

Ontology of Protection Motivation Theory on Digital Risk–A Systematic Literature Review

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Abstract: The world of technology is advancing at a breakneck pace. There is no doubt that the convenience of this technology simplifies and expedites everything. The services made available with digitization technology are vast to start with, such as government services, online sales, e-learning, e-banking and many more. Among the areas of importance that shall be highlighted via this article would be any routines involving digital payments. The availability of digital payments facilitates the buying process, business transactions, and bill payments, among other things. Risks related to digital payment usage shall be accelerated if individuals lack experience, disclosure, and much more information related to the procedure of digital payments itself. Not to mention, the risks of cyber security hacking which also on the rise courtesy of the increasing usage of digitalized technology per se. As a result, risks that occur will negatively affect the public's perception, trust and confidence. Simultaneously, this will impact the economic environment, business, and society. As a result, precautionary behavior among customers shall be studied rather than technology acceptance. The protection motivation theory (PMT) shall be adopted for this study since it is well-suited to identifying users' adaptive behavior towards the usage of technology as well as determining whether or not they are aware of the risks associated with the relevant technology involved. The study uses the method of Systematic Literature Review using 11 extant studies to evaluate the protection behavior of digital payment risk.

Keywords: *Digital payment, cyber risk, protection behavior, protection motivation theory.*

1. Introduction

The breakneck pace in 1995 when the internet was introduced to the world and the surreal changes it represents influence all aspects of human life is profoundly astounding. The internet has undoubtedly grown staggeringly over the last several decades, causing crucial changes in society, business, and technological systems. Based on the Malaysia Cyber Security report, Internet users in 2020 will be 88.7%, up from 87.4% in 2018 (MKN, 2019). This shows the encouraging numbers who used the internet as a main matter in their daily activities.

The importance of digital payment cannot be denied especially to the government and financial institutions which will certainly have serious implications for the sustainability of the global economy holistically. As digital technology has been embraced in a significant manner nowadays, it certainly reflects significantly on the economic growth of all countries including Malaysia. The digital economy has boosted Malaysia's economy as emphasized by (Morgan, 2020), especially during the Malaysian Control Order (MCO) in Mac 2020 whereby increased the internet users for education, remote working situations, and related business activities. The services made available with digitization technology are government services, online sales, e-learning, and e-banking among many others. The availability of digital payments facilitates the selling and buying process, business transactions, and bill payments. It is reported that online purchases in 2020 are increasing due to the pandemic event where people take caution by staying at home and buying online (Khazanah Report, 2020). Hence, digital payments such as online banking and electronic wallets get more attention and popularity (Sartiges et al., 2020). Hence, the level of user acceptance of digital payment is increasing staggeringly and provides a tremendous effect on the digital section.

According to Rohiman (2020), any behavior change is highly influenced by the current surroundings. Digital payment is associated with both potential risks and opportunities. Wong & Mo (2019) posited that the technological advancement environment rather than user safety will influence an individual's behavior. The adaptive behavior of digital payment is highly influenced by their knowledge, beliefs and hold on. As more people know digital payment gives more advantages and relies on the security emphasized by the financial

providers thus they tend to make purchases and pay bills online. At the same time, digital risks such as internet fraud and data breaches are also on the rise.

It has to be mentioned that all digital operations involve a technological component (Jansen & van Schaik, 2018). Alsaad & Al-Okaily (2021) said that human decision-making is influenced by the dangers and threats they are aware of. In addition to that, about 49.8% of online users are feeling uncertain or insecure while using the internet (Malaysian Communications and Multimedia Commission, 2020). However, despite the feeling of insecurity, most people are unaware of the digital risk and potentially are at risk whilst using it (Medeiros et al., 2020) which led to the increasing number of using digital payments resulting in fraud risk (Afridi et al., 2021). Interestingly, according to Afridi et al., (2021), studies on the security of digital transactions are still scarce, especially during the pandemic season. This study therefore set out to assess the parameters involving the whole issues related to security and precaution from previous journals related to PMT towards digital risks.

