proposed model has been able to reach an accepted level in the terms of predictive power in most of the endogenous factors. All fit criteria related to measurement model such as model fitness, construct reliability and validity are also successfully achieved. Particularly, the performance expectancy which can be explained by variable such as fitness to the purpose, perceived usefulness, and outcome expectation is strong predictor of the bank user's behavioral intension to adopt MM services. This result is in harmony with the theoretical literature of Venkatesh et al., (2003) and empirical evidences by Ismail et al., (2017), from Uganda, by Lubua & Semlambo, (2017) and Lema, (2017) from Tanzania, and Tobbin, (2011) from Ghana. Similarly, the estimation result for show effort expectancy and facilitation conditions (infrastructure) shows positive and significant effect on the user's behavioral intension to adopt MM services. These findings are in line with the above mentioned empirical evidences and the theoretical literature by Venkatesh et al., (2003). Particularly, the result regarding the facilitation conditions is in line with the theoretical literature by Alshehri, Rutter and Smith, (2019)too.

Amongst all the exogenous variables, perceived security exerts a maximal effect on user's intention to adopt MM services followed by facilitation condition, performance expectancy, trust on the technology and effort expectancy. This finding is also in harmony with several studies, for example Kumar et al., (2020) and Lema, (2017), undertaken in the area of behavioral intentions to adopt of new technologies. The potential reasons for security and trust on the service are reported as an instrumental factor could be due to the fact that it can reduces the perceived risk associated with technology and creates a positive attitude towards it. This is also in harmony with the justification provided by Shankar & Datta (2018) and Silic & Ruf (2018). More importantly, the users' behavioral intention to adopt MM services is significantly transformed in to actual behavior. However, the user's behavioral intension to adopt the service is not significantly affected by social influence which is contrary with the findings by Murendo et al., (2018)conducted in Uganda. This suggests that user's intention to adopt the service in Ethiopia is not mainly associated social image building or recommendation from family members, friends or other associates. But it is determined by the factors such as performance expectancy, perceived security, trust on the technological services, effort expectancy, infrastructure, hedonic motivation (entertaining capacity of the service), and cognitive trade-off between the perceived benefits of using the service and the monetary benefits from using it. Moreover, factors such as sex, age, and user's experience of using mobile technology which were considered in the construct as a moderators following to the

suggestion by Venkatesh et al., (2012) are excluded from the path. Because, no direct or indirect effect of the moderators on the users behavioral intension to adopt the service were observed.

**Practical implications for policy**

As the MM services continues to become a fashioned service following to the swift development of mobile technologies and increasing demand for cashless monetary transactions, the banking system is also enhanced instantly in many countries including in Ethiopia. However, the introduction of new MM services cannot fully achieve the expected benefits if it is not used by all banking account holders. Regarding the users' behavioral intension to adopt the services, the following practical implications are derived from the results of this paper.

First, the institutions engaged in providing MM service should use an aggressive approach to strengthen positive trust drivers. Such approach can create positive attitudes towards to the adoption of MM services by reducing trust inhibitors such as discomfort and insecurity dimensions which are sources of users' reluctance to adopt technology. Therefore, those banks and non-bank organizations offering MM services should aggressively promote better knowledge and attitudes towards their services through marketing activities. They should also strive to simplify their services interfaces and make it user-friendly that can avoid instances of users discomfort and frustration. Besides, they must set realistic goals in accordance with users' trust and security and assist them in overcoming difficulties when using the services. Because, assisting, guiding, and educating users can help to promote acceptance. Reliable, simple and user-friendly MM interface design can also ease transitions; thereby it can attract many more bank account holders to adopt the services with increasing varied services.

Second, the MM service providers should examine their service quality dimensions in order to increase their services users' hedonic motivation (enjoyment) and habit of using the MM services. In order to maximize, users' satisfaction and behavioral intentions to adopt the service, the service providers should offer a MM interface design which is reliable and easy to understand and operate with engaging functions. To do so, the service providers should design aesthetically appealing services with a state-of-the-art technology which have multi-purpose operational interfaces such as text messaging, hold-to-talk voice messaging, one-to-many messaging, video games, video and audio calls and conferencing, photograph and video sharing, moment sharing, location sharing, card repay, loans, mobile top up, utilities (bills) payments, documents and emojis transfer, article paywalls, online and spot shopping payments, red envelopes payments, and rail, air flight, taxi, movie and hotel bookings functions.

