



# ANALYTICAL STUDY ON FINANCIAL FRAUDS ON E-PAYMENT IN INDIA.

**Author – Ritika Das (Student)**

Christ (deemed to be) University

Bengaluru, India

## Abstract

Cashless payment methods or businesses that totally depend upon electronic payment methods are seem to be rapidly growing in India. To manage an overwhelming amount of monetary transactions, any financial sector of an economy must be reliable and transparent. Due to its popularity among citizens, India's e-payment system has accelerated growth in recent years. The Indian government is also acting, launching the "Digital India" initiative to increase awareness, availability, as well as adoption of digital technologies. However, People still prefer to conduct their transactions in cash. E-payment systems are broadly classified as On-line MasterCard Payment, On-line Electronic Money System, Electronic Cheque, and Cards-based e-Payment System. Each payment system has advantages and disadvantages for retailers and buyers. The following edicts govern new payment systems: accessibility, cost, security, traceability, anonymity, acceptability, and control. To compete in the hyper-competitive market, most banks-built e-commerce, that supports an e-payment system. The first primary objective is to comprehend e-payments; the secondary purpose is to thoroughly examine the characteristics of e-payment systems; and the ultimate aim is to identify the characteristics of the ideal electronic payment system.

**Keywords:** E-payment, Digital India, E-commerce, fraud.

## Introduction

With the widespread use of the internet in our daily lives, people have grown accustomed to online trade in E-Commerce for the sale and purchase of goods and services. People are sending money electronically via the Internet. Furthermore, the expansion of web-based company has resulted in new monetary requirements that, for the most part, cannot be provided by traditional payment methods. Following this expanding trend, associated individuals are studying various electronic payment systems, including difficulties involving electronic payment systems and digitised currencies. Every online transaction is processed through payment gateways, which serve as points of access to financial institutions. Payment gateways authorise and validate payment details between multiple parties and financial institutions. The existence of e-commerce and trading of product and services have a long history and has been through different changes. As exchange became more complicated and difficult, people began to represent values in an abstract way, progressing from barter to certified notes of money, cheques, payment orders, debit and credit cards, etc and, finally immersing as electronic payment (or E-payment) systems. To manage an overwhelming amount of monetary transactions, any financial sector of an economy must be reliable and transparent. Due to its popularity among citizens, India's e-payment system has accelerated growth in recent years. According to a report published in 2016 stating that India was found to be ranking 2<sup>nd</sup> in the world mobile subscription. An Electronic Payment System (EPS) is a kind of inter-organizational information system (IOS) for monetary transactions that connects various associations and clients. According to the 2017 KPMG report and the adoption of e-payments has increased by approximately ten percent and is expected to rise

further. Any country's payment system, no matter how advanced and sophisticated, does confront a number of hazards, including failures of banks, Frauds, counter-party failures, and so on. Such deviations could occur and start a chain reaction that could eventually lead to Payment system disruption and distrust. The payment system is breaking down in a systematic and cascading fashion and can undermine public trust in the government system of payment. This study provides a full overview of the electronic payment system in order to raise awareness of it. Globalisation and the financial revolution have caused significant changes in developing nations in a variety of ways. Among the key changes are: shifts in consumer tastes and preferences, increased demand for international products, and new trading and investment opportunities. Technological improvements certainly played a condemnatory role in creating the world borderless. Better communication and information technologies have also delivered incredible opportunities in the global business; countries are now digitally connected via the Internet. Electronic money is indeed the result of this digital convergence and has been proven to be an electronic replacement for currency.

## THE STUDY'S OBJECTIVES

This paper makes a fair effort to:

- Define the e-payment; and
- Understand it.
- To determine the qualities of the perfect electronic payment service;
- To carefully analyse the characteristics of e-payment systems.

## Research Methodology

Exploratory research and secondary data were used to create the paper. The information was gathered from books, journals, periodicals, websites, and other publicly available sources. This article presents a unique understanding of the e-payment system, its characteristics, and the qualities of the optimal electronic payment system.

