

Electronic Payment Systems: Security Issues and Solutions

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Abstract: Financial transactions performed without the use of traditional documents such as checks are known as electronic payments. Debit card, credit card, smart card, e-wallet, e-cash, electronic cheques, and other electronic payments are examples. The amount of private and business transactions conducted online is steadily increasing. E-payment systems have achieved varying degrees of adoption across the world; certain electronic payment methods are widely used, while others are not. The main objectives of this study awareness are of electronics transactions safety and securities in payment systems. The goal of this study was to identify the difficulties and challenges that electronic payment systems face, as well as to provide some ideas for improving the quality of e-payment systems.

Key Words: E-Payment, Smart Cards, E-Cash, Cyber Security

INTRODUCTION:

An electronic payment system (e-payment system) is a means of making transactions or paying for products and services without using cheques or currency. It's also known as an online payment system or an electronic payment system. Due to the growing popularity of internet-based banking and shopping, the electronic payment system has developed in recent decades. We can witness the increase of electronic payment systems and payment processing equipment as the globe progresses with technological advancement. The percentage of check and cash transactions will decline as these expand, improve, and enable ever more secure online payment transactions. It manages the e-business environment by making electronic payments at any time over the Internet. We have to use two types of payment systems in the actual world.

1. *Based on Internet:* There are four different types of Internet-based payment systems are Debit Card, Credit Card, Smart Card and E-Cash.
2. *Based on Electronic Transactions:* There are four different types of electronic transactions-based payment systems are Cyber Cash, Net Bill, First Virtual Holdings and Secure Electronic Transaction.

OBJECTIVES OF THE STUDY

- To increasing public knowledge of various e-payments systems
- To encourage individuals to utilise e-payment systems
- To ensure the safety and security of e-payments

- To create awareness about various frauds of e-payments

OVERVIEW OF PAYMENT SYSTEM

In most cases, a country's central bank is the driving force behind the creation of national payment systems. The Reserve Bank of India, as the country's central bank, has taken various steps to ensure that payment systems in India are safe, secure, sound, efficient, accessible, and authorised. The Reserve Bank has made a number of steps to introduce and improve safe and efficient payment systems in the country in order to fulfil the needs of the general population. The country's enormous geographic spread and the Indian banking system's huge network of branches need the logistics of collecting and delivering paper instruments. These characteristics of the country's financial organisation have always been considered while creating payment systems.

The RBI's activities in the mid-eighties and early-nineties centred on technology-based solutions for improving the payment and settlement system infrastructure, as well as the launch of new payment products by leveraging bank technical developments. As the amount of checks increased, the current system became overburdened, forcing the implementation of a more cost-effective alternative method.

A. Debit Card:

A debit card is a bank card with characteristics such as automated teller machines and point of sale that allow it to be used at merchant locations. A debit card is connected to a person's bank account and allows money to be withdrawn at ATMs and points of sale without having to write a cheque. A debit card holder pays for his purchases at the bank immediately. It is intended to take the place of actual currency and cheques. Customers who use a debit card deposit money with the bank ahead of time and withdraw it at the time of purchase. In the real world, there are two different sorts of debit cards: 1. Online Debit Card 2. Offline Debit Card

B. Credit Card:

A credit card is a plastic card that allows people to borrow money to buy products and services. On the order form, the client enters the card number, expiration date, and billing address, and the seller may verify the information and be confident in the payment. There are three types of credit card payments on internet networks. 1. Payment using plain credit card statement 2. Payment using encrypted credit card details 3. Payment using third party verification.

C. E Cash:

E-Cash is a software-based, anonymous, inaccessible online token payment mechanism that runs on Unix, Windows, and Macintosh. When a consumer buys a token, e-cash software saves the digital money to the customer's computer, which is then signed by the bank. Users may simply spend digital money in any business that takes e-cash without giving the merchant their credit card information. As well as an example of the cashless approach.

D. Smart Card:

It's a half-inch square piece of plastic the size of a credit card that acts as the card's input-output system. Motorola was the first to develop a smart card in 1977. A smart card is made up of a programmable and small chip, as well as RAM and ROM storage. It can also be self-contained by connecting to a bank. This is referred to as a smart card because of the chip's ability to store information in its memory.

E. Cyber Cash:

Cyber cash is a web-based service that electronically credits a customer's account after automatically processing and verifying the customer's credit card information. Cyber cash servers serve as a connection point between the Internet and the secure financial network of the merchant. To ensure the security of electronic payment systems, this method employs digital signatures.

F. Net Bill:

Net Bill is a payment mechanism for small amounts of money. Net bill payment systems leverage the Internet to facilitate safe and cheap payments for products and services. The net bill server keeps track of both consumers and merchants' accounts, allowing businesses to pay for products delivered to customers. Digital goods are provided. There is software that confirms the receipt of items called a money tool. As a result, the electronic payment net bill system allows money tools, merchant servers, and net bill servers to communicate.