Finally, this research establishes new theoretical relationships which were not reflected on the extended UTAUT (UTAUT2) model developed by Venkatesh et al., (2012). The new paths involve Trust → BI, Security → users' BI, and then BI → Actual use behavior (UB). Therefore, the MM service providers should work to eradicate security concerns of the service users by designing a strong service application with useful security features. Moreover, the service should be designed in a way that demonstrates that the users' data and transactions are safe guarded from hackers. In this regard, a money pay back surety policy and third-party security certificates for all transactions can minimize transaction risks and boost users' confidence on the service.

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## Appendix

**Model Fit Summary**

**CMIN**

| Model | NPAR | CMIN | DF | P | CMIN/DF |
|---|---|---|---|---|---|
| Default model | 115 | 2167.363 | 920 | .000 | 2.356 |
| Saturated model | 1035 | .000 | 0 | | |
| Independence model | 45 | 5861.920 | 990 | .000 | 5.921 |

**RMR, GFI**

| Model | RMR | GFI | AGFI | PGFI |
|---|---|---|---|---|
| Default model | .085 | .889 | .863 | .801 |
| Saturated model | .000 | 1.000 | | |
| Independence model | .119 | .389 | .361 | .372 |

**Baseline Comparisons**

| Model | NFI Delta1 | RFI rho1 | IFI Delta2 | TLI rho2 | CFI |
|---|---|---|---|---|---|
| Default model | .930 | .802 | .948 | .924 | .944 |
| Saturated model | 1.000 | | 1.000 | | 1.000 |
| Independence model | .000 | .000 | .000 | .000 | .000 |

**Parsimony-Adjusted Measures**

| Model | PRATIO | PNFI | PCFI |
|---|---|---|---|
| Default model | .929 | .886 | .891 |
| Saturated model | .000 | .000 | .000 |
| Independence model | 1.000 | .000 | .000 |

**NCP**

| Model | NCP | LO 90 | HI 90 |
|---|---|---|---|
| Default model | 1247.363 | 1115.225 | 1387.167 |
| Saturated model | .000 | .000 | .000 |
| Independence model | 4871.920 | 4634.259 | 5116.238 |

**FMIN**

| Model | FMIN | F0 | LO 90 | HI 90 |
|---|---|---|---|---|
| Default model | 6.105 | 3.514 | 3.141 | 3.908 |
| Saturated model | .000 | .000 | .000 | .000 |
| Independence model | 16.512 | 13.724 | 13.054 | 14.412 |

**RMSEA**

| Model | RMSEA | LO 90 | HI 90 | PCLOSE |
|---|---|---|---|---|
| Default model | .062 | .058 | .065 | .000 |
| Independence model | .118 | .115 | .121 | .000 |

**AIC**

| Model | AIC | BCC | BIC | CAIC |
|---|---|---|---|---|
| Default model | 2397.363 | 2431.603 | 2842.980 | 2957.980 |
| Saturated model | 2070.000 | 2378.155 | 6080.553 | 7115.553 |
| Independence model | 5951.920 | 5965.318 | 6126.292 | 6171.292 |

**ECVI**

| Model | ECVI | LO 90 | HI 90 | MECVI |
|---|---|---|---|---|
| Default model | 6.753 | 6.381 | 7.147 | 6.850 |
| Saturated model | 5.831 | 5.831 | 5.831 | 6.699 |
| Independence model | 16.766 | 16.097 | 17.454 | 16.804 |

**HOELTER**

| Model | HOELTER .05 | HOELTER .01 |
|---|---|---|
| Default model | 163 | 168 |
| Independence model | 65 | 67 |

**Execution time summary**

| | |
|---|---|
| Minimization: | .109 |
| Miscellaneous: | 2.735 |
| Bootstrap: | .000 |
| Total: | 2.844 |

