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## E-Payment Adoption in Saudi Arabia

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## E-Payment Adoption In Saudi Arabia

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### ABSTRACT

*Internet technology has influenced banking systems because of its capability to enhance the performance of financial operations. Several factors influence the adoption of new technology within the financial industry, namely the customers' Perception of Benefit, Quality, Ease of Use, Security, Self-Efficacy, and Trust. However, various cultures and geopolitical issues influence technology adoption and are worth further study. This paper focuses on the factors that influence the behaviors of Saudi Arabians and their adoption of e-payment systems. It reports new research that distinguishes and investigates the key issues that impact the population in Saudi Arabia regarding the use of electronic payment. Results show that perceived benefit, ease of use, security, trust, and self-efficacy are associated with e-payment adoption. Quality is relatively not crucial to Saudi Arabians. Furthermore, according to the stepwise regression, employment status and self-efficacy are the best predictors for using e-payment systems.*

### Keywords:

e-payment, online banking, Saudi Arabia, international commerce, technology adoption, TAM, Technology Acceptance Model, self-efficacy

## INTRODUCTION

The increasingly connected online business and its supporting payment systems have become an economic mainstay as the world becomes. The introduction of e-commerce and e-payment systems has changed the way financial business is transacted worldwide, enabling business transactions to evolve from paper-based to electronic forms. The new technology provides users with greater convenience, speed, and security (Premchand & Choudhry, 2015). This is especially evident in many countries where infrastructure, political, geographical, or cultural barriers have hindered new technology adoption (Jeffus et al., 2015; Chen et al., 2019). As a result, many developing and newly developed countries are seeing rapid rates of e-payment adoption (Hamdi, 2011).

Saudi Arabia's eCommerce revenues continue to increase and have a significant impact on the global online transaction industry, according to the Statista Digital Market Outlook. In 2020, VISA Inc. reported a sharp increase of 14% globally in e-commerce from January to September, most likely due to COVID-19. Capitalizing on this growth and to enhance social distancing, VISA pushed its tap-to-pay transaction method resulting in a 65% penetration growth outside the United States. VISA also expanded its relationships with digital wallet commerce ecosystems like STC, the market leader in digital wallet services in Saudi Arabia (Kelly, 2020). Saudi Arabia had an \$8B e-commerce revenue in 2021, ranking it 27<sup>th</sup> globally. This was a 17% increase from 2020, and continued growth is expected over the next several years. The five most significant e-commerce segments in Saudi Arabia are fashion (32%), Electronics & Media (32%), food and personal care (21%), toys, hobby and DIY (10%), and furniture and appliances (5%). The online market penetration in Saudi Arabia is 69%, meaning 69% of all Saudi Arabians have made online purchases in 2021 (The eCommerce market", 2022).

However, previous literature suggests that e-commerce adoption research in non-western cultures is limited (Masihuddin et al., 2017; Sabou et al., 2017; Chen et al., 2020; Nadler et al., 2019; Ellis et al., 2021b; Ladkoom and Thanasopon, 2020). This study explores this gap in the research by investigating e-payment usage in a less or newly developed country like Saudi Arabia. We provide a brief review and definition of e-payment, plus an overview of the e-payment adoption literature and its roots in technology adoption. This discussion will be followed by the research hypotheses, study methodology, analysis, and conclusions.

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## LITERATURE REVIEW

### *E-Payment Defined*

Electronic payment systems have been the subject of significant attention from researchers and information system designers during the last two decades due to their vital role in modern electronic commerce. These varied research perspectives have led to comprehensive and in-depth views on how e-payment should be defined. For example, Dennis (2004) describes an e-payment system as a form of financial commitment that involves the buyer and the seller facilitated via electronic communications. Whereas Briggs and Brooks (2011) view e-payment as a form of interconnections between organizations and individuals aided by banks and inter-switch houses that electronically enable monetary exchange. From another perspective, Peter and Babatunde (2012) defined an e-payment system as any form of fund transfer via the internet. Similarly, Adeoti and Osotimehin (2012) state that electronic payment refers to an electronic means of making payments for goods and services procured online or in supermarkets and shopping malls. Kaur and Pathak (2015) define e-payment as payments made in an electronic commerce environment in money exchange through electronic means (Kaur and Pathak, 2015). More recently, Chen and colleagues (2018b) defined e-payment as the transfer of funds electronically from a payer to a payee through an e-payment platform that enables customers to access and manage their financial transactions through an electronic network. For this paper, we will be using the definition by Chen and colleagues (2018).

