CHAPTER 1
INTRODUCTION

This research aims to suggest some enhancements to the existing Online Payment Processing System which will add value and make the entire system user friendly. The prehistoric man had produced things like food, clothes and habitat themselves. With the growth of Civilization, commodities were initially bartered / purchased (exchanged) with other commodities and later gold was used for purchasing in olden days. With the introduction of currency trading was enabled to happen across the globe, though each transaction involved many people, process and was time consuming. With the advent of computers and information technology, trading process reached its zenith of development. Within few seconds, products or commodities are purchased from any part of the globe and also shipped anywhere.

Online Payment Processing System is a boon to today’s world, thanks to the advancement of Information technology. Online Payment Processing System henceforth will be called OPPS made a huge impact by cutting across all the barriers like space, time, language, currencies, etc. OPPS is the heart of any Ecommerce system. Ecommerce Systems made it possible to purchase products or services from any part of the world in a few minutes with various currencies [3]. Any enhancement to OPPS will encourage users by giving more confidence and comfort on one hand and increase the volume of business for merchants on the other. Above all, the payment systems play a major role in a country's monetary policy, financial sector and economic development as they improve macroeconomic management, release funds from the clearing and settlement functions for more productive use; reduce float levels and improve the control of monetary aggregates [44][68]. Firms in different economic sectors use payment system to transfer funds and to provide competitive financial services [61].

1.1 PURCHASE MODE BEFORE THE INTRODUCTION OF CURRENCIES

Payment system has played a vital role in part of human life right from time immemorial. In ancient times, money existed in various media like feathers, leather,
oxen, rice, yarns, etc. In those days money was essentially needed in barter trade, as a payment for another's goods. The commodities chosen to be used as money were those that were either easy to store or had some financial value attached to it. Bartering roughly existed 100,000 years back. The transactions of Barter were usually completed by two people and the value was determined almost solely on what each party agreed would be a fair exchange. The oldest form of money is probably livestock and plant products. Domestication of animals had begun long before civilizations began; so too had farming, and initially, cattle and grain were two very common media of exchange. Another form of trading also was in vogue where there were in the intermediaries store the values of the original items being exchanged until the person could find another person to exchange the desired goods or services [63].

Later, another common type of money developed. People used to trade items for gold/silver or in the form of some other items mentioned as above at a later stage. For example, people used to purchase a land by either paying gold to the seller or would give some other equivalent items like land, cows etc. Every buying or selling involved extensive work of evaluating the worth of the product or service and finding equivalent value given in terms of gold or in some other form. There were no standard valuation for each product/service practiced globally and so all transactions happened with word of mouth rates. When the buyer and the seller were located across various geographical locations, the transaction became very challenging and time consuming as it took time for both the buyer and the seller to come in person, arrive at the value and agree to the deal or it involved the services of a middle man.

1.2 PURCHASE MODE AFTER THE INTRODUCTION OF CURRENCIES

In the medieval period, coins were used for trading. Coins were made of gold initially and then silver coins were used. At a later stage, bronze coins were also used to make purchase of goods or services. Since the coins were easily counterfeited, usage of coins gave way to the paper currencies in the later stages. The early private merchant banks were creating money or banknotes by issuing loans from the deposits held in reserve. The security of this representative money was it could be easily redeemed for either gold or silver deposits that could be considered
legal tender to pay debts. National governments caught on and began also to issue paper notes that could be redeemed for actual gold or silver that represented convertibility [63]. The invention of paper currencies later paved way for standardization of values of currencies since each country was using their own currency. The standardization of currency further opened up the trading/commerce across the globe. Even though commerce was made possible across the boundaries, still the process was very complex and took so much of time as the buyer and the seller needed to share the products/services by meeting in person, negotiating the price, finalizing the deal and paying the value in required currency.

1.3 PURCHASE MODE AFTER THE INTRODUCTION OF CREDIT / DEBIT CARD – BEFORE THE INVENTION OF INTERNET AND E-COMMERCE

1.3.1 Credit Cards

Credit cards and Debit cards were used to make purchase simple and straightforward and thus enabling people to do shopping without carrying cash in physical form. But still the people are needed to be physically present to carry out the transaction. Though there were concerns about security, payments through credit/debit cards in the initial days of their introduction flourished by the sheer convenience they offered compared to taking the physical money in hand every time for all transactions. Though there was evidence of introduction of credit card which dates back to 1887 even though it appeared more like debit card, the modern version of credit card came into use in the 1950s.

Initially there was very little adaptation of credit cards to online payments apart from additional security codes. But now, more secure features have been added to protect transactions. A major difference between online and offline payments is that in online purchases a physical copy of the card is not provided and the merchant does not obtain a signed, or similar, confirmation from the customer. Also, whereas all offline transactions are authorized, this is not the case for all online purchases (especially with small businesses) although authentication and verification technologies have increased the ability of accurately authorizing transactions later.
Since credit cards were not specifically designed as OPPS, there are some inherent risks associated with their use as such. Cardholder authentication has usually been handled through the provision of name, credit card number and expiration dates without further authentication.

