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# The Effect of Perceived Ease of Use and Usefulness on Customers Intention to Use Online Banking Services: The Mediating Role of Perceived Trust

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***Abstract*— Trust is essential for all online transactions adoption and usage including online banking. In this paper, online banking trust was addressed through empirical evidence from the survey conducted in Jordanian commercial banks. An extended Technology Acceptance Model (TAM) framework used in this study. Partial Least Squares (PLS) used to analyze the data, which was composed of 198 questionnaires conducted with bank's customers in Jordan. The results confirm that trust increases if users perceive online banking to be useful whereas perceived ease of use fails to predict Jordanians' intention to accept and use online banking. Perceived trust also mediates partially the impact of perceived usefulness on the intention to use online banking services. The findings from this study are useful for policy makers, banking sectors and financial practitioners to enhance the use of online banking services among Jordanians.**

**Keywords — Online Banking, Technology Acceptance Model, Perceived Ease of Use, Perceived Usefulness, Perceived Trust**

## I. INTRODUCTION *(HEADING 1)*

Within the recently growing advances in information technology innovations, many aspects of human life as well as performance of organizations have been revolutionized. This is especially more realized through the significant evolvement of the Internet that has changed life for the last decade of the 20th century. Such rapid changes resulted by this promising technology have influenced the banking sectors [1].

Due to the increasing importance of such rapid technological changes, Information and Communication Technology (ICT) has been increasingly realized as a major driver in business development of banking sectors. Therefore, it is necessary for incorporation of information technology innovations in various departments of banking sectors to offer advanced and varied services, accelerate their performance, reduce in expenditure, and achieve more effective productivity [1-3]. In relation to the benefits of online baking for bank sectors, online banking is capable of provide competitive advantages, providing cost efficiencies, reaching customers at different and distanced geographical areas, setting up a brand name, and offering customized services. Concerning customers, either individuals or companies, online banking has features that enable customers not only to carry out or conduct banking transactions such as transfer of funds applications of loans, opening of fixed deposit account and letter of credit or

investment activities but also enable them to manage their personal finance through facilities such as importing data into personal accounting software and account aggregation. Using online banking, customers can financial transactions anytime and anywhere [4-6]. Although online banking is useful and advantageous for both banks and customers, there are still several underlying issues that should be addressed and taken into account by interested bank sectors. One of the most crucial issue is trust [5, 6].Many of studies suggest that trust is an important predictor of intention to use and accept many of online transactions [6-8]. For instance, some previous studies showed that trust is one of the major issues for customers to accept the applications of online banking [9, 10]. Other studies indicated that customers are not used to applying such online transactions, especially online banking. This is primarily due to the issue of trust as well as risk concerns among users or customers. It was also found that there is reluctance among customers in relation to providence of sensitive information to banks' websites and applications. This is because they worry about misusing debit and credit cards, which underlies their lack of trust [5, 11]. As pointed out by [11] and [12], one of the most important indicators of the success to many information system innovations is gaining customers' trust. Trust is also one of the essential aspects of online banking since it results into customers' acceptance of such services. In addition, trust is regarded as the major element in establishing a long-term relationship between banking sectors and customers. However, customer lack of trust is still a major barrier to in acceleration of the adoption of online transactions especially, acceptance and usage of online banking [2, 9, 13, 14].The present study aimed at shedding some light on the influence of Jordanian customers' Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) of online banking on their trust, acceptance and usage of such services. The study also investigated trust as an important element in the success and growth of online banking and determined the key trust factors as well as their effects on Jordanian users' intention and decision to accept and use online banking in performing financial and non-financial transactions. In addition, this study aims to investigating the mediating role of perceived trust to accept and use online banking services in the relationships between components of PEOU, PU and intention to use online banking services through examining the total effect with and without mediation effect. The results of the present study are expected to assist practitioners and researchers in Information System (IS) to manage and strategize elements in establishing trust, which will, in turns, foster or strengthens customers' acceptance of online banking and financial services. Such findings will also help banking sectors to offer more customer-oriented services and develop e-commerce competitive advantage. Therefore, based on these arguments of the above stated relationships of effect among the investigated constructs, the following research hypotheses were tested in this study:

H1: Perceived ease of use will positively influence bank customer's intention to accept and use online banking services.

H2: Perceived ease of use will positively influence perceived trust among bank customers to accept and use online banking services.

H3: Perceived ease of use will positively influence Perceived Usefulness among banks customers to accept and use online banking services.