### 1. E-payment

An Electronic Payment System (EPS) is a sort of inter-organizational information system (IOS) that connects several associations and individual clients for money-related activities. Complex interactions among partners may be necessary, which can be facilitated by banks and inter-switch houses who enable financial transactions to be conducted electronically. Another point of view is expressed by those who define an e-payment system as any sort of money exchange through the internet. Similarly, a system of electronic payment refers to an electronic technique for making payments for goods purchased on the internet or at marketplaces and shopping centres. According to another definition, e-payment systems are payments done in electronic exchange conditions as an exchange of money by electronic means. Electronic payment is viewed by as an exchange of money that happens online between the merchant and the purchaser. (Kalakota)<sup>1</sup>. E-payment was defined as the exchange of a fiscal claim by a payer on a party deemed useful. Payments done through the automated clearing house, commercial card systems, and electronic transfers are examples of e-payment. (Hancock)<sup>2</sup>.

#### 1.1 History

The history of e-payment may be traced back to 1918, when the Federal Reserve Bank used telegraph to transport currency in the United States (U.S.). However, that technology was not widely employed in the United States until the Automated Clearing House (ACH) was established in 1972. Since that time, electronic money has grown in popularity. This enabled commercial banks in the United States and the country's central treasury to develop an alternative to check payment.

<sup>1</sup> Kalakota, Ravi, and Andrew B. Whinston. *Electronic commerce: a manager's guide*. Addison-Wesley Professional, 1997.;

<sup>2</sup> Hancock D, Humphrey DB. Payment transactions, instruments, and systems: A survey. *Journal of Banking and Finance*. 1997 Dec 31; 21(11):1573–624. Crossref

## 1.2 Various Types of e-payment

In general, online payments are classified into two types: those made through the Internet Banking Payment Gateway (IBPG) and those made through an outside payment platform. The first is a direct mode of payment in which the client accepts the online payment through an e-business framework that is linked to the banking framework. The second, on the other hand, entails money being transferred from the purchaser's account to the merchant's account via an outsider or third-party payment mechanism. The IBPG is located between the banking process system and the Internet; it is a platform designed specifically for managing payment and payment authorization. The IBPG is the link that connects the buyer, seller, and bank. The payment gateway is required for the online mode of payment based on IBPG to exist.<sup>3</sup>

## 2. Payment System over the Internet

The Internet-based payment system is available in four forms:

### 2.1 Debit Card

The debit card is one of the most widely used e-payment frameworks. The debit card technology combines the characteristics of the ATM card with Internet banking. A debit card holder pays for his purchases directly through the bank, replacing checks and cash. Clients in this debit card system<sup>4</sup> deposit money into a bank ahead of time and withdraw it at the moment of purchase. There are two types of debit cards in the real world: i) online debit cards and ii) offline debit cards.

### 2.2 Credit Card

This is another sort of e-payment system wherein the card issued by a financial institution to the cardholder is used to make payments via the internet or through an electronic device without the use of paper money. The credit card is the most often used type of e-payment. In contrast to other EPS, it is not appropriate to utilise credit cards for small-value transactions, i.e., exchanges involving less than a dollar.

### 2.3 Smart card

This method employs a plastic card equipped with a microchip onto which monies can be put in order to make rapid payment of bills and transactions. A chip card is another term for a smart card. Smart cards can hold individual/related data about a client's business. Similarly, a chip card is used to store cash, which is depleted as it is used. A PIN provided by the client can be used to approve a smart card. These cards are secure because they can store data in an encoded format and have faster processing capabilities. Mondex and Visa Cash cards are two examples of smart cards.

### 2.4 E-Cash

This method was developed as an alternative to using credit cards to make Internet purchases.<sup>5</sup> It is a sort of electronic payment arrangement in which a fixed amount of money is stored on a customer device and made available for transactions through the internet. Electronic money is also known as digital currency, and it works using e-cash software that is installed on the client PC or electronic devices. Because of its low cost, electronic cash is one of the most appealing payment methods for small-scale transactions.