G. First Virtual Holding:

One of the earliest Internet payment systems that offer a third-party verification mechanism for making payments over the Internet was the first virtual. In the sense that it does not employ encryption, the first pragmatic payment system is unique. Because the Internet is an open network, some information should not flow on it. This is a core concept of payment systems. This data is mostly concerned with payment card information. The transaction is performed using a virtual PIN originally issued by the virtual firm, rather than a credit card number.

H. Secure Electronic Transaction:

Secure electronic transactions are an online payment method that ensures the safety of financial transactions conducted over the Internet. Visa and MasterCard created the SET specification, which is an open technological standard for commerce. It allows users to conduct secure credit card transactions over the Internet. The digital certificate changes the way the whole transaction, cardholders, and merchant legitimacy are confirmed.

I. Online Check/Electronic Fund Transfer:

A buyer inputs the digits or numbers contained on the check while purchasing using an online check. This is done for the purpose of authorisation, but with electronic fund transfer, a financial house called an Automated

Clearing House (ACH) is responsible for moving payments from the buyer's or promoter's account to the seller's receiver or recipient's accounts.

ATM, Acceptance Infrastructure and Card Statistics for the Current Year of 2021 (Rs. In Lakhs)						
Months	ATMs		PoS		Micro ATMs	Bharat QR
	On-site	Off-site	On-line	Off-line		
January	114588	94756	4654521	0	373412	3360228
February	114388	95452	4714916	0	373169	3492106
March	115605	97970	4720077	0	404463	3569890
April	115775	98684	4524724	0	414012	4028012
May	110623	104031	4520278	0	424906	4862739
June	115552	98214	4593265	0	453855	4932910
July	115284	98149	4607703	0	474523	5123562
August	116105	97465	4747560	0	494408	5269208

(Source: www.rbi.org.in)

ATM, Acceptance Infrastructure and Card Statistics for the Current Year of 2021					
Months	Credit Cards				
	No. of outstanding cards as at the end of the month	No. of Transactions (Actuals)		Value of transactions	
		ATM	PoS	ATM	PoS
January	61097889	504747	174418900	25111	6473703
February	61647183	498184	161376998	25348	6010449
March	62049087	592315	188726583	30664	7231876
April	62260420	509777	157531178	25842	5904907
May	62393434	365460	134472696	18643	5201381
June	62815482	431828	154700561	21871	6274596
July	63414463	474418	182048394	23526	7488467
August	63934371	501945	190470198	24823	7773294

(Source: www.rbi.org.in)

ATM, Acceptance Infrastructure and Card Statistics for the Current Year of 2021					
Months	Debit Cards				
	No. of outstanding cards as at the end of the month	No. of Transactions		Value of transactions	
		ATM	PoS	ATM	PoS
January	888065146	571238001	372257068	26691500	6269266
February	894001925	551302880	345831686	25865772	5878327
March	898201796	601611788	377433789	28463574	6681934
April	900794702	523305976	322525449	25495248	5573875
May	902308894	414951467	256779645	20248518	4282020
June	906008227	474269506	294645257	22919197	5057623
July	906036440	535621041	340400346	25431223	6059874
August	913811171	566430325	358583785	26303315	6435152

(Source: www.rbi.org.in)

ISSUES AND CHALLENGES REGARDING ELECTRONIC PAYMENT SYSTEM

A. Lack Use Ability:

Electronic payment systems either need a big amount of data from end-users or make transactions more complicated through the use of elaborate, extensive online interfaces. Making a credit card payment through a website, for example, is not the simplest method because it necessitates entering a big quantity of personal information and contact information into a web form.

B. Various Issues With E-Cash:

The biggest issue with e-cash is that it is not universally recognised, despite the fact that it is required that businesses accept it as a payment option. Another issue is that when we use e-cash to make payments, both consumers and salespeople must have accounts with the same bank that provides e-cash. Other banks will not accept your payment.

C. Lack of Security in E Payment System:

The Internet's online payment system is an accessible target for thieves looking to steal money and personal information. Customers are required to supply credit card and payment account information, as well as other personal information, via the internet. This information is sometimes sent in an insecure manner (Kolkata and Winston, 1997). Providing these details through mail or phone also raises security concerns.

D. Lack of Trustiness:

Electronic payments have a long history of fraud, abuse, and low credibility, as well as being a new method with a poor reputation. Potential customers frequently cite the risk as a reason for their lack of trust in paid services and, as a result, their refusal to purchase Internet services.

E. Lack of Awareness:

Paying with a credit card over the internet is a difficult task. Even well-educated people have difficulty paying online. As a result, they will always prefer traditional purchasing over online shopping. Customers try to pay online but are unable to do so due to a technical fault with the system. As a result, they avoid it.

