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The Moderator Role of Age in the Unified Theory of Acceptance and Use of Technology: Intention to Use Internet Banking in Sudan

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Abstract: The objective of this paper is to identify the moderator role of age in the unified theory of acceptance and use of technology: Intention to Use internet banking in Sudan. To achieve this objective the researchers adopted the questionnaire to data collection. A total of 375 questionnaires are distributed 207 respondents are well-responded. Used SPSS, Excel, SmartPLS to analysis the data collected. The results indicate that the age (34yrs and less) does prove as a moderator in effort expectancy, social influence, and intention to use Internet banking. Also the age generally does not prove as a moderator in internet banking awareness and intention to use internet banking. The study recommended to study effect of income and education level on acceptance of e –banking services.

Keywords: UTAUT, Sudan, Internet Banking, Internet Banking Awareness.

الدور المعدل للعمر في النظرية الموحدة لقبول واستخدام التكنولوجيا: النية لاستخدام الإنترنت المصرفي في السودان

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الملخص: هدفت الدراسة إلى التعرف على الدور المعدل للعمر في النظرية الموحدة لقبول واستخدام التكنولوجيا: دراسة على قبول العملاء لخدمات الإنترنت المصرفي في السودان. لتحقيق هذا الهدف اعتمدت الدراسة على الاستبانة كأداة لجمع البيانات من المبحوثين، حيث تم توزيع 375 استبانة على مستخدمي خدمة الإنترنت المصرفي في البنوك العاملة في السودان، وبعد تنظيف البيانات أصبحت الاستبانات الصالحة للتحليل 207 استبانة. استخدمت الدراسة برنامج SPSS, Excel, Smart PLS لتحليل البيانات.
توصلت الدراسة الى نتيجة مفادها أن المبحوثين الذين يبلغ أعمارهم 34 سنة فأقل يحسن العلاقة بين الجهد المتوقع، التأثير الاجتماعي، والنية السلوكية لقبول واستخدام خدمات الإنترنت المصرفي كمتغير معدل، وأيضاً العمر بشكل عام لا يحسن في العلاقة بين الوعي

بخدمات الإنترنت المصرفي والنية السلوكية لقبول واستخدام خدمات الإنترنت المصرفي في السودان. وأوصت الدراسة بدراسة تأثير مستوى الدخل والمستوى التعليمي في قبول الخدمات المصرفية الالكترونية.

الكلمات المفتاحية: النظرية الموحدة لقبول واستخدام التكنولوجيا، السودان، الإنترنت المصرفي، الوعي بالخدمات المصرفية الإلكترونية، برنامج.

1- Introduction

Internet banking was first introduced around the early 1980s and started gaining momentum in developing countries in the mid-1990s (Ramavhona& Makwena, 2016). The electronic banking in Sudan goes back to 1990s when the central bank of Sudan (CBS) took the initiative to introduce modern information technologies in Sudanese banking industry as a part of its banking system development plan for 1990 – 2000. Consequently, the CBS established the electronic banking services company (EBSC) in 1990 to be responsible for building and developing e-banking industry in Sudan (Khater, Customers' Acceptance of Internet Banking in Sudan By Using Unified Theory of Acceptance and Use of Technology (UTAUT) Model, 2016).

Venkatesh et al. (2003) developed the Unified Theory of Acceptance and Use of Technology (UTAUT) model to prevent the use of constructs from various models and provide a unified perspective of acceptance of technologies (Afonso, Roldan, Franco, & Gonzalez, 2012).

With the aim of testing the moderating effects of again the Unified Theory of Acceptance and Use of Technology: A study on Customers' Acceptance of Internet Banking in Sudan, this research is structured as following. The literature review is proposed in section two. The conceptual model and research hypotheses are presented in the section three. Section four for methodology. Section five shows the findings and discussion. The final section has the Conclusion and Future Work.