<sup>3</sup> Yang, Qifeng et al. "Research on Online Payment Mode Based On Internet Banking Payment Gateway." *2007 International Conference on Convergence Information Technology (ICCIT 2007)* (2007): 2043-2048.

<sup>4</sup> Al-Laham, Mohamad, Haroon Al-Tarawneh, and Najwan Abdallat. "Development of electronic money and its impact on the central bank role and monetary policy." *Issues in Informing Science and Information Technology* 6 (2009): 339-349.

<sup>5</sup> Kim, Changsu, et al. "An empirical study of customers' perceptions of security and trust in e-payment systems." *Electronic commerce research and applications* 9.1 (2010): 84-95.

## 2.5 Electronic Transaction-Based Payment System

The Internet-based payment system has four modes:

**Secure Electronic Transaction (SET)** A secure electronic transaction system is a payment arrangement for online payments that ensures the security of money exchanges on the web. The SET determination is an open, technical standard for business developed by MasterCard and VISA. SET provides secure credit card transactions via the internet. A digital certificate generates a trust change throughout the system, certifying vendor validity and cardholders.

Cyber Cash is an online service that processes and confirms the client's credit card information before billing the client's account and electronically depositing the money in the dealer's account. The servers of cyber money serve as a link between the online trader and the bank's secure monetary system. This technology employs digital signatures to ensure the security of electronic payments<sup>6</sup>. While money in electronic form ('e-money') is a broader concept that refers to all PC-based fund transfer systems (for example, ACHs, debit or credit cards) and the hardware associated with them (for example, point of sale terminals, ATMs), cyber cash focuses specifically on all money exchange systems that are managed via the internet.<sup>7</sup>

### 3. E-PAYMENT SYSTEM & CHARACTERISTICS

Various studies in the field of the electronic payment system are being done in the settlement of financial transactions. Electronic payment qualities include flexibility, ease of use, trust, security, reliability, efficiency, traceability, and convertibility (Lynch and Lunquist, 1996; Medvinsky and Neuman 1993). Many qualities have been identified in the literature, including usability, trust, anonymity, application, convertibility, efficiency, authorisation type, traceability, reliability, scalability, and security. However, the qualities listed above are mostly focused on the technological element of the electronic payment system, which is also one part of the payment system. When a transaction takes place, people recognise many aspects of electronic payment systems, including applicability and convertibility. Other qualities, however, are experienced indirectly but have an impact on consumers. To demonstrate this diversity, distinguishing qualities of electronic payment can be split into those that are immediately recognised by users and those that are visible to users. Reliability, applicability, traceability, anonymity, security, efficiency, trust, convertibility, and usability are direct user-related properties. Scalability, authorization type, divisibility, and interoperability are indirect views of technology-related features.

#### 3.1 Problems with the E-Payment System

Despite their various benefits, electronic payment systems have their own set of obstacles and hurdles, particularly in today's technologically evolved society. Previous scholars have noted infrastructure, regulatory, legal, and socio-cultural difficulties as hurdles.

Infrastructure is critical for the efficient implementation of electronic payments. A difficulty is the lack of appropriate infrastructure for electronic payments<sup>53</sup>. To be fruitful, electronic payments must have a financially sound and trustworthy infrastructure that is accessible to the majority of the population. In poor countries, vast areas of the country lack access to basic infrastructure that enables electronic payments.

#### 3.2 Regulatory and Legal Concerns

National, provincial, or worldwide legislation, regulations, and other guidelines are required for the proper implementation of e-payment programmes. A large portion of the components include tax evasion rules, supervisory specialists overseeing e-money organisations and commercial banks; central banks should keep an eye on payment systems, buyer and information security, participation and rivalry difficulties. As previously stated, the global and virtual nature of e-payment raises legal concerns, such as which laws are applicable in litigated cases and which jurisdiction will be competent, the legality of digital signatures and electronic contracts. A legal and administrative structure that fosters confidence and trust while assisting technical endeavours is a critical issue to address while carrying out e-payments.

<sup>6</sup> Masihuddin, Muddassir, et al. "A survey on e-payment systems: elements, adoption, architecture, challenges and security concepts." *Indian Journal of Science and Technology* 10.20 (2017): 1-19.

