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Go Cashless! Mobile Payment Apps Acceptance in Developing Countries: The Jordanian Context Perspective

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Abstract: Despite the expanding global usage of mobile phones in money transactions, the adoption of mobile payment systems in Jordan remains slow. This study employed the technology acceptance model (TAM) to identify the factors with a potential impact on mobile payment systems acceptance. The impact of perceived privacy (PP) and the mediating function of perceived certainty (PC) on the behavioral intention (BI) of mobile payment systems among Jordanian ministries were examined. Data obtained from 270 respondents were analyzed using partial least-squares structural equation modeling (PLS-SEM). The empirical findings show a positive link between perceived usefulness (PU) and PC on the BI of mobile payment systems. The mediation analysis demonstrated that PC partially mediated the association of PP with the BI of mobile payment systems. The final section concluded the paper by presenting the key theoretical and practical ramifications, as well as the research's limitations and future directions.

Keywords: digital payment; cashless; mobile payment; mediation analysis; technology acceptance; perceived certainty; PLS-SEM; TAM

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1. Introduction

A direct association between mobile payment technology and increasing sustainability, reducing digital waste, and bringing socio-economic development has been reported and discussed in the previously published literature [1,2]. By means of financial inclusion, mobile payments have brought socio-economic development by expanding the outreach of formal financial services among the less-privileged consumer segment, offering traditional and value-added services via cell phones [3]. Similarly, for banking institutions and other financial service providers, such as Fintech, mobile payment technology has diminished the need to deploy expensive auto teller machines (ATMs) and point of sale (POS) terminals, thus reducing digital waste and sustainable energy usage.

Today, rapidly developing mobile technologies and their apps allow banking and payment transactions to be carried out using mobile phones [4,5]. Meanwhile, there has been a significant increase in the number of smartphone users; by the end of 2021, there were about 14 billion mobile device users globally. This number was expected to reach 18.22 billion in 2025 [6]. In the Jordanian context, reports showed that the number of active mobile connections had reached 8.23 million, which was equivalent to 81% of the country's total population [7]. Clearly, technological advancements in mobile payment systems bring numerous advantages, including a one-click payment solution to simplify the tracking of small expenses, 24/7 payment anywhere using mobile phones, and, most importantly, secure transactions [8,9].

In June 2014, the Central Bank of Jordan (CBJ) introduced a simple technical solution for all parties by condensing the numerous links into a single link. This was to enhance the bill payment services provided by some banks and payment service providers. These solutions speed up and simplify invoice examination and payment collections through all banking channels in Jordan, including bank branches, ATMs, phone banking, Internet banking, mobile phone payments, and payment kiosks [10]. Therefore, by minimizing the reliance on paper money for the settlement of payments, these systems have helped to achieve efficiency and security, provided the right financial environment, and decreased transaction costs for a wider segment of users [11].

In essence, mobile payment systems, also referred to as m-payment systems, are "a means of payment through using mobile technology, whether by the customer using his account at the bank or by opening an e-wallet account at a payment service provider" [12]. These systems offer brand new and secure ways for instant electronic payments and ways for users without a bank to withdraw cash from ATMs, along with various mobile services on all NFC-enabled point-of-sale devices [13,14]. Additionally, m-payment systems can reduce transaction costs and save time and labor [10]. Among the other advantages of these systems, these include greater access to financial information, improved user interaction, and a quicker way to send SMS messages regarding financial transactions [9]. Furthermore, without having to deal with bank employees physically, the systems can assist users in managing their day-to-day tasks and carrying out financial transactions. Hence, customers can make purchases using smart devices wherever they are, via Wi-Fi, 4G LTE, near-field communication (NFC), radio frequency identification (RFID), or Bluetooth [15].

In this respect, the lack of certainty and trust in digital payment systems is considered to be the main impediment that prevents users from using electronic payments, causing a big psychological barricade to the acceptance of digital payment systems [11]. According to policymakers in the CBJ, the primary obstacles that prevent the expansion of mobile payment in the Jordanian context and the Arab world are said to be the weakness of financial culture and low trust among the citizens regarding the acceptance of such types of payments [10]. Other factors, such as security and privacy risks, have been cited as having an important role in impeding users from accepting mobile payment systems [9]. In this respect, with the increase in online transactions and the complications of e-payment security and privacy issues, trust has become a matter of considerable concern for many users [5]. For example, most users are afraid of technological cyberattacks and worry whether the transactions are conducted correctly using mobile payment systems [9,10]. Lastly, it is worth mentioning that spreading financial awareness, financial literacy, and building confidence are considered the key necessities of accepting mobile payment systems in the Jordanian context [5,9].