2. Theoretical Background

Most of the studies concerning technology usage and technological advancement revolve around the acceptance of the related issues and adopting related theories such as UTAUT, TAM and DOI to gain a clearer version of it. However, it mostly provides variables concerning security and technology partially and it lacks parameters involving the whole issues related to security and precaution. According to Rogers (1975), most of the theories mentioned above had been focused on the technologies themselves rather than explaining the individual response towards the risk or threat associated with them (Alsaad & Al-Okaily, 2021). This paper is focused on the Protection motivation theory (PMT). PMT is frequently used to study health behavior. According to Westcott et al. (2017) "any hazard for which the individual can carry out an effective recommended reaction". The goal of PMT is to determine an individual's beliefs that drive them to decide in a stressful situation. A complete assessment of threats needs to be carried out to recognize the protection motivation action (i.e., whether people take protective activities against prospective hazards) including perceived severity (the feeling that a thing will have severe consequences).

Jansen & van Schaik (2018) highlighted that PMT is very useful in identifying the cognitive response that mediates the individual adaptive behavior toward the digital risk while they face their associated risk. In the same vein, in his study, (Kuhlicke et al., 2020) also note the same. Tsai et al. (2016) also stated that PMT is one of the most powerful explanatory theories for predicting protective action intention. PMT was established by having four (4) constructs perceived vulnerability, severity, response efficacy, response cost, and self-efficacy. These constructs have a possible effect on the intention to take adaptive behavior (van Bavel et al. 2019). The outcome shall analyze, evaluate, and recognize the protective measures taken to avoid the threat (Rogers, 1975, Afridi et al. 2021, Chen et al. 2017) vulnerability (perceived likelihood) and fear arousal (assessing how much fear has been evoked as a result of perceive (Wong & Mo, 2019). Perceived severity and vulnerability reflect on how serious an existing risk is perceived to be and perceptions of how susceptible an individual is to the existing threat respectively. In this study, the adoption of the four PMT elements namely the perceived severity is used to assess the feeling toward knowledge of digital payment benefits and risk related to the impact of digital payment service quality, while the vulnerability shall refer to the habit or activities with digital payment. Response efficacy on the other hand caters to an individual's belief that it a recommended in engaging certain behaviors that will effectively avert a threat. Self-efficacy is a person's expected capability to perform a recommended coping behavior (Yoon et al., 2012). Response cost refers to all perceived costs associated with protective measures or actions, including both monetary and non-monetary costs (e.g., effort, time, and inconvenience).

Research Questions

This digital payment literature is discussed to recognize the adaptive pre-caution behavior among the users. The analysis focused specifically on investigating, the following research questions; -

RQ1: What are the demographics of the present studies of adaptive behavior on digital payment adoption including the sample of the study, number of years and the variables?

RQ2: What is the construct used in the existing studies of adaptive behavior on digital payment risk?

