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The Shift Towards Digital Finance: Drivers, Barriers, and Security in Mobile Payment Systems

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Abstract
In today's scenario the role of mobile payment and electronic payment systems (MPS and EPS) is increasing at a fast pace and MPS and EPS are quickly becoming an integral part of an economy. This paper focuses on the existing literature in the field of MPS and EPS and brings forward information which is most relevant and useful for the scholars and academicians working in this area. In this field of MPS and EPS, there are many theories and models of technology adoption which have been given by various researchers and some of them are as follows: Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), Diffusion of Innovation theory (DIT), and Information Systems Success (ISS) models. Apart from the aforementioned theories and models there are many more such theories and models. This paper attempts to summarize various determinants of adoption of MPS and EPS, which includes perceived usefulness (PU), ease of use (EOU), trust, and perceived security (PS), alongside barriers for adoption of MPS and EPS such as privacy risk (PR), infrastructure limitations, and socio-cultural resistance. In summary, this paper encapsulates future scope of research for scholars, academicians, and policymakers and attempts to add to the existing literature in the subject of secure and sustainable adoption of MPS and EPS.
Keywords: Mobile payments; Electronic payments; Digital payments; Online payments; Digital money.

Introduction

This paper encapsulates the latest and existing literature in the field of MPS and EPS. Further, this study focuses on the adoption behaviours, theories and security mechanisms which have been explored in various studies in the field of MPS and EPS. This paper further highlights the existing trends, prevailing gaps and various future research directions given in the extensive literature related to MPS and EPS.

As research work on MPS and EPS has surged progressively since the last few years because digital finance continues to gain significance in international economic operations. Digital literacy has a vital role in equipping stakeholders with the capability to recognise and mitigate risks (Yazdani et al., 2023).

Review of Literature

Study done in 2022 by Migliore et al., explores the differences in MPS adoption of two nations China and Italy by conducting a study that examines the factors which influence adoption and hurdles that affect adoption.

The research article in the year 2020 by Liébana-Cabanillas et al., explores the motivations of Indian population to use MPS, in the pre-existing market. The authors formulated a theoretical framework and tested it through a structural equation modeling on a survey data drawn out of India. They conclude that innovativeness, perceived ease of use (PEOU) have favourable impacts on PU of MPS whereas stress influences it negatively. Additionally, PU, perceived satisfaction, perceived trust favourably impact intention to use MPS, whereas PR has a negative influence. Despite government initiatives promoting cashless transactions and digital payments in India (Anthony et al., 2019), adoption rates remain relatively low compared to developed economies.

The study done in 2018 by Chhonker et al., summarizes with systematic review and citation analysis of scholarly articles on the use of mobile commerce (MC) technology between the years 2008 and 2017. To establish a pattern in terms of MC adoption research, the authors analyzed 184 peer-reviewed articles, published in 86 journals. Using network analysis techniques including association rule mining and community detection, they identified that TAM and UTAUT were the most commonly used theoretical frameworks. The major constructs that shaped user adoption were PU, PEOU, social influence / norm, attitude intention, performance expectancy (PE), and effort expectancy (EE) and facilitating condition. The analysis revealed co-authorship networks and highlighted researchers with significant contributions to the field. The study also mapped the evolution of MC applications being studied, from early focus on basic MC and mobile banking to more recent interest in mobile wallets, mobile e-governance, and mobile learning. This research provides valuable insights for understanding the theoretical landscape of MC adoption and identifies directions for future research.

As per the investigation by Jiaxin Zhang et al., (2019) , they arrived at the conclusion that the growth of MC is because of use of mobile banking services, and they highlighted the significance of PS elements from the viewpoint of customizable design and user acceptance for lasting utilization of the technology. Further on, it establishes the groundwork for more investigation on the impact of a sense of security on behavioral intentions of users and suggests that researchers consider how perceived security affects other post-adoption behaviors. This study also establishes the groundwork for further research into how users' behavioral intentions are affected by perceived security.

The study by Abdullah & Naved Khan, (2021) obtained fifty six published papers distributed across forty four international refereed journals through their complete literature research along with bibliometric evaluation to understand mobile payment better. Since 2014 the research literature on mobile payments continued to grow and American authors dominated the field according to Abdullah and Naved Khan. The data demonstrates that mobile payment research continues to speed up because of its rapid adoption.