Despite some initial concerns, Jordan, like other developing countries, has been demonstrating interest in digital payment systems. In Jordan, these systems have been recently considered in research, and some of the variables that affect users' perceptions of these systems have previously been examined [8,16–18]. Notably, most earlier studies on digital payment systems, particularly m-payment systems, discussed the general aspects of the initial acceptance and decision-making of users. This has motivated us to conduct this study, to add to the related literature by taking into account the construct of perceived privacy as an antecedent of perceived certainty and the construct of users' perception towards using digital payment platforms, especially given that most m-payment systems are widespread and popular, but the systems have not generally achieved the targeted level of acceptance in developing countries compared to the developed ones, aside from it being rather rudimentary [9].

Thus, this study attempted to find the answer to the following key question: "Can a modified TAM be used to assess the acceptance of m-payment systems among public-sector employees in Jordan?" Alongside the key question, there were two sub-questions to be addressed, as follows: "Does perceived certainty (PC) mediate the association of perceived privacy (PP) with the behavioral intention (BI) of mobile payment systems?"

and "Is there a direct association between the predictors of PC, PP, perceived usefulness (PU), and perceived ease of use (PEU) in mobile payment systems?" The main objective of this study was to ascertain the usefulness of a modified TAM in identifying the factors that influence Jordanian public sector employees' acceptance of mobile payment systems. This objective was broken down into two sub-objectives, as follows: (1) to investigate the relationships between PU, PC, PP, and the PEU and BI of mobile payment systems, and (2) to look at the role that PC plays in managing the relationship between PP and BI in m-payment systems.

Banks must deal with several challenges, including the services of competitors, technical needs, user understanding, and the security of m-payment apps [19]. Meanwhile, people's increased reliance on smart mobile devices has pushed banks, service providers, and m-payment app developers to create efficient m-payment apps to make online banking more effective. Additionally, culture could affect the adoption of mobile apps [20]. Accordingly, the present study adds to the knowledge of the factors affecting the intention and, consequently, the actual use of m-payment; therefore, the results would be of value to app developers and banks in improving the m-payment app services they offer to their consumers. Therefore, knowing the potential causes for the slow acceptance of mobile banking could aid banks in accelerating the use of such technology. The Jordanian context has yet to be empirically examined in terms of m-payment-related concerns because of the early deployment and implementation stages of the technology in this country. Hence, this study attempted to close this gap by experimentally investigating the key variables affecting m-payment adoption from the perspective of Jordanian customers.

This paper is structured over several sections. It starts with an introduction related to e-payment systems, followed by an illustration of the theoretical background and the research hypotheses. The third section presents the current research methodology, while the fourth section presents the empirical results. The fifth section discusses the research results, while the theoretical and practical implications are highlighted in Section 6. Finally, the last section offers our conclusions, the study's limitations, and future research.

2. Theoretical Background and Hypothesis Development

The technology adoption theories, models, and frameworks used here are common and have been used to study the consumer's initial acceptance or pre-adoption behavior. The research in this direction is ongoing and we have considered the latest changes and developments in the field. For example, within the banking and payment sector, the Internet was previously considered the backbone of every development and deployment technology, including automatic teller machines (ATMs) and net banking. After the rapid developments seen in mobile technologies, and considering the proliferation of smart devices globally, mobile-based banking and payment solutions started emerging in various countries and the concept of "anytime, anywhere, any device" banking has become the norm.

Accordingly, mobile payment systems have been attracting substantial interest in Arabic countries, such as Jordan. However, issues associated with these systems in these countries have not been adequately explored. For example, a previous study [9] has formulated a conceptual model, based on UTAUT2, to examine the mediating impact of trust on the link between security and privacy; the BI of the mobile payment systems and the conclusion was that trust mediated the positive association between security and privacy and the BI of mobile payment systems. In another related study in the Jordanian context [5], it was found that behavioral intention toward using mobile payment systems was largely shaped by their levels of security and privacy.

In another context, a study in Indonesia, conducted by Angelina and Rahadi [20], suggested a modified framework based on the UTAUT2, which consists of performance expectancy, effort expectancy, social influence, perceived security, hedonic motivation, and relative advantage on the BI of using e-wallet apps. In another study in the Indian context [21], a proposed model was developed, based on the TAM model, to explain customers' intentions to use mobile banking. The suggested model was tested using a

survey method, with a sample of 855 bank customers from public, private, foreign, and cooperative banks in India. The results found that security, computer self-efficacy, perceived ease of use, and perceived financial cost, in that order of influence, affected customers' intention to adopt mobile banking.