### *Technology Adoption*

The Theory of Reasoned Action (TRA) proposed by Fishbein and Ajzen (1975) and the later Theory of Planned Behavior (TPB; Ajzen, 1991) serve as the theoretical foundation for many studies on the adoption of new technology. These models assert that a person's pre-existing attitudes, and behavioral intentions influence user behavior, whether to accept or reject a new behavior. Further, the TPB proposed that the user's attitudes, expectations of essential others (i.e., subjective norm), and perceived user control over the behavior influence an individual's intent to adopt that behavior (Ajzen, 1991).

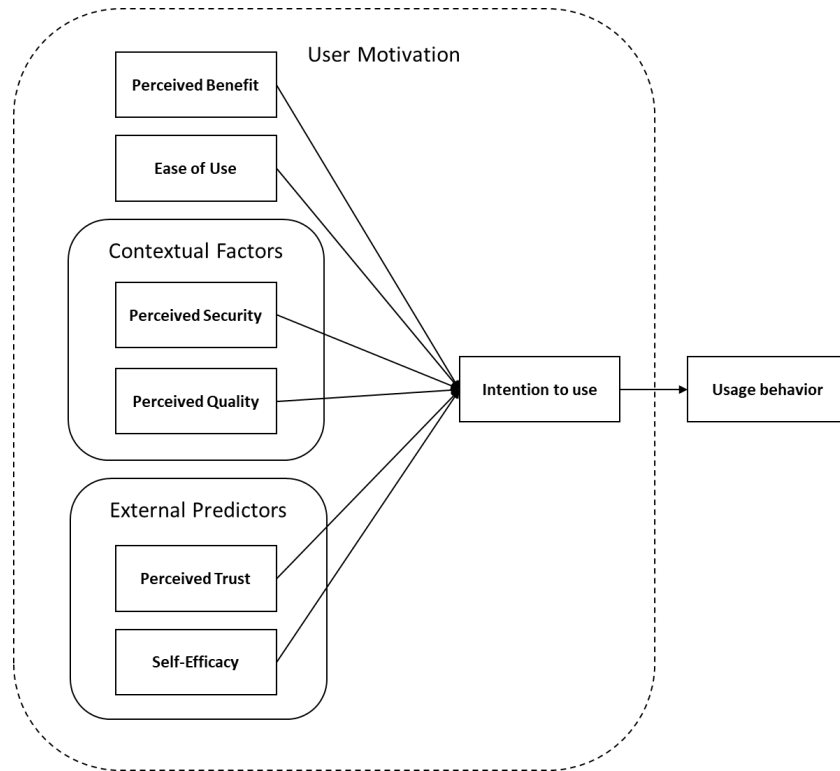
The TRA and TPB are general behavioral models. In the information systems field, the technology acceptance model (TAM; Davis, 1989) was derived from the TRA model to specifically describe technology adoption.

While retaining the relationship between attitude, intention, and actual behavior seen in the TRA, the TAM introduced perceived ease of use and usefulness as antecedents of a user's attitude toward new technology. These new constructs focused on how the characteristics of the technology impact the user's intentions.

These same technological constructs are also crucial for e-payment adoption (e.g., Ellis et al., 2021b). The TAM may be better suited to predict the adoption of a software package or specific technology since it does not include social aspects like subjective norms found in TRA and TPB (Abrazhevich, 2004). It would appear that a blend of these two theoretical backgrounds is necessary for the investigation of e-payment adoption.

### ***Model Development***

Our model utilized modifications to TAM reviewed by Marangunić and Granić (2015). We focus on six factors when examining the intentions and behaviors of using a technology like e-payment systems. These factors are perceived benefit, perceived security, perceived ease of use, perceived trust, perceived quality, and self-efficacy. Perceived security and perceived quality are contextual factors related to e-commerce ecosystems. Perceived trust and self-efficacy can best be described as external predictors of actual e-payment use. The two remaining factors, ease of use and perceived benefit, are our model's remaining constructs (Fig 1).

**Figure 1. Modified TAM Model**

Our dependent variable, actual usage behavior, has a single measure, namely, “how much money an individual spends each month via e-payment.” The following section describes the hypothesis developed for each of the six factors.