In credit card payment systems or pay-later payment systems, the payee’s bank account are credited the amount of sale before the payer’s account is debited [4]. Credit card systems fall into this category. Credit cards allow customers to make purchases up to a prearranged ceiling [33]. The credit that is granted is either settled in full by the end of a specified period, generally a month, or can be settled in part, with the remaining balance extended as credit [4].

1.3.2 Debit Cards

Debit card payments are directly withdrawn from the bank account and not from an intermediary account in contrast to credit cards. This can make it difficult for consumers to handle a dispute/chargeback, since there is typically no extra protection of the funds in a debit account. Once the funds have been withdrawn, they are harder to refund than with a credit card. Also, for debit payments a physical card and/or providing a card number is often not necessary; an account number may be enough. Apart from these differences, the payment mechanism is comparable with credit card transactions.

In debit card payment systems or pay-now payment systems, the payer’s account is debited at the time of payment. ATM card based systems fall into this category. According to, debit instruments allow the payer to have purchases directly charged (debited) to funds on his/her account at a deposit-taking institution such as a bank [36]. Debit instruments include direct debits, debit cards and cheques.

1.4 PURCHASE MODE AFTER THE INTRODUCTION OF INTERNET AND BEFORE THE INTRODUCTION OF E-COMMERCE SYSTEM

With the introduction of computers and internet the barrier of boundaries vanished. The seller could exhibit their products through the website. They could show the picture, video and properties of the product by which the buyer can understand and make a decision. Even the buyer had an option to compare various products from the seller. The websites showcasing the products gave great choices for
buyers to choose from. The buyer had to select a product/service and then make payment through any normal methods used like by cheque or by cash. Since payment was made manually, this also consumed some time for the seller to receive money, acknowledge the receipt of money, get the ordered product ready and send it to the buyer. Once the buyer received the product, he/she acknowledged the receipt of the product. The processes of releasing the money, tracking status took time here.

1.5 PURCHASE MODE AFTER THE INTRODUCTION OF E-COMMERCE SYSTEM

The buying and selling of goods and services over the Internet is known as electronic commerce (e-commerce). The concept of e-commerce is, however, not just limited to buying and selling of goods and making fund transfers electronically. It also includes the entire purchase process of developing, marketing, selling, delivering, servicing and paying for products and services [66]. The commencement of electronic payment system began with electronic commerce (e-commerce) [64].

With the introduction of OPPS, the so far complex and time consuming process of purchase has become simple and removed all physical barriers. People could view any product or service available anywhere in the world and could purchase them by making payment instantaneously. Though there are many advantages, major disadvantage is the lack of proper security of the system. There is a security threat that this information, the online customer provides to the merchant, could be intercepted by hackers and amount might be re-directed to hackers’ account or valuable information like credit card info, etc., could be used by the hacker resulting in loss for customers and loss of trust as users of electronic payments usually never see each other face-to-face [23]. Since there is no physical system to ensure the presence of the buyer, the information collected should not be reused for a second or third time by either merchant or hackers.

This problem was partly resolved by using SSL while transmitting data. There are many other systems devised to add more security and a few major systems are given below.
1.5.1 Complimentary Security Systems for Credit Card

Credit card companies have taken numerous steps to address security concerns and a number of complementary systems have been developed. Some such as SET have not had a wide take-up. Secure Electronic Transaction (SET) is an open standard developed by Master Card and Visa to provide a solution to security problems for online credit card payment system, this is achieved by providing digital certificate for both customer and merchant [35]. According to, this did not found acceptance because it was complicated and required both customer and merchant to download 5MB of software [62]. 3D Secure is Visa alternative to SET and does not require certificate to authenticate [35].

Currently the most important systems are MasterCard SecureCode and Verified-by-Visa. MasterCard SecureCode and Verified-by-Visa are the two techniques that help to protect an existing credit card with a password created by the user, assuring the user that only they can use their credit card when shopping online. The idea is to progressively adopt these more secure payments that substitute simple credit card payments.

1.5.2 Verified by Visa for Credit Card

Verified-by-Visa is a system that connects the card owner for each transaction directly with the bank by using a personal password and a personal message verifies the bank connection. This double authentication increases payment security. Inscription for customers at their bank is relatively easy. Another important characteristic of the system is its payment guarantee: The higher frequency of payment cancellation in online payments often represents a significant cost to merchants. With Verified-by-Visa the entire cost is borne by the credit card company, addressing merchant concerns over accepting credit cards. But at the same time, limitations for charge-backs mean that consumers face less favourable conditions under this system in comparison to simple credit card payments and lower costs for merchants is balanced against less flexibility for customers.

1.5.3 Mastercard Securecode for Credit Card

MasterCard’s SecureCode provides a similar service to add protection against unauthorized online use of credit cards. Once the user has registered and
created a private SecureCode, they are automatically prompted by the financial institution to provide the personal SecureCode in order to purchase online.