In addition, contemporary research (cf. Belanche et al. [22]; Türker et al. [23]) has identified the need for conducting more studies on the adoption of mobile payment systems, including person-to-person mobile payments, to provide a detailed insight into the factors affecting consumer choices, attitude, and behavior on the adoption and usage of these digital payments in various study contexts. Especially in the case of developing countries, Türker et al. [23] used the extended TAM model to examine the acceptance of QR-based mobile payment systems and found that the key variables of the intention to use mobile payment systems are perceived trust, perceived compatibility, and perceived usefulness.

In this regard, scholars and researchers have developed different technology models to understand the characteristics of technology acceptance by users. These models have been confirmed numerous times to define their efficacy for several IT-based applications. Nevertheless, the TAM model proposed by Davis [24] so far represents the most selected and important foundation of IT acceptance and is the most frequently utilized model in numerous research papers on the topic in the sociology and psychology domains. TAM consists of two main original factors: PU and PEU, which are employed in different technological contexts [24]. However, some research studies have described concerns concerning the usage of TAM with its original factors to explain users' BI toward IT acceptance. In the context of digital payment systems acceptance, the usage intention of respondents cannot be effectively explained with only a few original TAM factors. Consequently, we expanded the original TAM model by including new critical additional factors, namely, PP and PC, based on the recommendations of Al-Okaily et al. [9] and Singh and Srivastava [21], which could affect the acceptance of public sector employees in Jordan and of digital payment systems, as represented in Figure 1.

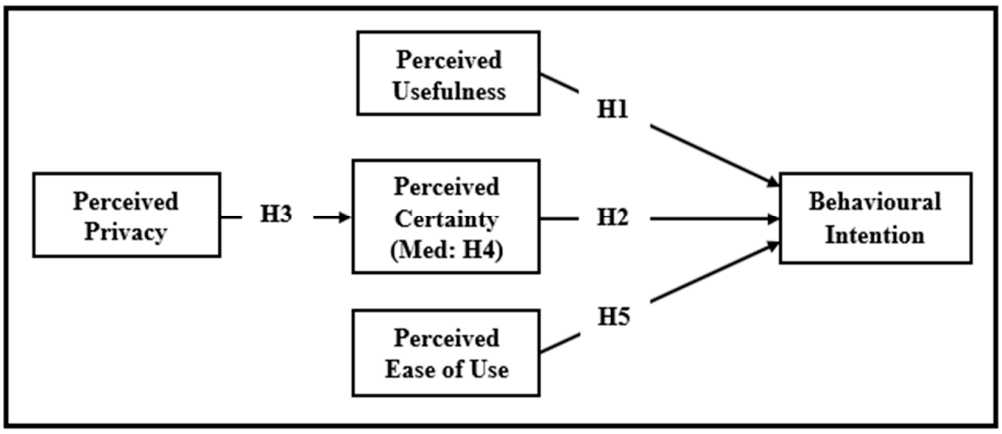

Figure 1. Research Model.

2.1. Perceived Usefulness

Perceived usefulness (PU) is the extent to which an individual is sure that the application of a given system will increase his or her job performance [24]. In this respect, the perceived usefulness component is comparable to performance expectancy, as in the unified theory of acceptance and the use of technology (UTAUT) [25]. Numerous scholars have examined the effects of PU on the BI of usage of a given system in both forced and voluntary settings, and sizable favorable direct effects have been discovered [3,5,9,26,27]. In addition, Refs. [9,28] examined the impact of PU on the BI of mobile payment systems and found that it is favorably significant in the context of mobile payment systems. The usage of mobile payment systems will, therefore, be widely accepted by employees if they believe that doing so will improve their job performance. Therefore, the following hypothesis has been suggested:

H1: *BI of mobile payment systems is positively affected by PU.*

2.2. Perceived Certainty

Perceived certainty (PC) is a crucial feature that substantially influences users' acceptance of new payment methods, according to earlier studies on mobile payment systems. Perceived security, dependability, the amount of authority that users have, and the standing of the company that offers the system—all have an impact on users' confidence or trust in any digital payment network [29]. Theoretically, trust has been shown to partially mediate the relationship between perceptions of and decisions to use mobile payment systems; therefore, the mediating role of PC in the relationship between the PP and BI of mobile payment systems would be worth the scrutiny [9]. When the elements were examined in the context of consumers' acceptance of mobile payment systems, various earlier research avenues in the field of mobile payment systems indicated that the relationship between confidence and trust and BI was positive [30]. However, some earlier investigations showed no connection between certainty and trust [31]. The current study was motivated by inconsistent results in the evaluation of PC as a direct and indirect association in a different setting, such as in the Jordanian environment. Therefore, the study suggested the following hypotheses:

H2: *The BI of mobile payment systems is positively affected by PC.*

H3: *The PC of mobile payment systems is positively affected by PP.*

H4: *The PC mediates the association between PC and BI of mobile payment systems.*