H4: Perceived usefulness will positively influence perceived trust in online banking services

H5: Perceived usefulness will positively influence customers' intention to accept and use Online banking services

H6: Perceived trust will positively influence customers' intention to accept and use online banking services.

H7: The impact of perceived ease of use on customers' intention to accept and use online banking services is mediated by the perceived trust.

H8: The impact of perceived usefulness on customers' intention to accept and use online banking services is mediated by the perceived trust.

## II. METHODOLOGY/ MODEL DESCRIPTION

A quantitative research approach was used as the research design in this study. The participants were Jordanian Banks customers. The customers (N=198) were selected as the samples of the study using random sampling. Concerning the number of the samples, Structural Equation Modeling (SEM) analysis, need the number of sample at least 100 [15]. Moreover, using smart PLS path modeling suggests that the size of the sample should be minimum 30 to 100 cases [15]. So, 198 respondents are regarded sufficient.

In order to evaluate how PEOU and PU affect customers' trust to accept and use online banking services, a quantitative research was conducted, where data was collected through online and offline survey questionnaires, which will attempt to help bank sectors to gain a better understanding of how these three factors affect their decision to accept and use internet banking services. The survey used for collecting the data from the samples was adopted from previous studies on online transactions acceptance and use [16-19]. It comprises an overall number of items (14) as shown in Table 1 which were modified by the researchers according to the purpose of the present study. They were also translated into Arabic language so that non-English speaking respondents could understand and respond to them easily. In responding to each item, the respondent need to select one of the five-point Likert-scale ranging from strongly disagree (1) to strongly agree (5). The survey was distributed to the participating 350 customers in different commercial banks in Irbid city. However, only 198 questionnaires were completed and used for data analysis. In the present study the data was analyzed using the SEM approach through smart PLS 2 software.

Demographic data for respondents presented below in Table 2, shown that 58.6% of the respondents were males; 43.40 % of them between 18 and 26 years old; and most of them have a bachelor degree. Around 58% of respondents have the experience to use the Internet more than 5 years.

As a result, the respondents' responses the items of the survey indicate that they have good experience and trust. It was also found that all the participants stated that they have bank account. However, the results showed that not all of them use online banking as those who used such services accounted for 67.70%.

TABLE I CONSTRUCTS AND MEASUREMENT ITEMS

| Construct | Measurement Items |
|---|---|
| **Perceived Usefulness** | **PU1:** Using the Online banking improves my performance in conducting my banking. |
| | **PU2:** Using the Online banking in my job increases my productivity. |
| | **PU3:** Using the system enhances my effectiveness conducting my banking and decrease time. |
| | **PU4:** Online banking services meet my needs, so I find it useful for me. |
| **Perceived Ease of Use** | **PEOU1**: I find it easy the learning how to use Online banking. |
| | **PEOU2**: Interacting with the system does not require a lot of my mental effort. |
| | **PEOU3:** I find the online banking will be easy for me. |
| | **PEOU4:** My interaction with online banking is clear and understandable. |
| **Perceived Trust** | **PT1:** Online banking keeps its promises. |
| | **PT2:** Online banking is trustworthy. |
| | **PT3:** Overall, I trust Online banking. |
| **Intention to use** | **ITU1:** Assuming I had access to Online banking, I intend to use it. |
| | **ITU2:** If my bank provides Online banking, I think that I would use it. |
| | **ITU3:** I plan to use the Online banking services offered by my bank. |

TABLE II DEMOGRAPHIC DATA FOR RESPONDENTS

| Category | Frequency | Percentage % |
|---|---|---|
| **Gender** | | |
| **Male** | 116 | 58.6 |
| **Female** | 81 | 40.9 |
| **Missing Values** | 1 | 0.50 |
| **Total** | 198 | 100 |
| **Age** | | |
| **18-26 Years** | 86 | 43.40 |
| **27-35 Years** | 81 | 40.90 |
| **36-50 Years** | 26 | 13.10 |
| **> 50 Years** | 5 | 2.50 |
| **Total** | 198 | 100 |
| **Education** | | |
| **Secondary and less** | 3 | 1.50 |
| **Diploma** | 14 | 7.10 |
| **BSc.** | 87 | 43.90 |
| **MCs** | 79 | 39.90 |
| **PhD** | 15 | 7.60 |
| **Total** | 198 | 100 |
| **Internet Use** | | |
| **None** | 4 | 2.00 |
| **< 1 Year** | 13 | 6.60 |
| **1-5 Year** | 65 | 32.80 |
| **6-10 Year** | 75 | 37.90 |
| **> 10 Years** | 40 | 20.20 |
| **Missing Values** | 1 | 0.50 |
| **Total** | 198 | 100 |
| **Internet Access** | | |
| **None** | 4 | 2.0 |
| **< 1 Hrs.** | 24 | 12.1 |
| **1-2 Hrs.** | 63 | 31.8 |
| **3-4 Hrs.** | 55 | 27.80 |
| **> 4 Hrs.** | 52 | 26.30 |
| **Total** | **198** | **100** |
| **Bank Account** | | |
| **Yes** | **198** | **100** |
| **Internet Banking Use** | | |
| **Yes** | **64** | **32.30** |
| **No** | **134** | **67.70** |
| **Total** | **198** | **100** |