2- Literature Review

2-1 Internet Banking in Sudan

The internet banking is "a new type of information system that uses emerging techniques such as the internet and the World Wide Web, and has changed how customers perform various financial activities in virtual space" (Santouridis&Kyritsi, 2014). It has also described in literature as "the delivery of information or services by the banks to their customers using computers or mobile phones via the internet (Ramavhona&Makwena, 2016). According to Ramavhona&Makwena (2016) the internet banking allows users to undertake financial transactions without the need to physically visit the bank.

2-2 The UTAUT Model

Venkatesh et al (2003) developed UTAUT model. It is a product study of eight models, which include: theory of reason action (TRA), technology acceptance model (TAM, TAM2), motivational model

(MM), theory of planned behavior (TPB), combined TAM/TPB, model of PC utilization(MPCU), and innovation diffusion theory (IDT). UTAUT integrates components from the other models, helps to determine user acceptance on four constructs, namely: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating condition (FC) (Omoefe& Francisca, 2013).Gender, age, experience, and voluntariness of use were introduced as moderators(Khan, Hameed, & Khan, 2017). The first three being direct determinants of usage intention and behavior, and the fourth a direct determinant of use behavior. The variables of gender, age, experience and voluntariness of us all work to moderate the impact of the four key constructs on usage intention and behavior as indicated (Khater, Customers' Acceptance of Internet Banking in Sudan By Using Unified Theory of Acceptance and Use of Technology (UTAUT) Model, 2016). See figure 2.2.1 herein below.

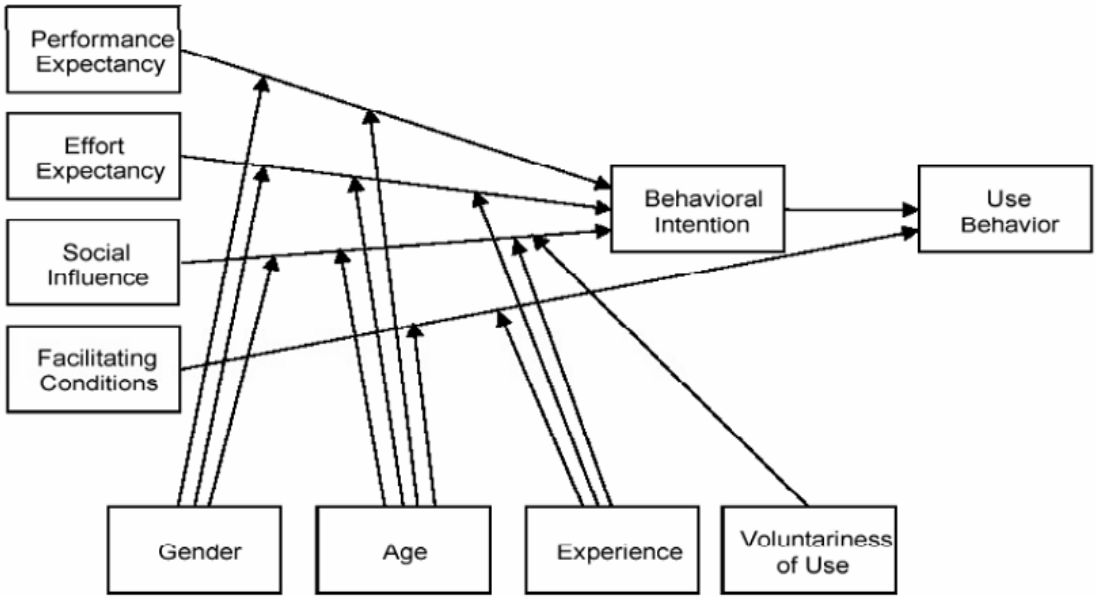

Figure 2.2.1: The UTAUT Model.