2.3. Perceived Ease of Use

Perceived ease of use (PEU) is "the degree to which users believe that adopting a certain system will be free of effort" [24]. In the UTAUT model [25], there is a performance expectancy component that is similar to the perceived ease of use factor in the context of the present study. Meanwhile, several past research studies in the field of mobile payment systems have confirmed a favorable association between PEU and BI in the use of new technology [32,33]. In the context of this study, it was anticipated that Jordanian public sector employees' perceptions of the minimal effort required to utilize mobile payment services would result in a higher BI of doing so. Thus, based on a review of the published literature, the following hypothesis was proposed:

H5: *The BI of mobile payment systems is positively affected by PEU.*

3. Research Methodology

This study's objective was achieved using a quantitative technique to test the relationship between TAM components and additional variables, namely, perceived privacy and perceived certainty, and public sector employees' inclination to utilize Jordan's mobile payment system. The database of the Jordanian Department of Statistics provided the sample list that was used in the current investigation. The report estimated that there were roughly 222,672 public sector workers in Jordan [9]. In Jordan, the majority of ministry offices are located in Amman city (23), and this study is focusing on them. The main reason for giving the survey to employees who are working in the Jordanian ministries is due to the fact that they had stable incomes and most, if not all, had smartphones. Having a stable income means that these respondents have stable and likely high purchasing and payment power while having smartphones means that they have the necessary tools for mobile payment usage. Furthermore, these respondents represent a large sector of Jordan's labor force; therefore, the outcomes were likely to have good generalizability. Hence, these reasons have motivated us to choose employees from this public sector. Owing to time and cost restrictions, non-probability sampling with a purposive sampling technique was employed in sample selection.

Taking into account all of these factors and a measurement error of 5%, the final sample consisted of 404 employees [33]. The number of returned surveys was 318, but only 270 were suitable for analyses, giving a response rate of 67 percent overall. In terms of measurement, it is essential to construct the measured items in order to meet the study questions and objectives. The literature study serves as the foundation for creating the measuring items for the research instrument. Accordingly, this section outlines the processes involved in developing the measurements needed to answer the research questions and accomplish the research objectives. The questions of the survey were created based on preliminary data regarding how well-liked information system models were, as described in the literature. However, this approach was implemented to ensure that the questionnaire was understandable and to confirm the precision of the tool and the data gathered.

Ten participants, who represented the academic domain, participated in the content validity test. These participants were experts in accounting and the accounting information system and were somewhat knowledgeable in information technology and mobile payments. The length, format, and language of the items were all aspects on which the experts were asked to comment. Some adjustments were made, based on the feedback from the experts, resulting in a survey instrument with sufficient accuracy. The scholarly literature served as the basis for the English translation of the survey instrument. In this regard, the variables and components that have been explored in numerous prior studies were utilized to assure the convergent and discriminant validity of the research model. For instance, Refs. [24,25] both employed identical items to test the primary TAM components of the PU, PEU, and BI of the mobile payment systems. Three items from [34] on perceived privacy were analyzed, while three questions from [35] were used to measure perceived certainty.

Arabic is Jordan's official language, and so, the use of a questionnaire in Arabic will ease the respondents' comprehension of the items, because Jordanians are Arabic speakers in general. However, since the survey items were adapted from past studies that employed the English language, the items were also originally in English. Notably, using the native tongue of the target population throughout the data-collecting procedure would allow the researcher to obtain more insightful information. However, there was little Arabic-language literature available that offers the same kinds of investigations as this study. Hence, the current study used the back-translation method recommended by Brislin [36] for questionnaire translation, in order to minimize any potential effects that might arise from the opposite side's cultural and linguistic differences.

Many academics have employed the 7-point numerical scale for data collection in the information systems domain because it offers a wider variance among the measures and a much wider variety of alternatives [37–39]. A seven-point scale's key benefit is its ability to pick up on subtle changes between respondents [40]. Therefore, all questions in this study were measured using a seven-point Likert scale, which spanned from "strongly disagree" to "strongly agree" (e.g., "1" strongly disagree; "7" strongly agree). The seven-point Likert scale was chosen in this study to measure the replies, since social science research and information systems frequently use this scale. In addition, the scale allows respondents to rapidly provide their answers to the items. The study findings were broken down into five categories, namely, perceived utility, perceived certainty, perceived privacy, perceived ease of use, and behavioral intention of the mobile payment systems. The respondents' demographic characteristics are shown in Table 1.