### ***Hypothesis Development***

#### ***Perceived Benefit***

Chou et al. (2004) identify benefits as a significant driver for e-payment systems acceptance and use. Gerrard and Cunningham (2003) view perceived economic benefits to include fixed and transaction costs in adopting e-payment. Fixed costs refer to the costs of installing payment equipment such as card readers and payment software, while transaction costs are those incurred by customers and merchants each time they carry out a business transaction (Chou et al., 2004).

Vendors typically bury these costs in the total cost of a transaction, for example, by including a slight markup in a product's price to cover the cost of providing e-payment services.

The benefit of the user of e-payment systems is the increased transactional efficiency experienced. This effect of perceived benefits on use has been applied in many studies (e.g., Vinitha and Vasantha, 2017a; Teoh et al., 2013; Pei et al., 2015). Based on the support provided, the following hypothesis is proposed:

H1: Perceived Benefit is positively related to e-payment usage.

### ***Perceived Security***

Security may be defined as protecting the details of transactions and customers' personal and financial information from internal and external fraud/criminal usage. Since consumers possess different experiences and expectations, they may adopt different attitudes towards the security of online transactions. Some may be afraid to make transactions online, fearing their privacy to be violated. Security is then one of the main concerns for customers who use e-payment systems (Guan and Hua 2003, Peha and Khamitov 2004, Linck et al. 2006). Schierz et al. (2009) found that perceived security affects the use of e-payment systems in Germany. Ramayah et al. (2005) found that perceived risk affect indirectly and negatively intention to use the e-payment system in Malaysia. Perceived security and risk were also found to be statistically significant with e-payment intentions in the United Arab of Emirates (UAE) (Salloum et al., 2019), in Indonesia (Sfenrianto, 2015), as well as other countries (Alalwan et al., 2017; Mehrad et al., 2016; Sinha and Mukherjee, 2016; Nasir et al., 2015). Based on this review of the literature, the following hypothesis is provided:

H2: Perceived Security is positively related to e-payment usage.

### ***Perceived Ease of Use***

Perceived Ease of Use (PEOU) can be defined as the difficulty users encounter when using a particular system (Davis, 1989). Past research consistently suggests that customers are less likely to adopt e-payment systems that they feel are overly cumbersome or complex (GAO, 2005; Truong and Jitpaiboon, 2008). Tella (2012) argued that ease of use will incur would a user's level of satisfaction and further affect the usage of e-payment. Vinitha and Vasantha (2017b) found that perceived ease of use was the most effective predictor of payment use in India. Hence, the following hypothesis is provided:

H3: Perceived Ease of Use is positively related to e-payment usage

### ***Perceived Trust***

A high level of user confidence and trust in an e-payment system contributes to the successful adoption of e-payment systems (Kurnia and Benjamin, 2007). Without customer trust, it would be extremely difficult for an e-payment system to gain widespread usage. The trust factor was found to be statistically significant in Arab culture (Rouibah, 2012). Kim al.2010) found that both perceived security and perceived trust affect the use of e-payment systems in Korea. It was found that customer trust is involved in e-payment usage in Nigeria (Gholami et al., 2010). Similarly, it was found that perceived trust was an essential factor for e-payment usage in the United States. (Carter and McBride, 2010; Schaupp and Carter, 2010). For a study in the United Arab of Emirates (UAE), it wasthereo relationship between trust and e-payment intention (Salloet al.al., 2019). Trust was also important in Traffic ViolationKuwait's Traffic Violation E-payment System (TVEPS) llah, 2014). Therefore, consumers' perceived trust in e-payment systems is defined as consumers' belief that e-payment transactions will be processed by their expectations (Tsiakis and Sthephanides, 2005, Mallat, 2007, Lin et al., 2011). This definition then provides the basis for the following hypothesis.

H4: Perceived Trust is positively related to e-payment usage.

### ***Perceived Quality***

Perceived Quality has been variously defined as the degree to which a person believes that using a particular system will require little effort and that it will enable them to complete their intended task more effectively (Dastan and Gurler, 2016; Chin and Ahmad, 2015. Past research had also demonstrated that when users holreased perceptions of quality when they find that a system is easy to learn and manage. This research has also found that users are more likely to be satisfied and perceive that there is a reduction in the risk associated with mobile transactions as perceptions of quality increase (Liao, Shi, and Wong, 2012; Zhou, 2011; Lorenzo-Romero, Constantinides, and Alarcon-del-Amo, 2011). Thus, the following hypothesis is provided.