Source: Venkatesh et al., 2003, p.447

Performance Expectancy (PE): in this research, PE describes as "the degree to which an individual believes that using the internet banking services will help him or her to attain gains in job performance". According to studies that conducted by Khater, (2016), Khater, Mahmoud, &Almansour, (2016), Mahfuz, Khanam, &Mutharasu, (2016), Afonso et al., (2012) PE has positive influencing on behavior intention. These studies have also shown that this positive influencing of PE on behavior intention is stronger for more than 34 years old Khater, (2016).

Effort Expectancy (EE): EE on this research explain thatinternet banking services users did not find difficult to use internet banking services in their communication media. Prior UTAUT studies' results presented that influencing is stronger for 34 years old and less Khater, (2016).

Social Influence (SI): here the customers perceive that important others (e.g. family, and friends) believe that they should use internet banking services (Mahfuz, Khanam, &Mutharasu, 2016).

Internet Banking Awareness (IBA): Rogers and Shoemaker (1971) defined the awareness as "customers go through a process of knowledge, persuasion, decision and confirmation before they are ready to adopt a product or service" (Saibaba &Naryana, 2013). Khater, (2016) stated that illiteracy among people could be accountable for absence of people's awareness of new innovations like e-commerce in general, and internet banking in specific.

3- Conceptual Model and Research Hypotheses

Basically this research use the UTAUT model to examine The Moderator Role of Age in the Unified Theory of Acceptance and Use of Technology: A study on Customers' Acceptance of Internet Banking in Sudan, this paper proposes a conceptual model bellow.

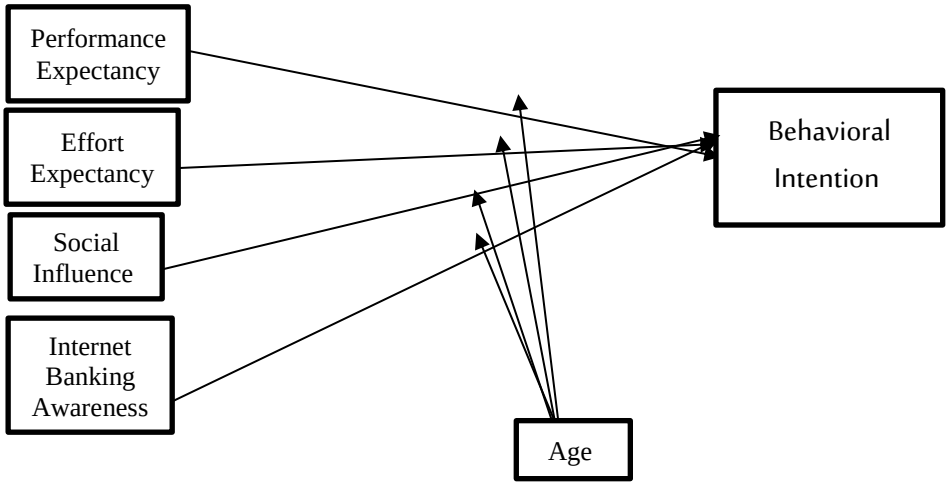

Figure 3.1: Conceptual Model

H1: PE has stronger positive effect on behavior intention for more than 34 years old than for 34 years old and less.

H2: EE has stronger positive effect on behavior intention for 34 years old and less than more than 34 years old.

H3: SI has stronger positive effect on behavior intention for 34 years old and less than more than 34 years old.

H4: IBA has stronger positive effect on behavior intention for 34 years old and less than more than 34 years old.

4- Methodology

This paper objective is to identify The Moderator Role of Age in the Unified Theory of Acceptance and Use of Technology: A study on Customers' Acceptance of Internet Banking in Sudan. The researcher adopted the questionnaire to data collection. A total of 375 questionnaires are distributed 207 respondents are well-responded. Data collection for this study was restricted to Khartoum State because it

is one of the states which have highest proportion of internet banking users. The questionnaire design was divided into two part, the first part is personal information, and the second part consists of 19 questions of 5 variables. The variables used in this research model were adopted from the UTAUT model Vencatch and (Khater, Mahmoud, &Almansour, 2016).