This academic paper by Johnson et al., (2018) investigates the factors affecting MPS adoption through the lens of DIT. The authors develop and test a model that incorporates PEOU, relative advantage, visibility, security concerns, PR, ubiquity, and trialability as factors influencing consumer intention to use MPS. Using data from survey of 270 respondents collected through Mechanical Turk, they found that EOU, relative advantage, visibility, and PS directly and positively influence adoption intentions. Additionally, perceived ubiquity and trialability positively impact PS, while PR negatively affects security perceptions. Importantly, out of all the respondents almost half of them identified themselves as current MPS users, which pointed towards a potential shift towards mainstream adoption. The article adds to the comprehension as to how consumers transition from entrenched payment methods to MPS and offers useful understanding for service providers on how to address security concerns and communicate benefits to drive adoption.

Talwar et al., (2020) examines how preliminary trust levels impact the process of MPS adoption and sustained use of mobile wallets. The authors have designed a two-step theoretical framework which unites ISS model and Transaction Cost Economics (TCE) theory together with IT continuance model to investigate complete consumer behavioural patterns from pre-adoption through post-adoption stages. The research based on data from 954 Indian mobile wallet new users demonstrates that high information quality and quality service lead to stronger initial trust that creates positive effects on confirmation and PU. Findings established that useful features strongly influence customers to remain using mobile products. Researchers discovered that initial trust did not diminish due to uncertainty no matter how specific mobile phone wallet assets proved to be. The study reveals essential information which mobile payment providers should use to enhance both information quality and service quality because these key factors establish initial trust which drives mobile payment adoption and sustain utilization. This research creates theoretical value through its unified model which links both pre-implementation and post-implementation behavioural indicators.

A comprehensive survey of security in MPS done by Ahmed et al., (2021) reveals that despite technological advances, cash still dominates with over 90% of payments in developing countries. The authors further analyze various MPS technologies, finding SMS most widely used, followed by NFC, GSM, and QR-Code. All reviewed systems implement authentication, while other security features show varying adoption rates. The paper categorizes payment methods as account-based or token-based and identifies three primary security mechanisms: encryption technologies (symmetric and public key), authentication methods (digital signatures and certificate authorities), and firewalls. The authors also analyze security vulnerabilities through attack vectors against privacy, authentication, confidentiality, integrity, and availability, concluding that while MPS continue to grow, significant security challenges ought be handled to ensure widespread secure adoption, particularly in developing economies.

The academic article in the year 2019 by Ali et al., provides a thorough view of EPS, starting with the evolution from the U.S. Federal Reserve's first electronic currency transfer to modern implementations. The researchers segregate EPS into transaction-based types which are - cyber cash, SET, virtual holdings, net bill, and internet-based methods which are - debit/credit cards, smart cards, e-cash. Further on, it examines the architecture, advantages, and security challenges of the aforementioned. The article underscores that by use of EPS the transaction costs of paper-based systems can be reduced, which is an important factor. The authors underscore that information security concepts and protection techniques including cryptography are of great significance. The investigation underscores that the obstacles to EPS adoption are infrastructure limitations, regulatory challenges, and socio-cultural factors.

In the academic paper by Ul et al., (2017), provides a complete investigation of online payment systems by assessing development patterns from the past and present trends with forecasts for future transformations. The articles discusses about various aspects of EPS and its evolution along with varied types of payments of the likes of credit cards (CC), debit cards (DC), mobile payments, e-wallets. It further discusses the security requirements and implementation barriers. It further reports that non-cash transactions experienced substantial growth between 2014 and 2015. Further on, it is discussed that the hurdles for adopting the online payment system are infrastructure problems and regulatory uncertainty and cultural resistance. This study reports that e-payment is cost-effective for the national GDPs. New financial components need to be better integrated with the existing ones and guidelines for service providers need to be developed and standardized, with improved security methods for the successful deployment of these systems.

In a summary, this academic article captures the growing literature related to MPS and EPS, the various theoretical models of MPS adoption, numerous cross country comparisons given in the existing literature, security mechanisms, and bibliometric studies of its field which will be useful for future researchers and academicians.

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