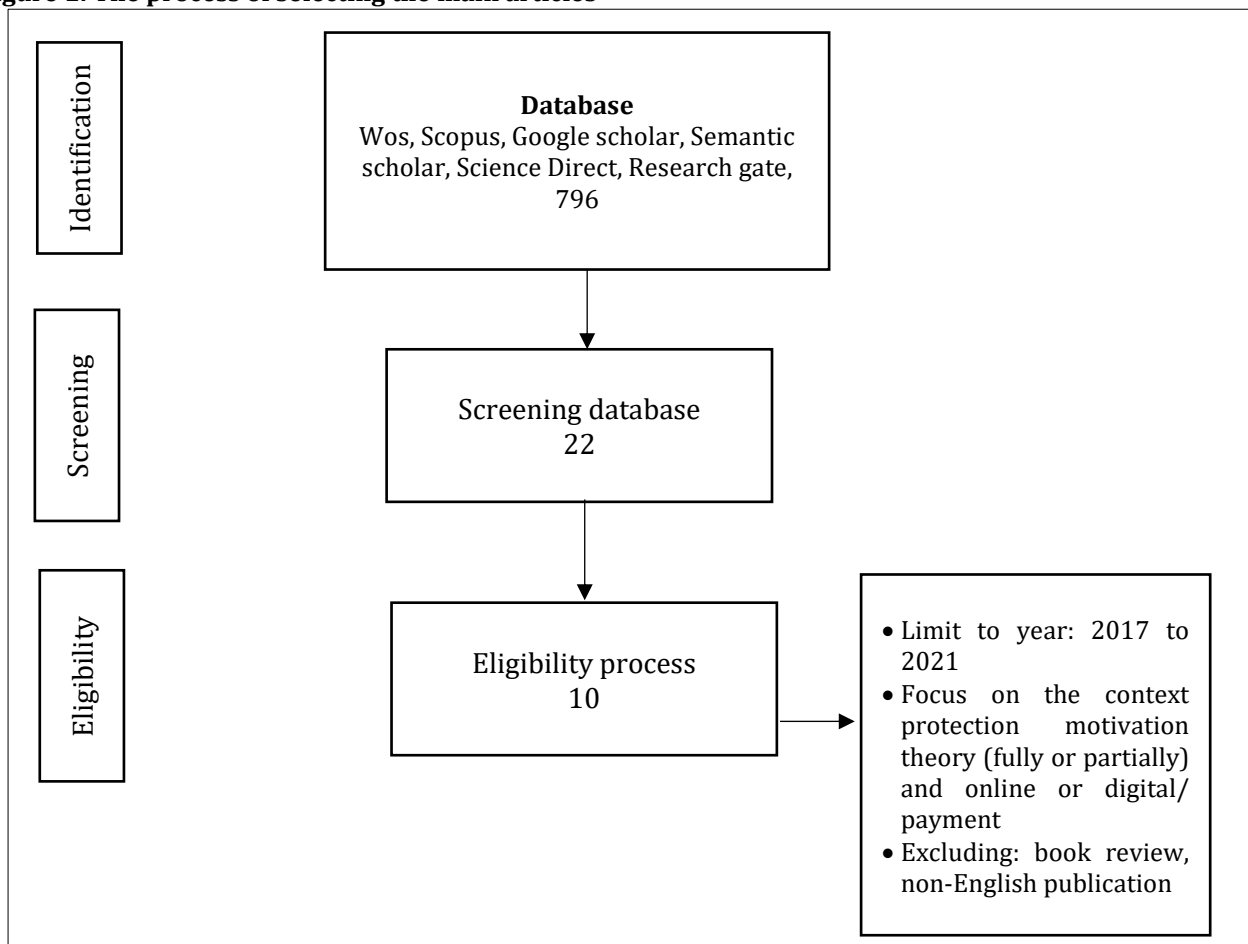
3. Research Methodology

This study used the Preferred Reporting Items for Systematic Reviews and Me-ta-Analyses (PRISMA) guidelines. There are a few stages or processes involved. This is to ensure all the findings are guided based on the limitation adjustment for the study. Identification, analysis and interpretation of all available evidence related to a specific research question can be verbalized via the Systematic Literature Review (SLR). To meet our research objectives and to address the research questions, we carried out an SLR to study the adaptive behavior toward digital payment risk. SLR is known to improve the likelihood of generating a clearer, more objective answer to research questions. As SLR considers study design (sampling strategy and data collection methods), data and analytical methods used, the reviews are effective at gauging the robustness of evidence. The use of the SLR procedure enabled the study to obtain an overall conclusion regarding the relationships between individual self-efficacy and IS security adoption.