(Afonso, Roldan, Franco, & Gonzalez, 2012) (Arenas-Gaitan, Peral-Peral, & Ramon-Jeronimo, 2015) Stated that the Partial Least Squires (PLS) is indicated for prediction and complex models, and the choice of it was justified by two aspect: first, compared to covariance structure analysis. Second, PLS does not require any prior distributional assumption and relatively small sample size is acceptable. So that the PLS was used for the measurement models analysis and the structural model analysis.

5- Findings and Discussion

5-1 Descriptive Analysis

Table (1) Presents descriptive analysis for the sample

Item	Category	F	%
Gander	Male	73	74.5
	Female	25	25.5
Age	Less than 25 years	18	18.4
	25 – 34 years	56	57.1
	35 – 44 years	21	21.4
	45 – 54 years	2	2
	55 years and more	1	1
Education	Basic	3	3.1
	Secondary	5	5.1
	Diploma	7	7.1
	Bachelor	53	54.1
	High Diploma	4	4.1
	Master	24	24.5
	Doctorate	2	2
	Other	0	0
Marital Status	Married	43	43.9
	Single	55	56.1
Occupation	Student	11	11.2
	Public Sector	30	30.6
	Private Sector	46	46.9
	Business	7	7.1
	Other	3	3.1
Experience	Less than 5 years	37	37.8

Item	Category	F	%
	5 and less than 10 years	40	40.8
	10 and less than 15 years	14	14.3
	15 and less than 20 years	2	2
	20 years and more	5	5.1
Income	Less than 1,000 SDG	15	15.3
	1,000 and less than 3,000 SDG	57	58.2
	3,000 and less than 5,000 SDG	15	15.3
	5,000 and less than 10,000 SDG	9	9.2
	10,000 SDG and more	1	1

5-2 Assessment of Measurement model

5-2-1 Convergent Validity

Convergent validity is the extent to which a measure correlates positively with alternative measures of the same construct (Hair, Hult, Ringle, &Sarstedt, 2014). Convergent validity report combine the results of the factor loading, composite reliability (CR), and average variance extracted (AVE) together in one table. (Hair, Hult, Ringle, &Sarstedt, 2014). The table 2 shows that all the values were above than 0.60 that indicates the convergent validity.

Table (2) Results of Measurement Model

Construct	Items	Loading	AVE	CR
Performance Expectancy	PE1	0,79	0,63	0,80
	PE2	0,81		
	PE3	0,87		
	PE4	0,79		
Effort Expectancy	EE1	0,79	0,61	0,83
	EE2	0,86		
	EE4	0,70		
Social Influence	SI1	0,81	0,73	0,92
	SI2	0,78		
	SI3	0,92		
	SI4	0,91		
Internet Banking Awareness	IBA1	0,86	0,70	0,90
	IBA2	0,84		
	IBA3	0,89		
	IBA4	0,76		
Behavioral Intention	BI1	0,88	0,81	0,93
	BI2	0,93		
	BI3	0,88		

5-2-2 Discriminate Validity

Discriminate validity is the degree where items are differentiated among constructs and measures distinct concepts (rahi, Ghani, &Alnaser, 2017). According to Rahi, Ghani, &Alnaser (2017) the average variance shared between each construct and its measure should be greater than the variance shared between the constructs and other constructs. Table three shows that the square root of the AVE as shown in bold values on the constructs. Table 3 depicts that all the items loaded higher on that construct and loaded lower on the other constructs that confirms the discriminate validity of the constructs.

Table (3) Results of Latent variable Correlations

	BI	EE	IBA	PE	SI
BI	0,90				
EE	0,43	0,78			
IBA	0,34	0,52	0,84		
PE	0,50	0,50	0,40	0,79	
SI	0,29	0,29	0,21	0,32	0,86

The values in the boldface are square root of AVE

5-3 Assessment of Structural model

The R^2 for behavioral intention in the table 4 and figure 1 was 0,31 which is acceptable based on suggested by Chin (1998). Researchers also assessed the effect size F^2 as suggested by Cohen (1988). Table 5 and figure 1 show that PE, EE, and SI depicted small effect size, whereas IBA has no effect size.