F. Online Payments Are Not Suitable in Rural Areas:

Rural regions have a low literacy rate, and those that are literate are unable to use computers or mobile phones. They are not interested in online payment since they are uninformed of technical advances. As a result, locals cannot use an online payment method.

G. User Perception About Acceptance of Electronic Payment Systems:

Any information system project's success or failure is largely determined by user acceptability. According to numerous researches on information technology, user information and human factors are significant elements that influence the effectiveness of any information system. Users' acceptance is defined by Dillian and Morris (1996) as "a desire to operate within a user group that is willing to utilise information technology for activities that are designed to support it." There are no exceptions when it comes to electronic payment methods.

This means that they will not be successful unless the users approve. The electronic payment system is a new way to pay for things online. Due to a lack of security in the changing corporate environment, issues are difficult to accept. In online payment systems, there is a need for improved information technology. The failure of electronic payment systems is due to a factor that overlooks user and market demands.

H. Highly Expensive and more Time Consuming:

The electronic payment system is more expensive than the physical payment system since it involves set costs, machine expenses, administrative costs, and so on. It also takes longer.

E-COMMERCE SECURITY TECHNOLOGY SYSTEM

A. Physical System Security:

According to national standards, information security level, and financial position, the site hosting your ECommerce applications (typically a data centre) must be physically secure, with suitable physical security requirements, construction, and administration to meet the applicable criteria. In addition to application and network security, secure operational practises must be followed. Resources (including hosting, application server, security, GAP, and other equipment), communication circuits, and physical media (soft / hard disc, CD-ROM, IC card, PC card, and so on) must all be part of the primary system.

B. Network Security:

The security of operating systems and servers is referred to as network security. By exploiting vulnerabilities in the operating system and server software, hackers can acquire control of your machine or server. Stable and trustworthy e-commerce platforms should be able to deliver services without interruption to enable the smooth development of e-commerce transactions. As a result of a system outage, an e-commerce system may not

function (eg hardware, software errors, network failures, viruses, etc.) Without business data, assessing the efficacy of time and space is frequently impossible, resulting in significant economic losses.

C. Data Transmission and Application Development:

Generally, refers to business transactions that appear in the media in network security issues, such as preventing theft, tampering, and forgery of business information, and was intended to negate the Business Act, namely, confidentiality, integrity, and E-commerce to achieve authenticity, and non-vengeance. All sensitive data sent over the internet must be encrypted. Customers who are unable to accept this level of encryption may be refused by businesses. E-mail should never be used to send confidential or sensitive information. It should also be encrypted if it should.

D. System Administration Security:

The primary goal is to safeguard the host computer's operating system and database system. The general strategy for protecting system security is to address security weaknesses through reinforced security, and then to employ security technologies and equipment to improve your security capabilities. System administrators should keep an eye on unusual behaviour within the company by reviewing log files and investigating login failures on a regular basis. They can also conduct an audit of their e-business systems to search for security flaws.

E. Safety Management Process Supervision in E-Commerce:

The network planning phase, as well as the design and administration of information security planning, must be strengthened. There is a need to devote some labour, material, and financial resources to bolstering information security. To reduce investment risks, define realistic network security targets and milestones that are achieved in phases.

OVERCOMES OF PROBLEMS IN ELECTRONIC PAYMENT SYSTEM

A. Encryption:

When it comes to online payment, the perception that e-commerce is unsafe is quite sensitive. The majority of online payment systems employ an encryption mechanism to ensure the security of personal and financial information transmitted during all online transactions. To avoid online payment fraud, several encryption techniques are used.

B. Digital signature:

To achieve transaction authenticity, all parties engaged in an online financial transaction must employ a digital signature.

C. Firewall:

A firewall is a set of security measures meant to prevent unwanted electronic access to a networked computer system and to protect private networks and individual computers from over-the-Internet threats, with firewalls

entering and exiting on predetermined grounds. It's possible to use it to filter outbound traffic. Firewall policies are a collection of regulations.

CONCLUSION:

The term "electronic payment" refers to any payment method that does not include the use of real currency or cheques. Debit cards, credit cards, smart cards, e-wallets, and other similar devices fall under this category. The usage of payment methods in e-commerce is the key connection for its online development, and we've looked at a few of them in this paper. This is the danger. Theft of payment data, personal data, and fraudulent rejection on behalf of consumers are all examples of online payment fraud.

As a result, until electronic signatures become more widely used, we must rely on existing technologies to ensure a decent baseline degree of network security. It is difficult to argue that any of the payment systems examined in this study is ideal, even though each one offers benefits over the others. Customers that want to protect their privacy choose payment options such as e-cash or net bill checks, which provide high degrees of anonymity.

They should utilize a smart card if security is a top consideration. The e-payment system will benefit both customers and service providers in the long term, increasing national competitiveness. The success of electronic payment system adoption is determined by how customers and suppliers address security and privacy issues, which will boost market trust in the system.

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