1.6 EVALUATION OF ONLINE PAYMENT PROCESSING SYSTEM

Over the years we have experienced a progression of value transfer systems starting from barter, through bank notes, payments orders, cheques, and later Credit Cards [4]. This has finally evolved into Electronic payment systems which enables commerce on the Internet.

The Computer systems and Internet are the key enablers in OPPS. With the introduction of OPPS, the physical need to be present is eliminated and saves a lot of time for the user. Any person can view various products/services, can understand about them better using notes, text and video about them, choose and buy them instantaneously by making online payment. The shipment can also be done to any part of the world. The entire system used to buy and sell products or services which uses OPPS is called Electronic Commerce. These systems are commonly known as e-commerce, eCommerce or e-comm. These systems are more than just buying or selling products and include the entire online process of developing, marketing, selling, paying, delivering, tracking and servicing. The use of ecommerce further leads to the innovations in Electronic Data Interchange (EDI), Inventory management systems and automated data collection systems.

Electronic commerce (e-commerce) has rapidly flourished because of the openness, speed, anonymity, digitization and global accessibility characteristics of the Internet, which facilitated real-time business activities, including advertising, querying, sourcing, negotiation, auction, ordering, and paying for merchandise [23].

Ecommerce types can be defined by looking at the range of various schemes of transactions distinguished according to their participants as given below:

- Business to business (B2B)
- Business to Consumer (B2C)
- Consumer to Business (C2B)
- Consumer to Government (C2G)
- Government to Consumer (G2C)
- Employee to Business (E2B)
Out of all the above, B2C grows with a tremendous rate of around 25% per year and growth has been much higher in some segments (e.g. travel) [9].

Electronic Payments have several advantages which were never available through traditional modes of payment. Most important of them are as given below:

Privacy
Integrity
Compatibility
Good transaction efficiency
Acceptability
Convenience
Mobility
Low finance risk
Anonymity

Perhaps the greatest advantages of electronic payments are the convenience and time saving. Individuals can pay their bills and make purchases at unconventional locations 24 hours a day, 7 days a week, and 365 days of the year and there is no waiting for merchants or businesses to open.
A huge survey was conducted to identify the factors or reasons that act as barriers to use online payment or ecommerce system and the reasons are listed below. These were referred by various journals and papers [26]. Many consumers are skeptical or doubtful about the functional mechanisms of electronic commerce, its transparent processes and effects and the quality of many products that are offered online. This survey also talks about behavior of consumer and how the equations of trust are formed in the perspective of consumer [21]. The main concern with electronic payment is the level of security in each step of the transaction because money and merchandise are transferred while there is no direct contact between the two sides involved in the transaction. There are some negative aspects of online payments like lack of authentication, repudiation of charges and credit card fraud. Current systems are working on eliminating these disadvantages and they are successful in doing that with the help of 3D Secure/Verified-by-Visa and MasterCard SecureCode, OTP, etc.

Many business leaders, found the online sales growth decline gradually over the period of time inspite of addressing security issues and others, could see Web consumers as disloyal and unwilling to spend. Later extensive research found that it was because the managers were not exploiting what customers’ value most: engagement. Most firms limit their sites to providing narrow information about the products or services that are for sale and do not want to provide information that diverts attention from the core offerings. But research found that providing relevant other complimentary information pertaining to core service or product helps customers search for solutions, invites them to think of all the ways the core products might add value to their lives, wins their loyalty, and entices them to buy [18].

As per Laudon and Traver (2007), Online payment system has been widely accepted by consumers and merchants throughout the world, and by far the most popular methods of payments especially in the retail markets [38]. Laudon and Traver, (2007) also highlighted some advantages over the traditional modes of payment [38]. Some of the most important are: privacy, integrity, compatibility, good transaction efficiency, acceptability, convenience, mobility, low financial risk and anonymity.
1.7 SOME BENEFITS OF ONLINE PAYMENT PROCESSING SYSTEM

- **Lower bank fees:** Electronic transactions have brought change to fee structure over the years to encourage electronic banking. Fees are now very high for any sort of interpersonal assistance (over the counter or with cheques) and much lower for transactions over the internet or the telephone.

- **Lower office expenses:** One can save money on office expenses because of less need for cheques, envelopes, cash slips and postage. Regarding the office records, all payroll transactions can be safely stored and backed up electronically. Should one need a hard copy, one can simply print one out from the saved data. With this, there is increased payment efficiency.

- **Saves time and increases convenience of making payments:** With electronic payroll, there is no more need to prepare bank slips, travel to the bank, wait in a queue, etc. Electronic payroll can be done 24 hours a day, 7 days a week. Once the account details have been set up (most systems can be automated so that payroll is completed automatically by the system), the payment can be made straight into the employee's bank account. Meaning, no more waiting for cheques to clear; or taking time off to deposit their wages into an account or travelling to drop the payment schedule with the bank. Payment can be made swiftly and remotely using various electronic devices.

- **Security:** Obviously there can be many security risks when travelling to and from banks with payroll money. Electronic Payment System allows secure transfer of funds and this can be completed from ones business premises or at home [14].