Table (4) Results R-Square of the endogenous latent variable

Construct	R^2	Result
Behavioral Intention	0,31	week

Table (5) Results of F^2 of the exogenous latent variables

Construct	F^2	Result
PE	0,11	Small
EE	0,03	Small
SI	0,02	Small
IBA	0,01	No

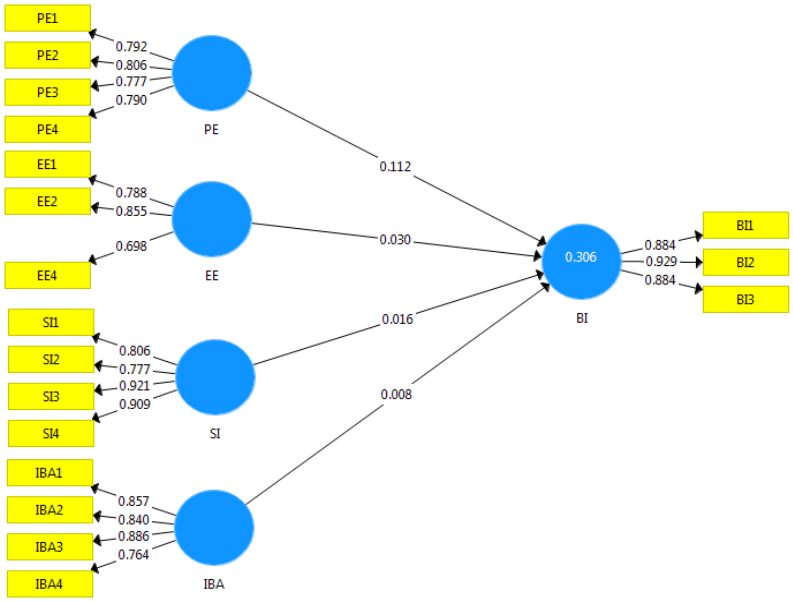

Figure 1: effect size

5-4 Hypotheses Testing

The results of the table 6 below depicts that the relationship between PE and BI is supported ($\beta = 0.33$, $p < 0.05$). But H2, H3, an H4 are not supported ($\beta = 0.18$, $p > 0.05$), ($\beta = 0.11$, $p > 0.05$), ($\beta = 0.09$, $p > 0.05$) respectively.

Table (6) Path Coefficient of the Research Hypotheses

Hypothesis		Std. beta	Std. error	T- value	P- value	Decision
PE → BI	H1	0,33	0,14	2,46	0.01	Supported
EE → BI	H2	0,18	0,14	1,31	0,24	Not Supported
SI → BI	H3	0,11	0,08	1,36	0,18	Not Supported
IBA → BI	H4	0,09	0,17	1,52	0,59	Not Supported