This study is guided by the research question "What are the main demographics and constructs for adaptive precaution behavior among the users? The main purpose of this study is to explore the areas of past study in the context of protection motivation theory and digital payment or digitization. In the literature search, this study has used databases or digital libraries including Web of Science, Semantic Scholar, Google Scholar, Science Direct (Elsevier), DOAJ and Emerald Management Xtra. There are two (2) processes involved in the article selection in this study. The first process is the process of identifying the database to adaptive precaution behavior. The second is database screening and the eligibility of an article according to the main objective.

Among the keywords are: "Protection motivation theory" AND "Digital money" "Protection motivation theory" AND "Digital payment" Protection motivation theory" AND "online banking" "Protection" AND "electronic payment", "precaution" AND " Digital payment" The search of articles ranged in between year 2015to 2021, and the details of each article are shown in the Figure 1.

Figure 1: The process of selecting the main articles



The preliminary search yielded 668 articles that involve all the context and construct. Hence, this study inclusively limits by excluding all the studies that are not related to protection motivation, digital or online payment. After the process of screening and assessing the eligibility, about 22 articles were chosen to fit in.

The criteria for SLR were:

C1: The articles must be an empirical study that used protection motivation theory.

C2: The results of the studies related to digital payment risk.

The C1 will be manually scanned and only focus on an empirical study of the protection motivation theory on digital payment risk and exclude any articles out of context and construct. C2 meets all the criteria examined the adaptive behavior (actual behavior) will evaluate the sample, year, experience and age of the user.

Research Themes

The process of reviewing studies entails analyzing the content of each selected article. The content analysis can be classified into six broad dimensions: theoretical basis, number of years, variables, location, sociodemographic characteristics, methodological perspective, and result variables of interest. We conducted a statistical analysis using frequencies and percentages to combine and summarize the variables collected.

Distribution of Studies by Year

Table 1 shows the literature distribution by publication year of the studies. Data from the SLR shows the adaptive behavior of digital payment adoption literature from 2015 to 2021. Table 1 shows that from 2015 to 2022 research on the protection motivation theory and online payment had been focused. It showed a varied number of papers produced. For 2021, the number of studies is high compared to other years because the Coronavirus happened globally and the attention to contactless payment was high.

Table 1: Distribution studies by year.

Year	No. of studies
2015	1
2017	1
2018	2
2019	2
2020	1
2021	3
2022	1
TOTAL	11

Sampling

For the unit of analysis, the majority of the paper was researched on an individual basis with the varieties of numbers of sample size. Table 2 shows the sample size for ten papers while one conceptual study highlighted the importance of conducting a study on PMT and digital payment areas. Based on the pattern of the studies, it can be summarized that the fluctuation numbers in the sample size seemed to follow the population. It provided various values of results that match with the concurrent issues and problems.

Table 2: Sampling

Sample Size	No. of Studies
0-100	2
101-200	-
201-300	1
301-400	2
401-500	2
501-600	2
601-700	-
701-800	-
801-900	-
901-Above	1
TOTAL	10

Socio-demographic

Social demographics shall focus on gender, age, and level of education. The highest percentage that used digital payment are female due to their characteristic of shopping and buying a thing. Young people are potential digital adopters since they are more tech-savvy and comfortable with payment methods (Wei et al., 2021). While Baby boomers are inexperienced with digital payment (Fatokun et al., 2019). Despite having social media experience, they were hesitant to use it owing to a lack of expertise. However, Medeiros et al., (2020) & (Fatokun et al., 2019) Noted that young people are most susceptible to falling for cybercrime since they lack information inexperience and expertise.