It should be noted that the user's actual use (the user's behavior, in the context of a genuine user) was not considered in this study because mobile payments are new in Jordan, and so, their usage is still limited [5]. Hence, this study examined the non-users' intentions to use mobile payment systems instead. Notably, some employees did not partake in the survey because they perceived it as time-wasting, while some had insufficient knowledge of mobile payment systems. Indeed, the researchers faced some difficulties in conducting the survey.

Table 1. Respondent characteristics.

Category	Coding	Frequency
Gender	Male	143
	Female	127
	Total	**270**
Age	Less than 30	54
	30–40	138
	41–50	61
	More than 50	17
	Total	**270**
Education Level	Bachelor's	155
	Master's	42
	PhD	11
	Others	62
	Total	**270**
Duration of Mobile Phone Use	Less than 3	23
	3–6	56
	7–9	46
	More than 9	145
	Total	**270**
Duration of Internet Use	Less than 3	38
	3–6	59
	7–9	52
	More than 9	121
	Total	270
Mobile Payment System Use Status	User	22
	Non-User	270
	Total	**292**

4. Evaluation of the Model Quality for PLS-SEM

To test the hypotheses using the current study's suggested model, PLS-SEM was used. The main reason for applying PLS-SEM in this study is due to the fact that PLS-SEM avoids the concerns of a small sample size and has less strict assumptions of normality distribution and error terms [41]. With respect to sample size, there is no agreement among the researchers and scholars about it; and yet, Hair et al. [42] assumed a number of 200 to be ideal. The sample size of the current study is 270, which is considered appropriate for using PLS-SEM. Therefore, the sample size used for the analysis satisfied the adequacy of the analysis and the generalizability conditions.

Typically, the PLS model is examined and interpreted in two steps [41,42]. To confirm its validity and dependability, the measurement (outer) model is validated at the first stage. Confirmatory factor analysis is used to assess the measurement features of multi-item constructs, including convergent validity, discriminant validity, and reliability (CFA). The structural (inner) model is examined at the second stage by calculating the path coefficient using bootstrapping to test the research hypotheses [41,42]. Additionally, PLS can be used with models that have a high level of complexity, a complex structural model, and numerous interactions between constructs [41]. PLS-SEM fitted the present study's model to produce precise predictions, and so, the PLS-SEM measurement (outer) model and structural (inner) model were both evaluated, as discussed in the following sections.

4.1. PLS-SEM Measurement Model

4.1.1. Convergent Validity

Convergent validity concerns the level to which a measure constructively correlates with the various measures of similar constructs [41]. The variance inflation factor (VIF) in this context assesses the variance recapitulated by the indicators relative to measurement

error; it must be more than 0.50 to justify the factor's use [42]. Additionally, internal consistency reliability assesses how consistently an instrument's components measure the expected outcomes for a particular construct [39]. In order to assess the dependability of the internal consistency, two primary statistics were used; namely, composite reliability and Cronbach's alpha are used. However, composite reliability (CR) is seen to be more effective in assessing the internal consistency's reliability, particularly for PLS-SEM users. Therefore, CRs with threshold values of 0.70 and higher were adopted [41]. All of the results, as indicated in Table 2, were satisfactory and fell within the advised range.

Table 2. Item loading, Cronbach's alpha, CR, and AVE.

Construct Name	Item Name	Item Loading	Cronbach's Alpha	CR	AVE
		>0.70	**≥0.70**	**≥0.70**	**≥0.50**
Perceived Usefulness	PU1	0.810	0.813	0.761	0.757
	PU2	Deleted			
	PU3	0.839			
	PU4	0.848			
Perceived Ease of Use	PEU1	Deleted	0.892	0.912	0.865
	PEU2	0.874			
	PEU3	0.943			
	PEU4	0.920			
Perceived Privacy	PP1	0.904	0.881	0.901	0.708
	PP2	0.890			
	PP3	0.880			
Perceived Certainty	PC1	0.893	0.938	0.947	0.872
	PC2	0.951			
	PC3	0.925			
Behavioral Intention	BI1	0.931	0.945	0.961	0.845
	BI2	0.948			
	BI3	0.952			
	BI4	0.947			

4.1.2. Discriminant Validity

Discriminant validity entails "the degree to which a construct is actually unique from other constructs by empirical standards" [41]. Accordingly, this study employed three methods in discriminant validity evaluation, namely, the Heterotrait-Monotrait ratio of correlations (HTMT) [42], the Fornell and Larcker method, and cross-loadings [41–43]. As the HTMT criterion is sufficiently sensitive and specific in spotting discriminant validity problems, a threshold value of 0.90 should be used [43].