<sup>7</sup> Guttman, Robert. *Cybercash: the coming era of electronic money*. Springer, 2002.

### 3.3 Social and Cultural Issues

Social and cultural differences in attitude, as well as the use of different types of cash (e.g., credit card use in North America and debit card use in Europe), complicate the task of developing a global electronic payment system. According to, disparities in the level of security sought and productivity among individuals from other societies, as well as the degree of advancement, exacerbate the issue.<sup>8</sup>

### 3.4 Popular Electronic Payment Systems

One of the most useful tools that the Internet has to provide in today's society is the opportunity to relocate one's business via a website. This is why it has become more important to purchase on the Internet through a variety of payment service providers. Payment Service Provider is a business that provides online marketing services; it acknowledges electronic payments by supervising transactions between seller and purchaser. The most common payment methods that are normally available include bank transfer, real-time orders, and credit card. Some common online payment systems are<sup>9</sup>:

1. Braintree;
2. Stripe;
3. PayPal
4. Authorize.Net,
5. Dwolla,
6. 2Checkout,

### 3.5 E-payment System Adoption/Economic Growth

In today's society, globalisation is the outcome of innovative technical endeavours. The advent of technology has altered the landscape of payment methods, ushering in the e-World<sup>10</sup>. Clearly, modern innovation has transformed traditional payment systems into a more efficient and viable system that is free of the cash-and-carry dysfunction. The effectiveness of conducting financial transactions, as well as more secure and faster access to cash, among other factors, has propelled the e-payment system ahead of the paper money-based framework<sup>3,4</sup>. Interestingly, in Nigeria, the e-payment framework is gaining prominence to the point that clients prefer to do financial transactions without visiting banks.

As the cashless economy dominates today's financial systems<sup>11</sup>, the period of money-based payment framework is gradually blurring. The e-payment system has become a standard via which fiscal elements travel advantageously, particularly in poor countries like Nigeria where cash is commonly carried. In such a country, the e-payment system has shaped into an important beginning point of her current economy; a well-functioning e-payment system has been seen to have significant implications for fiscal strength, total financial activity, and monetary policy. Meanwhile, the initiative for a non-cash economy will be preferred in the new era only if it is supported by age advantage, good education, ownership of significant innovative foundations, and various other components, and is appropriately set up by every concerned individual of the economic system and proficiently managed before forcing citizens to comply.

## 4. FEATURES OF THE GOOD ELECTRONIC PAYMENT SERVICE

4.1 Compliant: Regardless of the system's domain, it must be in accordance with the licences and the legislation.

4.2 Reversals: System payment systems should not be mistreated; rather, they should be adaptable to reversals.

<sup>8</sup> Tadesse, Wondwossen, and Tsegai G. Kidan. "e-Payment: Challenges and opportunities in Ethiopia." *United Nations Economic Commission for Africa* (2005).

<sup>9</sup> Niranjanamurthy, M. "E-commerce: Recommended online payment method-Paypal." *International journal of computer science and mobile computing* 3.7 (2014): 669-679.

<sup>10</sup> Oginni, Oyewole. *Impact of E-Banking on Commercial Banks' Performance*. Lap Lambert Academic Publishing, 2013.

<sup>11</sup> Siyanbola, TRIMISIU TUNJI. "The effect of cashless banking on Nigerian economy." *eCanadian Journal of Accounting and Finance* 1.2 (2013): 9-19.

4.3 Free (non-discriminatory): The electronic payment system must be as accessible as cash and for people who do not consider themselves creditworthy. Finally, much like cash, a conflict with a financial organisation or mediator is only feasible if it is paid.

4.4 Transaction amount neutral: Transaction fees are higher for larger quantities compared to lesser ones.

4.5 Transparent: This feature in which an electronic payment system informs the sender whether or not the payment was received by the receiver. Instead than depending on any notice as to whether or not payment has been made, a visual receipt can be used to confirm.