H5: Perceived Quality is positively related to e-payment usage.



### *Self-Efficacy*

Self-efficacy can be defined as "judgments of how well one can execute courses of action required to deal with prospective situations" (Bandura, 1982). Bandura (1986, 1997) suggests that the perception one has of their capabilities to perform a task will increase the likelihood that the task job is completed successfully.

In a study conducted in Kuwait, it was found that internet experience was a significant variable affecting e-payment adoption (Khaili and Nasrallah, 2014). Self-efficacy was not a significant factor in the Japanese e-payment usage study, but it was identified as a predictor of e-payment adoption in the Ivory Coast (Chen et al., 2020; Chen et al., 2018b). It is relatively more important for explaining e-payment adoption behavior in less developed countries. Therefore, based on this, we propose the following hypothesis:

H6: Perceptions of Self-Efficacy (SE) are positively related to e-payment usage.

## **RESEARCH METHODOLOGY**

### *Survey Instrument and Data Collection*

This study selected six constructs: perceived ease of use, perceived trust, perceived security, self-efficacy, perceived quality, and perceived benefit. The measuring items for the constructs used were based on a previously published paper (Teoh et al., 2013). Since all selected scales had been reviewed and published before, adequate reliability and validity were assumed.

The instrument consisted of a survey given to a convenience sample of Saudi Arabian citizens via the Saudi students currently studying at a mid-sized university in the central United States. The survey consisted of questions on demographic and behavioral items as well as administrative items such as location (latitude and longitude of IP addresses). The survey was translated into Arabic and reviewed by a panel of five Saudi students to ensure its validity. Respondents used a cell phone or computer to fill out the online survey that was Qualtrics. The survey was available during the Fall of 2016 and the Spring of 2017. About 520 surveys were collected, of which 498 were complete.

### *Respondent Demographics*

Table 1 shows the demographic profiles of study respondents. The mean age of respondents was 30.64 years old, with a standard deviation of 10.48 years.

The largest age group was found to be old with 145 (29.1%) respondents. Regarding working status, there were 209 (42.0%) working full time and 57 (11.4%) working part-time. Approximately 38.3% were students at least part-time, and the remaining 54.8% were non-students. Our sample contained 248 males (49.3%) and 236 females (47.6%). Gender distribution was found to be fairly equal.

**Table 1. Demographic profiles of respondents**

<b>Variables</b>	<b>Frequencies</b>	<b>Percentage</b>	<b>Mean</b>	<b>S.D.</b>
<b>Age*</b>			30.64	10.482
15-20	61	12.2		
21-25	145	29.1		
26-30	88	17.7		
31-35	42	8.4		
36-40	44	8.8		
41-45	37	7.4		
46-50	33	6.6		
51-55	9	1.8		
56-60	6	1.2		
61 and over	5	1.0		
<b>Missing</b>	28	5.6		
<b>Total</b>	498	100		
<b>Work Status**</b>			.49	.47
Full-Time	209	42.0		
Part-Time	57	11.4		
Not Working	215	43.2		
<b>Missing</b>	17	3.4		
<b>Total</b>	498	100		
<b>Student Status***</b>			.35	.44
Full-Time	130	26.1		
Part-Time	61	12.2		
Non-Student	273	54.8		
<b>Missing</b>	34	6.8		
<b>Total</b>	498	100		
<b>Gender</b>			.49	.50
Female	236	47.4		
Male	248	49.8		
<b>Missing</b>	14	2.8		
<b>Total</b>	498	100		

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\* Original data was collected as integer values.

\*\* Working full-time = 1, part-time = 0.5, not working = 0.

\*\*\* Full-time student = 1, part-time = 0.5, non-student = 0.

We collected data on six constructs. These include user perceptions of *Benefits*, *Trust*, *Security*, *Ease of Use*, *Quality*, and *Self-Efficacy*. To assure the reliability of each construct, we conducted a Cronbach's alpha analysis using SPSS.

The number of items, alphas, means, and standard deviations of six constructs are presented in Table 2. Some items were dropped from the final constructs to improve the alpha values (to enhance the reliability of the latent construct measurements). Alphas are above seven that assure the reliability of each construct, and since all questions are adopted from previous studies, validity is also assumed.