**Estimates (Group number 1 - Default model)**
**Scalar Estimates (Group number 1 - Default model)**
**Maximum Likelihood Estimates**
**Regression Weights: (Group number 1 - Default model)**

| | | | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|---|---|
| BI | <--- | EE | .122 | .272 | .448 | ** | |
| BI | <--- | PE | .207 | .073 | 2.828 | *** | |
| BI | <--- | SI | .308 | .715 | .432 | .291 | |
| BI | <--- | SE | .741 | .529 | 1.400 | *** | |
| BI | <--- | HM | .052 | .216 | -.242 | *** | |
| BI | <--- | PV | .067 | .047 | 1.407 | *** | |
| BI | <--- | TR | .194 | 1.532 | .126 | *** | |
| BI | <--- | HT | -.654 | 2.106 | -.310 | .184 | |
| BI | <--- | FC | .344 | .770 | .447 | *** | |
| UB | <--- | BI | .046 | .112 | .414 | *** | |
| UB | <--- | FC | -.028 | .067 | -.421 | .213 | |
| UB | <--- | HT | .035 | .078 | .452 | .045 | |
| EE5 | <--- | EE | 1.000 | | | | |
| EE4 | <--- | EE | 1.313 | .131 | 9.990 | *** | |
| EE3 | <--- | EE | 1.124 | .114 | 9.859 | *** | |
| EE2 | <--- | EE | .918 | .110 | 8.320 | *** | |
| EE1 | <--- | EE | .014 | .092 | .149 | .882 | |
| PE5 | <--- | PE | 1.000 | | | | |
| PE4 | <--- | PE | 1.124 | .072 | 15.591 | *** | |
| PE3 | <--- | PE | 1.007 | .063 | 15.992 | *** | |
| PE2 | <--- | PE | .748 | .055 | 13.524 | *** | |
| PE1 | <--- | PE | .271 | .063 | 4.306 | *** | |
| SE5 | <--- | SE | 1.000 | | | | |
| SE4 | <--- | SE | .812 | .275 | 2.953 | .003 | |
| SE3 | <--- | SE | 1.154 | .296 | 3.896 | *** | |

| | | | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|---|---|
| SE2 | <--- | SE | 1.583 | .367 | 4.309 | *** | |
| SE1 | <--- | SE | 2.597 | .565 | 4.595 | *** | |
| SI4 | <--- | SI | 1.000 | | | | |
| SI3 | <--- | SI | 1.064 | .123 | 8.675 | *** | |
| SI2 | <--- | SI | 1.367 | .140 | 9.791 | *** | |
| SI1 | <--- | SI | 1.227 | .129 | 9.530 | *** | |
| HM3 | <--- | HM | 1.000 | | | | |
| HM2 | <--- | HM | 1.085 | .057 | 18.867 | *** | |
| HM1 | <--- | HM | .920 | .058 | 15.746 | *** | |
| PV3 | <--- | PV | 1.000 | | | | |
| PV2 | <--- | PV | .214 | .126 | 1.705 | .088 | |
| PV1 | <--- | PV | .201 | .121 | 1.657 | .098 | |
| TR1 | <--- | TR | 1.000 | | | | |
| TR2 | <--- | TR | 1.072 | .101 | 10.642 | *** | |
| TR3 | <--- | TR | .484 | .081 | 6.000 | *** | |
| TR4 | <--- | TR | .740 | .094 | 7.881 | *** | |
| TR5 | <--- | TR | .644 | .098 | 6.573 | *** | |
| BI1 | <--- | BI | 1.000 | | | | |
| BI2 | <--- | BI | 1.491 | .320 | 4.655 | *** | |
| BI3 | <--- | BI | .813 | .234 | 3.475 | *** | |
| BI4 | <--- | BI | 1.248 | .279 | 4.479 | *** | |
| BI5 | <--- | BI | .997 | .268 | 3.718 | *** | |
| UB1 | <--- | UB | 1.000 | | | | |
| UB2 | <--- | UB | 3.988 | 8.874 | .449 | .653 | |
| HT3 | <--- | HT | 1.000 | | | | |
| HT2 | <--- | HT | .520 | .162 | 3.217 | .001 | |
| HT1 | <--- | HT | .687 | .115 | 5.990 | *** | |
| FC1 | <--- | FC | 1.000 | | | | |
| FC2 | <--- | FC | .985 | .126 | 7.833 | *** | |
| FC3 | <--- | FC | 1.590 | .189 | 8.412 | *** | |
| FC4 | <--- | FC | 1.587 | .179 | 8.884 | *** | |
| FC5 | <--- | FC | 1.217 | .158 | 7.702 | *** | |