4.6 Anonymity: Transactions take place between the sender and the receiver.

4.7 Immediate: Instead of cash payment, the individual will receive an authorization notification via electronic payment system.

## 5. E-payment System Security

The security of data and information is critical in all information systems. Data security entails methodologies, technologies, and procedures that ensure data is secure from i. manipulation or unintentional change (integrity), ii. unauthorised access (confidentiality), and iii. timely availability (availability) to authorised clients on demand.

All of the following security elements must be included in electronic payment systems; an unsecure e-payment system will not be trusted by its clients. Furthermore, trust is critical for ensuring client acceptance. According to 63, e-banking and e-payment apps have security risks because they rely on fundamental ICT frameworks that create vulnerabilities in economic organisations, corporations, and can potentially harm customers.

### 5.1 E-Payment System Security Requirements

Some conditions must be met for a secure commercial trade to take place electronically. They can be expressed as follows:

#### 5.2 Authorization and Integrity

Integrity can be defined as the validity, accuracy, and completeness of data in relation to business qualities and desires. In payment systems, integrity means that no cash is taken from a client unless the client approves the payment. Furthermore, merchants are not required to accept any payment without the express permission of the clients; this is appealing when clients want to avoid unwelcome bribery.

#### 5.3 Confidentiality

Confidentiality can be described as the protection of private or sensitive material from unauthorised disclosure. A number of the organisations involved may wish to maintain confidentiality in their communications. In this context, confidentiality involves the restriction of knowledge about various pieces of data associated to the exchange, such as payer/payee verification, buy content, total, and so on. Members frequently wish to ensure that transactions are kept private<sup>64</sup>. Where untrace ability or anonymity is desired, it may be necessary to restrict access to this information to only a subset of the participants.

#### 5.4 Reliability and Availability

Availability ensures that data frameworks and information are ready for use when needed; it is sometimes described as the pace at which a framework may be used for profitable activity. All factions must be able to make or receive payments whenever the requirement arises.<sup>12</sup>

#### 5.5 Improving E-payment Security

According to the most widely accepted method for protecting e-payments is to use cryptographic-based advances such as digital signatures and encryption. When used, these advances reduce speed and proficiency, necessitating a trade-off between efficacy and security.

<sup>12</sup> Asokan, N., et al. *Electronic payment systems*. IBM Thomas J. Watson Research Division, 1996.

## 5.6 Payment Gateway Problems

Payment gateways are not a new concept, and they are already offered by service providers and a few banks, albeit in limited quantities. The majority of them simply allow credit card transactions, with no regard for other growing payment instruments such as E-cheques, Electronic Funds Transfer (EFT), and so on.

However, in order to fully realise the potential of online electronic commerce, users should be able to use a variety of payment methods such as ATM cards, EFT, E-cheque, and others. Another difficulty with current payment gateways is the ability to conduct just Business-to-Business (B2B) or Business-to-Customer (B2C) transactions, hence ignoring valuable government enterprises. Furthermore, a single service cannot meet the variety of transactions and numerous banks.

Some of these difficulties are given below:

- Regulatory conflicts
- Expensive expenses
- Hidden charge structure
- Inadequate support for various forms of international currencies
- Statutory snags
- Standards inadequacy
- Interoperability snafus
- Concerns about upkeep and ownership
- Bigoted merchant behaviour on chargebacks and disputes
- Obtaining a national agreement for a payment infrastructure
- International deal expenses

## 6. Payment Gateway Security Considerations

As more people gain access to the Internet, so does the appeal of online commercial activity. When customers make online purchases, the use of payment gateways comes to the fore. When it comes to online transactions, the payment gateway plays a significant role because it acts as an intermediary between the bank and the merchant<sup>13</sup>. Customers are required to enter sensitive information when utilising a payment gateway as a manner of payment. However, as the number of online transactions grows, so do security dangers. The biggest problem in online transactions is security, because it is the payment gateway's obligation to protect any critical information from fraudsters and hackers.

### 6.1 Payment Gateway Security Mechanisms

The research work undertaken on the security elements of payment gateways include numerous security measures for strengthening the security of information details transmitted online. Protocols, security standards, encryption techniques, and hashing are examples of such mechanisms.