Fornell and Larcker's technique and cross-loading approach are the other two methods for evaluating the discriminant validity of conceptions [44]. To measure the discriminant validity, as declared in Tables 3 and 4, control of the AVEs for all factors and cross-loadings for all items were made. In the tables, the values in bold and the grey-shaded areas represent the AVEs for all constructs and cross-loadings.

Table 3. HTMT—Fornell and Larcker criteria.

Construct	HTMT < 0.90	PC	PEU	BI	PU	PP
PC	Yes	**0.881**				
PEU	Yes	0.613	**0.946**			
BI	Yes	0.535	0.597	**0.931**		
PU	Yes	0.686	0.663	0.690	**0.785**	
PP	Yes	0.471	0.425	0.504	0.525	**0.907**

Table 4. Discriminant validity—cross-loadings.

Item	PC	PEU	BI	PU	PP
BI1	0.594	0.524	**0.943**	0.631	0.480
BI2	0.642	0.593	**0.955**	0.677	0.501
BI3	0.545	0.536	**0.941**	0.628	0.455
BI4	0.605	0.594	**0.934**	0.661	0.458
PEU2	0.578	**0.964**	0.587	0.654	0.418
PEU3	0.557	**0.954**	0.510	0.598	0.356
PEU4	0.602	**0.940**	0.590	0.626	0.424
PU1	0.580	0.460	0.577	**0.820**	0.466
PU3	0.610	0.476	0.594	**0.839**	0.446
PU4	0.502	0.647	0.511	**0.798**	0.353
PP1	0.433	0.383	0.448	0.491	**0.895**
PP2	0.448	0.419	0.439	0.449	**0.930**
PP3	0.420	0.330	0.452	0.454	**0.955**
PC1	**0.891**	0.520	0.669	0.669	0.485
PC2	**0.904**	0.550	0.635	0.689	0.491
PC3	**0.912**	0.494	0.506	0.534	0.366

Each latent factor's connection with other factors in the theoretical model utilized in the study should be higher when looking at the cross-loading, the factor loading indicators, and the square root of AVE, with the condition that the values of factor loading are higher than 0.70 [41]. The results show that all values for the square roots of the AVEs were larger than the correlations between the components, proving the discriminant validity of the model. As a result, having the majority of the components in the path model has no discernible discriminant validity, as seen in either analysis.

This study employed a table of chi-square statistics' threshold values to establish the empirically best values. The value was established at 34.350, as it was associated with the study's 18 measurement items (at level 0.01). In order to denote the beginning and end of all variables, a new "response" variable was added to the SPSS Excel spreadsheet—this step was proposed by [41]. The Mahalanobis distance (D2) can be computed with simple linear regression analysis. In this regard, the newly produced response number becomes the dependent variable, while all measurement items except those of the demographic factors become the independent variables. Utilizing MAH 1 as a new output, the new Mahalanobis distance (D2) output and the chi-square value were compared.

Based on the MAH 1 output, 4 cases appeared to be outliers—their MAH 1 was larger than the cutoff value of 34.350 (see Table 5)—therefore, these cases were excluded from the dataset. Hence, the finalized number of observations for the PLS analysis was 270. As mentioned earlier, the present study achieved a 67% response rate.

Table 5. Outliers' Cases.

No.	Case No.	χ 1 Value
1.	244	44.872
2.	129	43.570
3.	141	38.981
4.	123	35.481

4.2. PLS-SEM Structural Model

By using the PLS algorithm and the bootstrapping technique, the structural suggested model was tested in the second step of the PLS-SEM study. Notably, even when the path coefficients in PLS-SEM are highly significant, the preceding hypothesis should be rejected if the routes are not significant or if they exhibit indications that are contrary to the expected direction [41]. On the other hand, significant pathways observing the hypothesized track lend empirical support to the suggested causal relationship. In order to generate average

errors and achieve the t-statistic shown in Table 6, the researchers set 5000 of re-sampling data with a spare bootstrap case number that is equal to the initiative sample number (270).

Table 6. Results of the research model.

No.	Relationship		Standard Beta	T Value	*p*-Value	Sig.	Decision
	IV	DV					
H1	PU ——> BI		0.216	2.901	0.007	Sig. +	Supported
H2	PC ——> BI		0.221	3.534	0.000	Sig. +	Supported
H3	PP ——> PC		0.113	3.805	0.003	Sig. +	Supported
H4	PP -> PC -> BI		0.321	7.436	0.000	Sig. +	Supported
H5	PEU ——> BI		0.055	0.282	0.019	N.S.	Not supported

5. Research Discussion

This study created a research model to investigate the variables affecting mobile payment systems' BI. The correlations between PU, PC, PP, PEU, and BI of mobile payment systems were examined using PLS-SEM. The questionnaire was used to gather the data, and 270 usable responses were analyzed using PLS to examine the generated model. Figure 2 illustrates the support for all presented hypotheses with the exception of PEU on BI of m-payment systems. It was clear from the outcomes that the use of mobile payment methods by Jordanian public sector employees appears to be mostly driven by PC. Likewise, the outcomes demonstrated that PC moderated the impact of m-payment systems' PP and BI. The current section is devoted to discussing the study's findings and its empirical results.