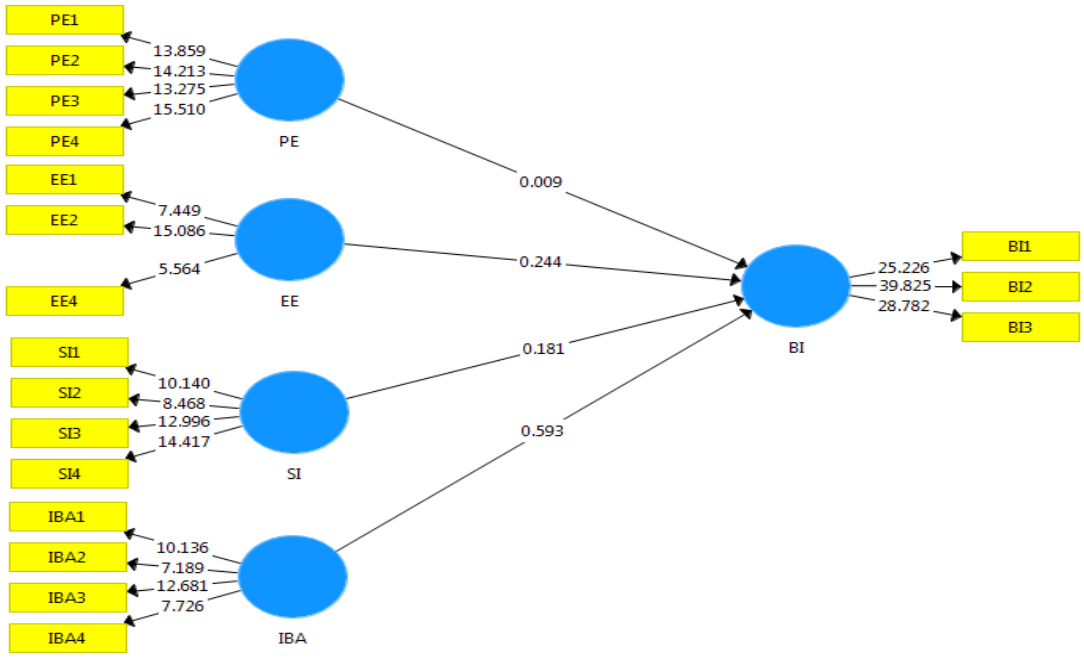

Figure 2: hypotheses testing

Age as a moderator variable

According to UTAUT model, testing is conducted to find out whether the age was able to be a moderator on this research. The table 7 below shows that magnitude of the t-value has change compared to the results of testing hypotheses in table 6. It means that the age is prove as a moderator the relationship between independent variables and dependent variable for 34 years and less.

Table (7)Path Coefficient of the Research Hypotheses, age as a moderator

Hypothesis	34 years and less				More than 34 years			
	β	T-value	P-value	result	β	T- value	P- value	result
PE → BI	0,40	3,70	0.00	supported	0,44	0,37	0,71	Not supported
EE → BI	0,26	2,05	0,04	supported	0,18	0,47	0,64	Not supported
SI → BI	0,27	3,63	0,00	supported	-0,32	1,09	0,27	Not supported
IBA → BI	-0,03	0,26	0,79	Not supported	0,35	0,88	0,38	Not supported