Variables

The variables used that had been adopted under this study vary by their preference and setting. As below mentioned, the variables have been used to identify the individual’s adaptive or maladaptive behavior toward digital payment risks and the country involved in the study using PMT and digital payment: -

Table 3: Variables

No.	Title	Construct				
		Vulnerabilities (V)	Severity (S)	Response cost (RC)	Response Efficacy (RE)	Self-efficacy (SE)
1.	Testing A Model of Precautionary Online Behaviour: The Case of Online Banking	/	/	/	/	/
2.	User Awareness Design for Electronic Money User Using Protection Motivation Theory and NIST 800-50 Framework	/	/	/	/	/
3.	Determining Factors and Impacts of The Intention to Adopt Mobile Banking App in Cameroon: Case of SARA By Afriland First Bank	/	/			
4.	Consumer Preference for Adopting Online Payment Methods-The Influencing Role of Consumer Trust, Self-Efficacy and Satisfaction Among Urban Indian Adults in Bengaluru					/
5.	Investigating Maturity of Mobile Commerce Adoption: A Qualitative Study					
6.	The Effects of Protection Motivation and Perceived Innovation Characteristics on Innovation Resistance and Innovation Acceptance in Internet Primary Bank Services	/	/			/
7.	Adoption of Online Retail Banking Practices as A Precautionary Protective Behavior During the Covid-19 Pandemic	/	/		/	
8.	Security Behaviour of Mobile Financial Service Users					/
9.	Studying Safe Online Banking Behaviour: A Protection Motivation Theory Approach	/	/	/	/	/

10.	The Mediating Role of Perceived Security on The Relationship Between Internet Banking Users and Their Determinants	/	/	/	/
11.	Security Risk Tolerance in Mobile Payment: A Trade-off Framework	/	/	/	/
12.	Evaluating the sustainable use of mobile payment contactless technologies within and beyond the COVID-19 pandemic using a hybrid SEM-ANN approach	/	/	/	/

4. Discussion and Conclusion

SLR has been used to identify adaptive behavior by using the Protection Motivation theory (PMT). There are significant gaps in the prior literature that were identified during a systematic review of the selected studies. The gaps in knowledge related to the know-how and the accompanying areas for further research are highlighted in this research. The use of PMT and digital payment will show the right direction in the study. The results of the research according to the publication by year, the beginning of the publication in 2017 have been selected for this study. This is because digital technology first became popular in 2010, therefore, it is more appropriate to study the behavior years after that.

Studies involving the adaptation of behavior on digital payment risks have been conducted on different groups such as individuals, organizations, and across the country. This is to identify to what extent the adaptation of safe behaviors that use this PMT theory according to the group type can be valued by the factors that influence the behavior. Numerous studies use individuals in assessing safe adaptive behaviors. Based on the sample size, the target sample (respondents) varies from 300 - 1,200 respondents. The numbers normally influence the accuracy and reliability of the data.

PMT's construct is deemed to be fully or partially used which suits the aims of studies. A study used security rather than a main construct to measure the effect adoption of mobile commerce due to users' concerns about the safety of data transmission and storage, and privacy while transacting wireless. The additional constructs proposed such trust, perceived risk, perceived cost, fear, and emotion. As a result, the use of constructs is required based on the feasibility of the studies as well as the ability to measure the protection behavior of the users. Several studies indicate that a practitioner, financial provider, or fintech organization should prioritize security education and training, as well as increasing user perception of the use of digital payments. This is critical for gaining the trust and satisfaction of the user. Positive experience, awareness, and government support will influence adaptive behavior among the user (Ojo et al., 2022).

As for the conclusion, the study of PMT and digital payment risk as the basis underlying theory has been accelerated ever since the COVID-19 implication in early 2020. However, the issue of security in digital payment remains the strongest drawback and it could contribute to the declining number of users if this issue is not been addressed effectively in the future (Sahi et al., 2022). Therefore, reviewing the pattern of studies on behavior adaptation with related issues will help in understanding the individual perception and belief toward the usage of digital payment risks. For future research, researchers could review from different angles of digital payment such as the usage of debit or credit card or e-wallet. Most of the paper focused on quantitative research, thus it's suggested to have qualitative research on PMT and digital payment studies. In addition, the adoption on another theoretical basis shall also encouraged.

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