<sup>13</sup> Jamdaade, Krantee, and Hetal Champaneri. "A review: secured electronic payment gateway." *International Journal of Technology Enhancements and Emerging Engineering Research* 3.6 (2015): 70-72.

## 6.2 Data Encryption

It is one of the most important security measures used in payment gateways. It is the payment gateway's obligation to protect the customer's information (credit/ debit card details) from various forms of network attacks. The encryption procedure is only secure if the keys are kept secret, which prevents unauthorised parties from decrypting the data in encrypted form.<sup>14</sup>

## 6.3 Data Encryption in Data Fields

This technology, also known as end-to-end encryption, employs industry standard encryption to prevent sensitive information from being read just at the entrance point.

## 6.4 Cryptography

Cryptographic approaches can be classed as: i) Symmetric cryptography and ii) Asymmetric cryptography.<sup>15</sup>

## 6.5 Secure Socket Layer.

On servers and web browsers, a secure network protocol known as Secure Socket Layer (or SSL) is employed. It leverages certificate authentication to transfer confidential data by building a channel that is encrypted uniquely.

## 6.6 Certification Authority

Stephen Kent presented an innovative strategy for improving payment gateway security that uses certification to authenticate authority in order to make online transactions safer. The initial step in this security mechanism is to generate a Certificate Signing Request (CSR), which is then sent to the Certification Authority.

## 6.7 Public Key Infrastructure

A security system is required to protect sensitive information communicated through payment gateways (such as credit/debit card details) from unauthorised parties. Public Key Infrastructure (PKI) is yet another security method used to improve the security of e-commerce systems by utilising certification authority, digital certificates, and numerous other registration authorities.

## 7. The Benefits of Using a Payment Gateway

Payment gateways play an important role in the overall e-commerce activity since they enable secure online exchanges of goods and services over the Internet. Yet, it ensures the security of the bank's financial systems through a security channel, and it also serves as a link for both communications and commercial dealings of goods and services, as well as the economic system, thus uniting all members of e-business in one body.<sup>16</sup>

7.1 A Payment Gateway is quite affordable due to the multiple benefits it provides, which include:

- The obvious 365 x 24 x 7 availability
- Real-time debit/credit card authentication
- Competent and quick transaction management
- Numerous payment options
- Secure sharing of transaction details between purchasers, dealers, and financial institutions.
- Efficient and flexible real-time report generating
- Support for multi-currency settlements, if needed
- Customer refund is feasible

<sup>14</sup> E-Commerce Security Systems. Available from: Crossref. Date accessed: 20/02/2017.

<sup>15</sup> Masihuddin, Muddassir & Khan, Burhan & Mattoo, M. & Olanrewaju, Rashidah. (2017). A Survey on E-Payment Systems: Elements, Adoption, Architecture, Challenges and Security Concepts. *Indian Journal of Science and Technology*. 10. 1-19. 10.17485/ijst/2017/v10i19/113930.

<sup>16</sup> Zhang, Xuewang and Linlin Wang. "Key Technologies for Security Enhancing of Payment Gateway." *2008 International Symposium on Electronic Commerce and Security* (2008): 743-748.



- Vendors can get rid of large databases, complicated software, and extensive processing;
- CA (Certifying Authority) verified secure servers;
- cost-effective collection of voluminous data with the added benefit of being verified for card validity; and
- card hot-list access for filtering out fraudulent transactions.

## 8. Conclusion

The evolving modern trends demonstrate the importance of electronic payment systems in worldwide trade and business. Their reach includes transactions ranging from one dollar to many million dollars. This course presents a thorough knowledge about electronic payment systems, payment gateways and their security issues. Despite their expanding popularity and widespread use, payment gateways have been shown to have several security flaws. It is possible to get significant knowledge about the benefits and downsides of currently available electronic payment systems, as well as the available security procedures for the payment gateway, by reviewing prior studies. This article also examined electronic payment systems from the standpoint of adoptability, with the goal of improving customer knowledge and happiness.