## III. RESULTS AND DISCUSSION

### *A. Descriptive Statistics*

The respondents' attitudes were surveyed through 14 items. Their responses to the 14 items or questions of the questionnaire were analyzed using descriptive statistics, including the mean values and standard deviations. As stated by [20], while the mean value underlies the central tendency of the data, the standard deviation is usually intended for measuring the dispersion, thus offering an index of the spread or variability in the data. Based on the descriptive statistics obtained from the quantitative analysis of the data in Table 3, the respondents' responses to the items are indicative of their positive attitudes. More specifically, the results show that the values of the standard deviation (SD) were in the range from 0.886 to 1.122, which means that there is a narrow spread around the mean. In addition, the values of the mean obtained from all items that constituted both constructs: PEOU 1 and PEOU 3 tended to be higher than (2.5) and ranged from 3.35 (PT2) to 4.06.

### *B. Measurement and Structural Model*

The results of the parameter estimates and statistical for all the four constructs: ITU, PEOU, PT and PU show that they are all valid measures of their respective constructs. The overall results of the measurement model shown on Table 4 satisfactorily support the model in terms of reliability, convergent validity and discriminant validity. The results in Table 4 shows that while the indicator of ITU2 obtained the highest indicator reliability (0.967), the indicator of PEOU2 and PT1 had the lowest reliability (0. 844). In addition, the results indicate that whereas Intention to Use achieved the highest value for AVE (0.905), PEOU achieved the lowest acceptable value (0.774). In brief, all these values were at the acceptable levels in relation to their convergent validity. This study used composite reliability as internal consistency criteria, CR, which measures the extent to which the indicators of the construct underlie the latent investigated or measured variable. Previous research suggested that the value of CR must exceed 0.70 [21]. For this study, all the values of CR of the tested constructs exceeded the suggested value. They ranged from (0.929) for perceived trust to (0.966) for Intention to Use.

Next, we performed a path analysis for the purpose of testing or examining the six research hypotheses or the direct impact hypothesized in the study. As displayed in Figure 1 and Table 5, it was found that the R2 value for PT was 0.411. This suggests that PEOU and PU explained almost 41.1% of the variance of the participants' perceived trust. Moreover, looking at te results of closely, it is evident that there are positive correlations between PEOU and PT (b = 0.229, t-value=2.486) and between PU and PT (b = 0.472, t-value=5.845), thus supporting H2 and H4, respectively. The results also show that the R2 value for the construct of PU was 0.400, which implies that PEOU explains 40% of the variance of PU. This also means that PEOU was positively correlated with PU (b = 0.632, t-value=9.542). Therefore, H3 was supported by the results of the current study. Finally, the R2 value for the ITU construct was found to be 0.598. Such result indicates that 59.8% of the variance of ITU was attributed to PEOU, PU and PT. In other words, PU was positively associated with ITU (b = 0.382, t-value=4.817) and PT (b = 0.464, t-value=7.163). However, it was found that there is no significance correlation between PEOU and ITU. Hence, while H5 and H6 were supported, H1 was not supported. The results of the study demonstrated that the construct that most significantly predicted ITU was PT. This was followed by PU as the second most significant predictor of ITU. This suggests that the higher the level of PT is, the higher the level of participants' or users' ITU online banking services.

In this study, we also employed the Sobel test for examining the mediation effect (Table 6). In other words, the test was intended to examine whether the mediator variable can significantly inform us of the effect of the independent variable on the dependent variable. This means that it was concerned with the indirect impact of the independent variable on the dependent variable via the mediator variable. For this purpose, we used a freely available calculator from this URL: http://www.danielsoper.com/statcalc/calculator.aspx?id=31.
Based on the results obtained from this test, it was revealed that PT mediates only the relationship between PU and ITU with (b=0.219, t-value=5.435). Regarding PEOU, it did not display any direct effect. Yet, it had an indirect effect through PT. In addition to this, we used the method recommended by Baron and Kenny (1986) for evaluating whether there is a full or partial mediation. Based on the results, there was a partial mediation between PU and ITU. This supports H7 whereas H8 is not supported.