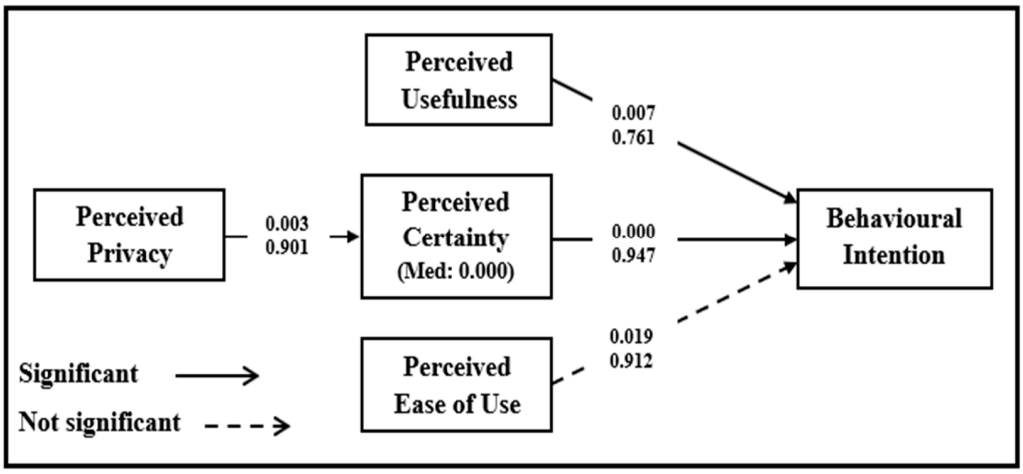

Figure 2. Results of the research model.

First, H1 was endorsed because the empirical results offer compelling evidence concerning the impact of PU on BI of m-payment systems. This shows that users who performed their jobs well had a high BI for using mobile payment methods. As a result, Jordanian consumers were most influenced by their opinions of the value and expected advantages of utilizing m-payment systems. This result was consistent with the TAM results [24]. Additionally, the findings of this study were consistent with current information systems literature [18,28] which shows that raising PU will lead to a risen BI for the use of mobile payment services.

The second hypothesis contends that the PC and BI of m-payment systems are positively correlated. The findings demonstrate that PC considerably and positively contributes to the business intelligence of mobile payment systems, supporting H2. This shows that Jordanian users with high levels of trust were more likely to use m-payment system services. In a similar vein, trust has undergone extensive testing and has been found to be a crucial success element in the acceptance of mobile technologies [9].

Hypothesis 3 of this study, delineating the function of PP in m-payment systems was supported. This means that Jordanian public sector employees will find the use of m-payment systems more comfortable if they feel secure about their personal information transfer. Relevantly, Refs. [5,9] also reported the positive impact of perceived privacy on perceived certainty and the use of BI to employ mobile payment services. For employees, feeling very confident regarding the privacy offered by the mobile payment systems will motivate them to use the systems.

Hypothesis 4 claims that the connection between the PP and BI of mobile payment systems is mediated by perceived confidence. From the findings of this study, it appears that among Jordanian public sector workers, PC somewhat mediated the relationship between the PP and BI of m-payment systems. This suggests that the perception of privacy may indirectly influence the propensity to utilize mobile payment systems through the perception of certainty. Thus, this result was consistent with earlier studies' results that trust mediates the relationship between privacy and the choice to use mobile payment systems in the Jordanian setting [9].

Finally, since the results showed no discernible association between the PEU and BI of m-payment systems, H5 was not supported. This result may be explained by the employees' perception that using mobile payment systems is difficult and needs more effort. As a result, PEU had no influence over Jordanian users' choices on the use of m-payment systems. Hence, the prediction of the TAM model on H5 outcome was not reliable. Several related studies [18,39], suggested that there was no meaningful connection between PEU and BI in the use of mobile payment services.

6. Research Implications

6.1. Theoretical Implications

The theoretical ramifications of applying TAM to Jordan's mobile payment ecosystem are still unclear. Furthermore, very few studies attempted to use TAM to explain why mobile payment systems were so well-liked in the Middle East. Determining the significance of TAM and its new connections in the adoption of mobile payment systems among the Jordanian employees of public sector enterprises was the aim of the current study. New variable components, namely, perceived privacy and perceived certainty, were added to TAM in the proposed models. These variables have been described as crucial in improving the payment transactions of employees. Additionally, the model enables the CBJ administrations and policymakers to concentrate on the aspects that affect workers' decisions to accept and use mobile payment systems in a Jordanian context.