**Standardized Regression Weights: (Group number 1 - Default model)**

| | | | Estimate |
|---|---|---|---|
| BI | <--- | EE | -.242 |
| BI | <--- | PE | .534 |
| BI | <--- | SI | .590 |
| BI | <--- | SE | .755 |
| BI | <--- | HM | -.142 |
| BI | <--- | PV | .186 |
| BI | <--- | TR | .428 |
| BI | <--- | HT | -1.195 |
| BI | <--- | FC | .519 |
| UB | <--- | BI | -.584 |
| UB | <--- | FC | -.533 |
| UB | <--- | HT | .805 |

| | | | Estimate |
|---|---|---|---|
| EE5 | <--- | EE | .592 |
| EE4 | <--- | EE | .784 |
| EE3 | <--- | EE | .753 |
| EE2 | <--- | EE | .572 |
| EE1 | <--- | EE | .009 |
| PE5 | <--- | PE | .777 |
| PE4 | <--- | PE | .813 |
| PE3 | <--- | PE | .834 |
| PE2 | <--- | PE | .715 |
| PE1 | <--- | PE | .241 |
| SE5 | <--- | SE | .281 |
| SE4 | <--- | SE | .220 |
| SE3 | <--- | SE | .373 |
| SE2 | <--- | SE | .510 |
| SE1 | <--- | SE | .743 |
| SI4 | <--- | SI | .530 |
| SI3 | <--- | SI | .650 |
| SI2 | <--- | SI | .858 |
| SI1 | <--- | SI | .782 |
| HM3 | <--- | HM | .836 |
| HM2 | <--- | HM | .927 |
| HM1 | <--- | HM | .744 |
| PV3 | <--- | PV | .891 |
| PV2 | <--- | PV | .277 |
| PV1 | <--- | PV | .223 |
| TR1 | <--- | TR | .652 |
| TR2 | <--- | TR | .741 |
| TR3 | <--- | TR | .369 |
| TR4 | <--- | TR | .500 |
| TR5 | <--- | TR | .407 |
| BI1 | <--- | BI | .364 |
| BI2 | <--- | BI | .490 |
| BI3 | <--- | BI | .279 |
| BI4 | <--- | BI | .444 |
| BI5 | <--- | BI | .310 |
| UB1 | <--- | UB | .027 |
| UB2 | <--- | UB | .131 |
| HT3 | <--- | HT | .560 |
| HT2 | <--- | HT | .187 |
| HT1 | <--- | HT | .369 |
| FC1 | <--- | FC | .554 |
| FC2 | <--- | FC | .576 |
| FC3 | <--- | FC | .648 |
| FC4 | <--- | FC | .725 |
| FC5 | <--- | FC | .561 |

**Covariances: (Group number 1 - Default model)**

| | | | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|---|---|
| TR | <--> | HT | .234 | .033 | 7.176 | *** | |
| SI | <--> | HT | .122 | .023 | 5.378 | *** | |
| SE | <--> | TR | .117 | .028 | 4.210 | *** | |
| SE | <--> | HT | .095 | .024 | 4.018 | *** | |
| SI | <--> | TR | .090 | .020 | 4.619 | *** | |
| SE | <--> | FC | .005 | .005 | .973 | .330 | |
| SI | <--> | HM | .135 | .023 | 5.789 | *** | |
| SE | <--> | SI | .045 | .013 | 3.458 | *** | |
| HT | <--> | FC | .041 | .013 | 3.036 | .002 | |
| PE | <--> | FC | .128 | .021 | 6.170 | *** | |
| PE | <--> | PV | .047 | .024 | 1.941 | .052 | |
| EE | <--> | PE | .140 | .024 | 5.729 | *** | |
| EE | <--> | FC | .080 | .016 | 5.025 | *** | |
| PE | <--> | HT | .033 | .020 | 1.634 | .102 | |