**Table 2. Cronbach's Alpha for Perception Constructs**

	# of Items	Alphas	Mean	Standard deviation
Perceived Benefit	5	.758	3.627	.619
Perceived Security	4	.715	3.673	.644
Ease of Use	5	.887	3.793	.766
Perceived Trust	5	.820	3.307	.724
Perceive Quality	4	.856	3.482	.729
Self-Efficacy	7	.824	3.596	.647

The dependent variable for all six hypotheses is a monthly expenditure via e-payment systems, the most direct measure of usage. Usage was measured by asking how much money individuals spent on an e-payment system. The majority of respondents (57.4%) spend less than \$200, with 142 (28.5%) spending less than \$100 and 144 (28.9%) spending between \$100 and \$200. Using mid values for each bounded income group, we found the mean monthly expenditure was \$346.06 with a standard deviation of \$594.15 (Table 3). This relatively high standard deviation occurs because a small amount, of 20 respondents (4.0%) spent a great deal of money per month.

**Table 3. Frequency and Descriptive Analysis of E-Payment Usage (Monthly Expenditure)**

<b>Ranges</b>	<b>Frequencies</b>	<b>Percentage</b>	<b>Mean</b>	<b>S.D.</b>
<b>Money Spent Monthly</b>			346.06	594.15
Less than 100	142	28.5		
101–200	144	28.9		
201–400	94	18.9		
401–800	51	10.2		
801–1200	18	3.6		
1201–2400	7	1.4		
More than 2401	13	2.6		
<b>Missing</b>	29	5.8		
<b>Total</b>	498	100		

\*Midpoint values used for capped ranges

Some demographic variables were found to be correlated. For instance, age is negatively associated with student status, making sense since younger people are most likely to be students. There is also a negative correlation between gender and working status which means that males are more likely to have a full-time job than females. Working status and student status are negatively related, which means that a full-time student is less likely to be working full-time.

Regarding e-payment behavior, gender and working status were associated with monthly expenditure via e-payment. Males spent more money via e-payment than females. Also, people with full-time or part-time employment were more likely to spend more money than those who did not work. Student status was found to have no statistical relationship with e-payment behavior. Age was also found to be insignificant among Arabians in this study. This result is consistent with a study in Dubai (Najdawi et al., 2019), in which generation cohorts were insignificant. Age cohorts did not have an impact among different generations (X, Y, and Z) regarding digital payment in Dubai, UAE. In another study that age groups did not affect the adoption of digital wallets in India (Mavale et al., 2020).

**Table 4. Pearson Correlation matrix**

	1	2	3	4	5	6	7	8	9	10	11
1 Age	1										
2 Gender	.137**	1									
3 Work	.248**	-.327**	1								
4 Student	-.532**	-.091*	-.415**	1							
5 Benefit	-.207**	-.182**	0.07	.127**	1						
6 Self Efficacy	-.131**	-0.085	0.041	0.048	.441**	1					
7 Trust	-.118*	-.215**	0.09	.095*	.612**	.489**	1				
8 Security	-0.089	-0.075	0.059	0.016	.585**	.550**	.655**	1			
9 Ease Of Use	-.212**	-.113*	0.013	.112*	.506**	.536**	.564**	.573**	1		
10 Perceive Quality	-.122**	-.122**	-0.017	.116*	.498**	.538**	.581**	.518**	.557**	1	
11 Money Spent	0.008	-0.062	.138**	-0.001	.127**	.130**	.148**	.107*	.099*	0.071	1

\*Significant at .05 level

\*\* Significant at .01 level

Table 4 shows the Pearson correlations for the tested variables. The six latent constructs exhibited statistically significant correlations among themselves at the .01 level of significance. This result is similar to studies conducted in China (Nadler et al., 2019) and Japan (Chen, 2020). For the analysis in Cote D'Ivoire, it was found that benefits/ease of use, trust/security, and perceived quality are statistically related. But self-efficacy is not statistically associated with these constructs (Chen et al., 2018b). These findings are consistent with a similar study conducted in UAE (Najdawi et al., 2019). However, the perceived quality of the e-payment system does not associate with the e-payment system.