TABLE III DESCRIPTIVE STATISTICS FOR ITEMS

| Construct | Items | Mean | Std. Deviation | Rated Scale | Order |
|---|---|---|---|---|---|
| Perceived Usefulness | PU1 | 3.85 | 1.036 | High | 4 |
| | PU2 | 4.03 | 0.939 | High | 1 |
| | PU3 | 4.02 | 0.971 | High | 2 |
| | PU4 | 3.89 | 1.001 | High | 3 |
| Perceived Ease of Use | PEOU1 | 4.06 | 0.919 | High | 1 |
| | PEOU2 | 3.90 | 0.961 | High | 4 |
| | PEOU3 | 4.06 | 0.888 | High | 2 |
| | PEOU4 | 3.96 | 0.886 | High | 3 |
| Perceived Trust | PT1 | 3.62 | 0.920 | Medium | 1 |
| | PT2 | 3.35 | 1.030 | Medium | 3 |
| | PT3 | 3.44 | 0.994 | Medium | 2 |
| Intention to Use | ITU1 | 3.73 | 1.084 | High | 2 |
| | ITU2 | 3.70 | 1.122 | High | 3 |
| | ITU3 | 3.95 | 1.070 | High | 1 |

TABLE IV RESULTS OF MEASUREMENT MODEL

| Model construct | Measurement item | Loading | CRa | Cronbach's alpha | AVEb |
|---|---|---|---|---|---|
| **Intention to Use** | ITU1 | 0.960 | 0.966 | 0.9473 | 0.905 |
| | ITU2 | 0.967 | | | |
| | ITU3 | 0.926 | | | |
| **Perceived Ease of Use** | PEOU1 | 0.893 | 0.932 | 0.9026 | 0.774 |
| | PEOU2 | 0.844 | | | |
| | PEOU3 | 0.920 | | | |
| | PEOU4 | 0.860 | | | |
| **Perceived Trust** | PT1 | 0.844 | 0.929 | 0.8857 | 0.815 |
| | PT2 | 0.935 | | | |
| | PT3 | 0.927 | | | |
| **Perceived Usefulness** | PU1 | 0.881 | 0.949 | 0.9284 | 0.823 |
| | PU2 | 0.926 | | | |
| | PU3 | 0.908 | | | |
| | PU4 | 0.914 | | | |

TABLE V EXAMINING RESULTS OF HYPOTHESIZED DIRECT EFFECTS OF THE VARIABLES

| Hypothesis | Relationship | Coefficient | t-value | Result |
|---|---|---|---|---|
| **H1** | **PEOU→ITU** | **0.018** | **0.256** | **Not Supported** |
| **H2** | **PEOU→PT** | **0.229** | **2.486** | **Supported** |
| **H3** | **PEOU→PU** | **0.632** | **9.542** | **Supported** |
| **H4** | **PU→PT** | **0.472** | **5.845** | **Supported** |
| **H5** | **PU→ITU** | **0.382** | **4.817** | **Supported** |
| **H6** | **PT→ITU** | **0.464** | **7.163** | **Supported** |

TABLE VI RESULTS OF EXAMINING MEDIATION EFFECTS OF PT, USING BARON AND KENNY (1986) METHOD

| **DV = ITU M = PT** | **Independent Variable (IV)** | |
|---|---|---|
| | **PEOU** | **PU** |
| Total Effect of IV on DV without | 0.123(sig:0.133) | 0.601(sig:0.000) |
| Direct Effect of IV on DV with M | 0.018(sig:0.798) | 0.382(sig:0.000) |
| Indirect Effect of IV on DV | 0.106(sig:0.017) | 0.219(sig:0.000) |
| Effect of IV on M (path b) | 0.229(sig:0.014) | 0.472(sig:0.000) |
| Effect of M on DV (path c) | 0.464(sig:0.000) | 0.464(sig:0.000) |
| Mediation Path | PEOU→PT→ITU | PU→PT→ITU |
| Mediation Effect | No | Yes |
| Degree of Mediation | --- | Partial |
| Hypothesis Result | H7) Not Supported | H8) Supported |