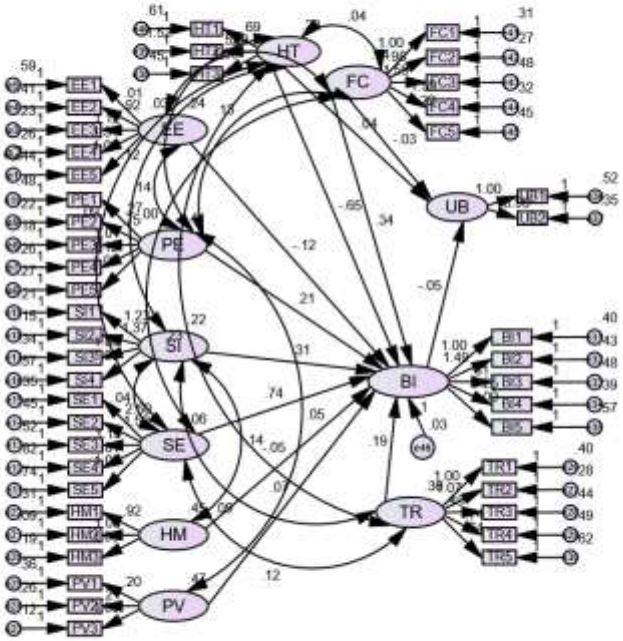
**Correlations: (Group number 1 - Default model)**

| | | | Estimate |
|---|---|---|---|
| TR | <--> | HT | .951 |
| SI | <--> | HT | .574 |
| SE | <--> | TR | .853 |
| SE | <--> | HT | .835 |
| SI | <--> | TR | .351 |
| SE | <--> | FC | .052 |
| SI | <--> | HM | .426 |
| SE | <--> | SI | .376 |
| HT | <--> | FC | .244 |
| PE | <--> | FC | .541 |
| PE | <--> | PV | .108 |
| EE | <--> | PE | .449 |
| EE | <--> | FC | .440 |
| PE | <--> | HT | .113 |

**Variances: (Group number 1 - Default model)**

| | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|
| EE | .239 | .043 | 5.519 | *** | |
| PE | .407 | .049 | 8.310 | *** | |
| SE | .063 | .027 | 2.375 | .018 | |
| SI | .223 | .045 | 5.020 | *** | |
| HM | .451 | .049 | 9.187 | *** | |
| PV | .473 | .269 | 1.759 | .079 | |
| TR | .297 | .048 | 6.192 | *** | |
| HT | .204 | .050 | 4.042 | *** | |
| FC | .139 | .028 | 5.043 | *** | |
| e46 | .025 | .024 | 1.039 | .299 | |
| e1 | .443 | .038 | 11.569 | *** | |
| e2 | .258 | .032 | 7.935 | *** | |

| | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|
| e3 | .231 | .026 | 8.841 | *** | |
| e4 | .415 | .035 | 11.748 | *** | |
| e5 | .588 | .044 | 13.323 | *** | |
| e6 | .268 | .025 | 10.509 | *** | |
| e7 | .263 | .027 | 9.681 | *** | |
| e8 | .180 | .020 | 9.054 | *** | |
| e9 | .218 | .019 | 11.414 | *** | |
| e10 | .482 | .037 | 13.212 | *** | |
| e11 | .740 | .057 | 12.988 | *** | |
| e12 | .819 | .062 | 13.124 | *** | |
| e13 | .521 | .041 | 12.683 | *** | |
| e14 | .451 | .038 | 11.901 | *** | |
| e15 | .347 | .046 | 7.581 | *** | |
| e16 | .572 | .046 | 12.433 | *** | |
| e17 | .345 | .030 | 11.608 | *** | |
| e18 | .150 | .022 | 6.710 | *** | |
| e19 | .214 | .023 | 9.351 | *** | |
| e20 | .195 | .022 | 8.834 | *** | |
| e21 | .087 | .020 | 4.292 | *** | |
| e22 | .307 | .027 | 11.286 | *** | |
| e23 | .123 | .265 | .463 | .643 | |
| e24 | .261 | .023 | 11.285 | *** | |
| e25 | .364 | .029 | 12.363 | *** | |
| e26 | .402 | .037 | 10.856 | *** | |
| e27 | .280 | .031 | 9.136 | *** | |
| e28 | .443 | .035 | 12.817 | *** | |
| e29 | .489 | .040 | 12.241 | *** | |
| e30 | .620 | .049 | 12.682 | *** | |
| e31 | .400 | .033 | 12.192 | *** | |
| e32 | .429 | .040 | 10.826 | *** | |
| e33 | .476 | .037 | 12.710 | *** | |
| e34 | .388 | .034 | 11.441 | *** | |
| e35 | .569 | .045 | 12.544 | *** | |
| e36 | .520 | .039 | 13.320 | *** | |
| e37 | .352 | .027 | 13.252 | *** | |
| e38 | .446 | .049 | 9.055 | *** | |
| e39 | 1.524 | .115 | 13.221 | *** | |
| e40 | .612 | .049 | 12.441 | *** | |
| e41 | .313 | .027 | 11.722 | *** | |
| e42 | .271 | .024 | 11.529 | *** | |
| e43 | .484 | .045 | 10.681 | *** | |
| e44 | .316 | .034 | 9.295 | *** | |
| e45 | .447 | .038 | 11.664 | *** | |




**Communalities**

| | Initial | Extraction |
|---|---|---|
| EE1 | 1.000 | .776 |
| EE2 | 1.000 | .604 |
| EE3 | 1.000 | .704 |
| EE4 | 1.000 | .719 |
| EE5 | 1.000 | .656 |
| PE1 | 1.000 | .511 |
| PE2 | 1.000 | .755 |
| PE3 | 1.000 | .752 |
| PE4 | 1.000 | .781 |
| PE5 | 1.000 | .765 |
| SI1 | 1.000 | .678 |
| SI2 | 1.000 | .780 |

| | | |
|---|---|---|
| SI3 | 1.000 | .676 |
| SI4 | 1.000 | .612 |
| FC1 | 1.000 | .612 |
| FC2 | 1.000 | .686 |
| FC3 | 1.000 | .628 |
| FC4 | 1.000 | .684 |
| FC5 | 1.000 | .627 |
| HM1 | 1.000 | .754 |
| HM2 | 1.000 | .808 |
| HM3 | 1.000 | .826 |
| PV1 | 1.000 | .690 |
| PV2 | 1.000 | .629 |
| PV3 | 1.000 | .635 |
| HT1 | 1.000 | .546 |
| HT2 | 1.000 | .578 |
| HT3 | 1.000 | .605 |
| TR1 | 1.000 | .589 |
| TR2 | 1.000 | .648 |
| TR3 | 1.000 | .601 |
| TR4 | 1.000 | .523 |
| TR5 | 1.000 | .672 |
| SE1 | 1.000 | .643 |
| SE2 | 1.000 | .644 |
| SE3 | 1.000 | .661 |
| SE4 | 1.000 | .602 |
| SE5 | 1.000 | .543 |
| BI1 | 1.000 | .600 |
| BI2 | 1.000 | .634 |
| BI3 | 1.000 | .531 |
| BI4 | 1.000 | .529 |

| | | |
|---|---|---|
| BI5 | 1.000 | .625 |
| CO1 | 1.000 | .850 |
| CO2 | 1.000 | .845 |
| CO3 | 1.000 | .683 |
| CO4 | 1.000 | .695 |
| UB1 | 1.000 | .489 |
| UB2 | 1.000 | .488 |
| Sex | 1.000 | .629 |
| Exprience_Y | 1.000 | .685 |
| age2 | 1.000 | .673 |
| Occupation_n | 1.000 | .507 |
| Study_level | 1.000 | .639 |
| Type_service | 1.000 | .724 |
| Frequency | 1.000 | .552 |
| Income | 1.000 | .601 |

Extraction Method: Principal Component Analysis.