We conducted a stepwise regression analysis since the independent variables were strongly correlated (Table 5). The regression model is statistically significant with an F value of 6.402 with  $p < .01$  and with an R-square of .037, which means that the model can explain 3.7% of the variance of the dependent variable. The prediction equation found that employment status and self-efficacy are the two unique variables that best describe the monthly expenditure via e-payment. This result is also similar to the study in the Ivory Coast, where only employment status was the significant predictor in the regression analysis (Chen et al., 2018b). Studies in China (Nadler et al., 2019) and Japan (Chen et al., 2020) also resulted in self-efficacy not being statistically significant in the regression analysis.

**Table 5. Regression Analysis Results**

<b>Independent Variables</b>	<b>Unstandardized B</b>	<b>t-value</b>	<b>Significant Level</b>
Constant	-220.814	-1.271	.204
Employment Status	135.271	2.875**	.004
Self-Efficacy	156.952	2.530**	.012
R square	.037		
F-value	6.402		

## CONCLUSION

Four demographic variables – age, student status, employment status, and gender – were used to assess the impact on e-payment use. Six primary latent constructs identified from TAM, TRA, and other references were also used to examine the effects on e-payment behavior in Saudi Arabia. These constructs are perceived benefit, perceived trust, perceived security, perceived ease of use, perceived quality, and self-efficacy. A Pearson correlation analysis was used to examine the relationships between these variables. Stepwise regression was conducted to find the best predicting model of e-payment use in Saudi Arabia.

According to the Pearson correlation analysis, working status and gender were two demographic factors associated with e-payment monthly expenditures. Males are more likely to spend more money via e-payment than females. People who are working are more likely to spend more money than those who are not working. Income level could potentially be strongly associated with employment status. It was not measured here because of the difficulty in getting reliable self-reported income information using a survey. Age is found to have no relationship with e-payment usage. One possible reason was the average age of the sample was heavily concentrated on the younger generation (30 or younger). This finding is consistent with previous studies conducted in India (Mavale et al., 2020) and UAE (Najdawi et al., 2019).

For Saudi Arabians, five of the six latent constructs were significantly correlated with e-payment expenditure. Perceived benefit, trust, security, ease of use, and self-efficacy are all statistically significant. The perceived quality of the e-payment system does not affect the usage of e-payment in Saudi Arabia. It appears that traditional TAM, TRA, and other investigated constructs apply to e-payment use in this country (except for the perceived level of quality). This finding is consistent with another study conducted in UAE (Najdawi et al., 2019).

Due to the strong correlations among the independent variables, a stepwise regression was used to reduce the noise from multicollinearity. We used stepwise regression to find the best predictors of e-payment use among the four demographic variables and six constructs. The regression identified two variables – employment status and self-efficacy – as significant in predicting use. Typically, age is a broader socio-economic variable that is associated with a person's technology efficacy, income, and education. In this study, self-efficacy and employment status were identified as two predictors from the stepwise regression, but age was insignificant. Again, an overly young sample without a good representation could be a potential problem.

This study has some limitations that can be improved in future research. This study used the convenience sampling procedure. As a result, the sample was skewed in favor of younger respondents. The largest age group represented was the 21- to 25-year-old group, with 29.1% of respondents. Other large groups include 26- to 30-year-olds (17.7%) and 31- to 35-year-olds (8.4%). These age groups are at the core of the Millennial generation (Dimock, 2019) and comprise more than 50% of the total sample. A more inclusive sampling procedure is recommended to ensure the respondent pool represents people of different and diversified backgrounds.

Data on the income level of respondents would also be helpful. Combining income data with spending data would allow future researchers to examine spending as a percentage of income. Higher incomes likely contribute to higher levels of e-payment use since those individuals have more disposable income. However, there is no way to determine that relationship without the income data.

Countries around the world (e.g., Japan (Ministry of Economy, Trade, and Industry, 2018)) are beginning to encourage the use of e-payment systems over cash because of the transactional efficiencies. If the government and business community in Saudi Arabia want to promote e-payment use, it appears the most critical factors to consider are employment status and self-efficacy. It is not difficult to understand that a person who has a full-time job is likely to spend more money via e-payment than someone working. However, computer literacy levels are also important since they contribute to users' perception of their self-efficacy with e-payment systems. How to educate people to prepare them to use e-payment systems is one major challenge to be faced in promoting e-payment systems in Saudi Arabia.

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