It is interesting to note that the empirical findings of this study provided additional support for TAM, within the context of the developing nations. In this study, the perceived certainty component was found to have a mediating impact on the link between perceived privacy and behavioral intention, despite the report of its non-mediation effect on behavioral intention in some of the earlier investigations. The most noteworthy contribution of this study to TAM is its demonstration that behavioral purpose and perceived certainty both significantly affect perceived privacy and are identified as the new drivers of BI. Considering that it demonstrates that previously overlooked and crucial factors have an effect on IB in the context of mobile payment, it may be claimed that this study offers an important theoretical implication.

6.2. Managerial Implications

The current study addresses a number of important issues that have emerged in light of its practical implications. The study also enables decision-makers to close the gap when only a small portion of Jordan's total population actively uses mobile payment services. This study intends to widen the gap between the high penetration rate of 87 percent and the approximate 5 percent acceptability of mobile payment systems by helping policymakers understand the important factors that contribute to the low acceptance rate of Jordanians of mobile payment systems. This study will benefit Jordan's economic system by boosting

the GDP. Additionally, this research will help decision-makers comprehend the critical elements that will raise living standards, increase job opportunities, reduce poverty, lower the cost of producing paper money and the hazards associated with money transportation, as well as decrease the likelihood of human mistakes [11].

The encouraging results of the current study give managers knowledge about how to explain continuance intention. These conclusions contain recommendations for businesses and mobile payment developers to support users' intentions to keep using the systems. Furthermore, developers of mobile payment apps should devote more resources to their work, in order to prevent system failure and improve their apps' infrastructure. In fact, system failure could harm users' intentions to keep using their systems. A user-friendly interface might also be added to the apps, as this could boost usage. Additionally, trust is crucial because it influences how likely users are to utilize the apps.

7. Conclusions, Limitations, and Future Research

In conclusion, the research findings primarily demonstrate that PU and PC have a significant and positive influence on the BI of mobile payment systems among Jordanian ministries, with PC being the most influential factor in these systems' acceptance. As a result, most of the postulated hypotheses were accepted. On the other hand, the results demonstrate negligible correlations between the PEU and BI of the acceptability of mobile payment systems. Hence, the linked hypothesis was not supported. The data also demonstrated that PC was considerably and favorably impacted by PP, supporting the theory. Recent research results have supported the notion that PC partially mediated the relationship between PP and the BI's decision to use mobile payment systems. This conclusion relates to the mediating effect of PC, as given in the research model. As a result, a hypothesis on the impact of trust on mediation was accepted.

Many emerging economies' primary ICT financial tool is mobile technology [45]. Smartphones offer millions of people around the world quick access to banking, affordability, and security [46]. With the first mobile banking app, individuals without a bank can manage their accounts. Additionally, individuals can have access to their accounts from anywhere at any time. In undeveloped nations, mobile financing can help with socioeconomic growth, and there appeared to be a correlation between mobile devices and the GDP of developing nations [47]. A mobile payment platform can also aid in the growth of underdeveloped nations' economies [48,49]. In several developing nations, including Iraq, Kenya, and Iraq, the government has demonstrated efforts in providing the citizens with government-to-person payment through mobile technology [50]. This allows the government to pay salaries and wages and increase the system transparency. Additionally, the system has improved the effectiveness of tax collection. In underdeveloped nations, the expansion of the mobile finance industry will bring other benefits.

It is interesting to note that the current research also demonstrates the importance of perceived certainty in determining whether mobile payment solutions are accepted. Notably, only a few studies have looked into perceived certainty and how the acceptance of m-payment systems is related to it. Future research could therefore concentrate on these issues and consider how perceived security, perceived privacy, and perceived severity relate to the acceptance of m-payment systems indirectly (e.g., through mediating or moderating effects). Secondly, spreading financial awareness is considered critical to the acceptance of mobile payment app services. In fact, the current level of awareness of digital services among Jordanian citizens is still limited, resulting in citizens not adopting such apps. Consequently, future work could focus on the role of spreading financial awareness and its effects on mobile payment via app services acceptance [5,51,52].

Last but not least, it is important to note the challenges encountered when delivering the questionnaires in some ministry offices, as some managers refused to permit their staff to take the necessary time to complete the questionnaires. Additionally, some employees refused to devote their time to responding to the queries, while others declined to respond because they had insufficient expertise in mobile payment systems. Therefore, despite

the efforts taken to achieve solid and accurate results, many difficulties were encountered during the data collection procedure.

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