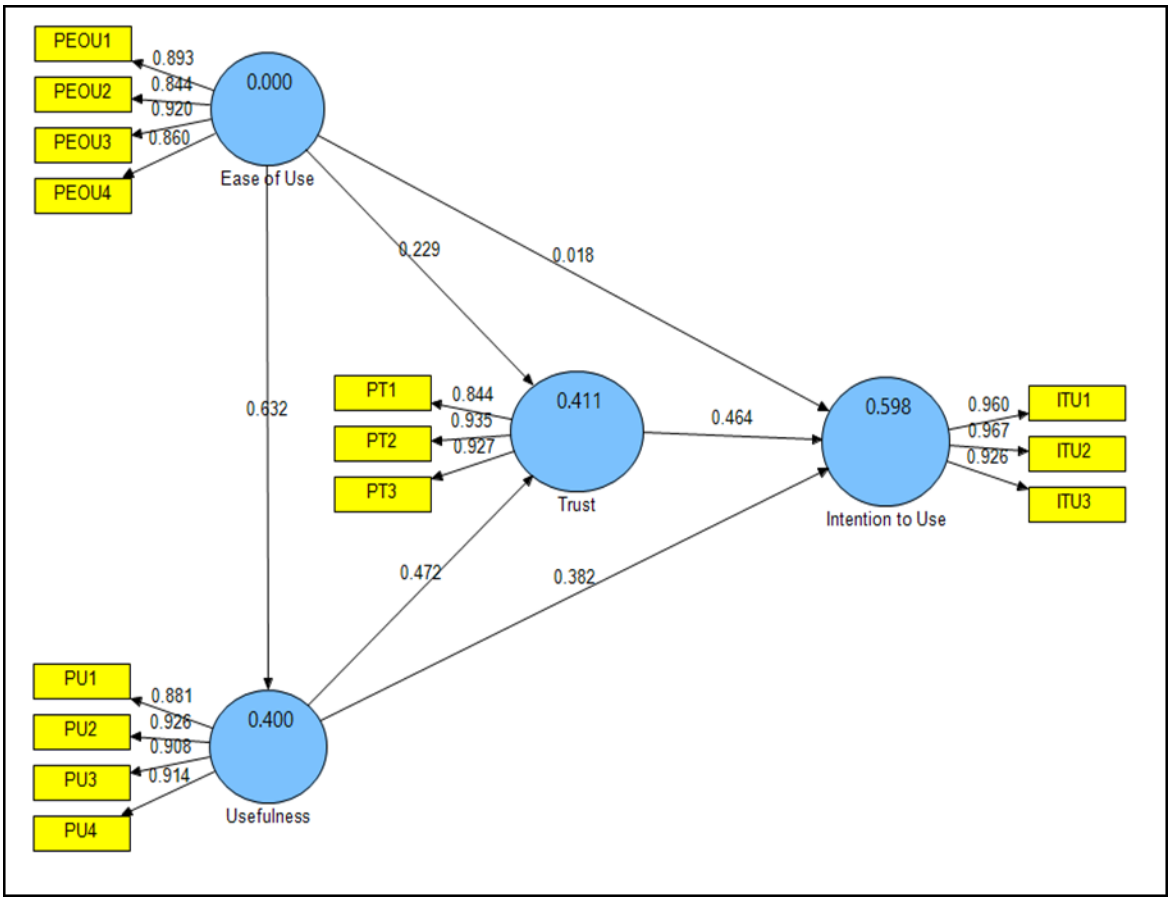


FIGURE VII MEASUREMENT MODEL

## IV. CONCLUSION

This study aimed to shed some light on the influence of Jordanian customers' Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) on their trust to accept and use online banking services. A general descriptive analysis was conducted, to obtain a summary about the respondents' demographic characteristics by using the response means, frequencies, and standard deviations. Then, the data were analysed by using the Partial Least Squares (PLS) method, with SmartPLS 2 software, which involved measurement and structural model to testing the proposed research hypotheses. The results of the present study support the conventional views of the effect of PEOU and PU as independent variables on the PT in Online banking. The study also provided insights into the role of PEOU, PU, and PT in predicting the intention to use online banking among Jordanian customers of commercial banks in the city of Irbid, which is the second largest city in Jordan. The results if the present study provided evidence of the role of trust in increasing participants' level of PEOU in accessing online banking. However, PEOU was not found to predict Jordanians' intention to accept and use online banking. Finally, PT was found to play or act as a partial mediator between PU and ITU. This is an indication of the part of impact of PU on ITU assumed or taken by PT. Thus, the results reported in this study can be valuable for policy makers, banking sectors and financial practitioners in improving the usage of online banking services among Jordanians.

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