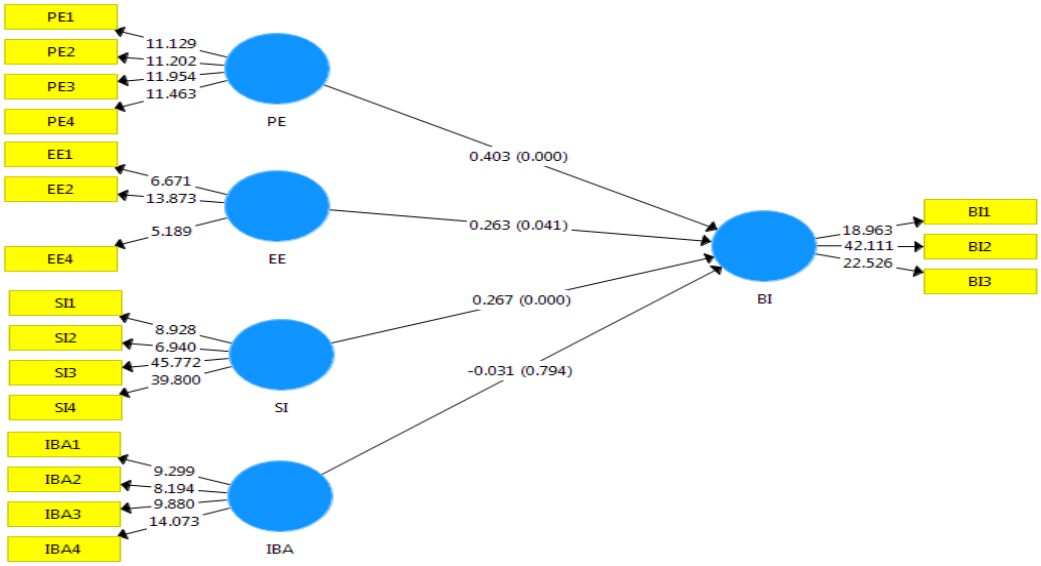

Figure 5.4.1: path coefficient for 34 years and less

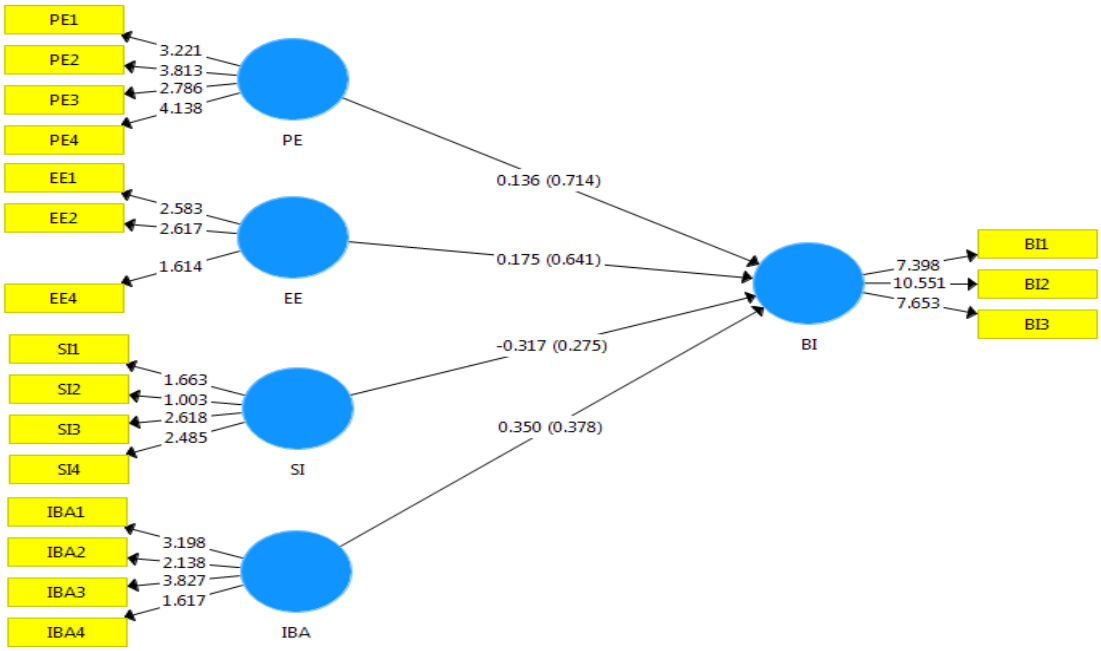

Figure 5.4.2: path coefficient for more than 34 years

6- Conclusion and Future Work

This paper objective is to identify the moderator role of age in the unified theory of acceptance and use of technology: a study on customers' acceptance of internet banking in Sudan. The results of SmartPLS confirmed fitness of the research model in table 2, table 3, table 4, and table 5. Therefore, the modifier model of UTAUT model with internet banking awareness is able to explaining the moderator role of age in the UTAUT model. Results of paper indicate that p-value of age (34 yrs and less) has changed if compared to the result in table 6. This means that the age (34yrs and less) does prove as a moderator in effort expectancy and social influence. Whilst p-value of age (more than 34 yrs) has changed if compared

to the result in table 6. This means that the age (more than 34yrs) does prove as a moderator in performance expectancy. Also the p-value of age generally has not changed, that means the age does not prove as a moderator in internet banking awareness.

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