

**ASSESSMENT OF THE CHOICE OF ATM LOCATION FROM COST
AND BENEFIT PERSPECTIVES: THE CASE STUDY OF BANK A
IN THAILAND**

WUTTIYA THUEMAN

**AN INDEPENDENT STUDY SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENT FOR THE DEGREE OF
MASTER OF SCIENCE IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT
INTERNATIONAL COLLEGE
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Research Title: Assessment of The Choice of ATM Location From Cost and Benefit Perspectives:
The Case Study of Bank A in Thailand

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ABSTRACT

An Automatic Teller Machine (ATM) plays an important role in a banking system nowadays. The bank offers the ATM services in order to support customer demand for cash and other services. Before the bank decides to deploy an ATM, there are several factors which the bank has to consider. Location of an ATM is one of the most important factors which can affect a number of ATM usages and leading to the benefit or loss to the bank. The objectives of this research are to determine whether the ATM location has an impact on a number of ATM usages, to study the effect of money movement in ATM machines on bank benefits and losses, and to study customer behavior on ATMs usage which relates to ATMs' location. First, the data of ATMs money movement from Bank A are analyzed by using basic statistical analysis and One-Way Completely Randomized Design method for hypothesis test. Then the questionnaire survey is conducted to study bank's customer behavior when using the ATM in department. Finally, the results reveal that the locations of ATM affected to ATM usages of bank customers.

Keywords : ATM location, Bank's customer behavior, ATM usage

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CHAPTER 1

INTRODUCTION

1.1 Background

Automatic Teller Machine (ATM) is an electronic telecommunications device that provides the cardholders to perform basic financial transactions without bank representative or teller. There are two primary types of ATM. First type of ATM is the service that assists the cardholder to perform electronic bill payment, statement inquiry, transfer and withdraw money. Second type of ATM is the more complex teller machine that can deposits, credit card payment and report account information.

ATM has an important role for human life because it can make life easier. The concept of ATM is a self-service machine that allows the cardholders to perform basic financial transactions at any time even during non-banking hours. It increases the cardholders' convenience, which results in transport costs and time reduction. The cardholders can perform finance transactions anywhere which ATM is available. Now-a-days, the ATM are located at convenient places such as shopping malls, convenient stores, airports, railway stations, universities and workplaces where the cardholder can access and perform the financial transaction by using ATMs easily. Moreover, ATM machines provide benefits to bank by reducing the workload of bank's staff and help bank to provide service without human errors.

Normally, there are ten most frequently used transactions by ATM machines including deposit and withdrawal, balance and statement inquiry, funds transfer, mobile top-up, credit card payment, electronic bill payment, insurance payment, barcode payment, pin code changing and changing the limitation of withdrawing money (Kamonwan Taohai, Suphakant Phimoltares and Nagul Cooharojananone, 2010).

1.2 Statement of Problem

Location of ATM machine is one of the most important factors that bank should consider. Assessment where to place ATM machine is very important issue for bank because there are many requirements. These include for example set up and operational cost, which bank must monitor and maintain, the price of buying or leasing an ATM that bank needs to spend money for rental and ATM form factor to be deployed such as indoor ATMs, mobile ATMs or in-wall ATMs. The location of ATM machine affects to a number of transactions which can make benefit to bank because that transactions have the operation fees. On the other hand, if money in ATM

machines has no movement it will affect to bank as well. Moreover, location of ATM machines which easily access can create customers' satisfaction with the services of the bank.

1.3 Research Objective

The objectives of the research can be stated as follows:

- 1.) To determine whether the ATM location has an impact on a number of ATM usage
- 2.) To study the effect of money movement in ATM machines on bank benefits and losses
- 3.) To study customer behavior on ATMs usage which relate to ATMs' location

1.4 Scope of Study

The research focuses on the relationship between location of ATM and ATM usage of bank's customers in the shopping centers in Chatuchak area of Bangkok. Two different types of shopping center are considered with different target customers. The research also studies the effect of money movement in ATM machines on bank benefits and losses by using the ATMs' money movement data from one of top five banks in Thailand. Moreover, the research also studies customer behavior on ATMs usage which relate to ATMs location in department store. The subjects of this research were limited people who live in Bangkok and familiar with the financial transaction through ATMs located in department stores.

1.5 Research Organization

This independent study is organized into various parts as follows. Following this chapter the relevant literature, previous study, research or theory related to the study is reviewed in Chapter 2. Then the research methodologies used in this study are presented in Chapter 3. After that, there is an analytical of data in Chapter 4, in which there are the outcomes and key findings. Eventually, the conclusion and the recommendation are drawn in Chapter 5.

1.6 Expected Contribution

For the expected outcomes, the researcher clearly understands the relationship between location of ATM and ATM usage of bank's customers and how the location of ATM affects to bank benefits and losses. Moreover, the researcher also understands customer behavior on ATMs usage which relate to ATMs location.

CHAPTER 2

LITERATURE REVIEW

2.1 ATM Introduction

Financial transaction involves with human life now-a-days. Both business owners and employees entail these transactions including with cash withdrawal, deposit money, money transferring and bill payment. During bank hours, customers can directly contact and perform financial transactions at bank office. However after usual working hours of a bank, customers still demands for those transactions. The first ATM was installed in USA by Barclay's Bank since 1967 and it was introduced and became popular in many countries later. Until now there are widely in bank businesses to serve their customers by ATM services (Mujtaba and Mahmood, 2011). An Automatic Teller Machine (ATM) is a self-service machine which is located in public places that bank allows the cardholders to perform financial transaction by themselves, especially cash withdrawal. At present the ATM is an important device and people use the ATM widely (Yarlikas, 2009). ATM is a kind of service that bank offers to their customers in order to enhance customers' satisfaction. The ATM is a financial management instrument that has an important role for bank to serve their customers.

The cardholders who hold the ATM cards of any banks can get their money from the banks easily. Currently, many people no longer need to carry on the wallets with full paper money, they need only an ATM card to insert into any ATM terminals and fill in PIN code then they can get their cash. The most important function of bank can perform via ATM which is operated by plastic card. Cheque, personal attendance of the customer, banking hour's restrictions and paper based verification were replaced by the plastic card. (Singh and Komal, 2009)

When the cardholders use ATM services, they will arrange the ATM card and PIN code which the banks provide them when opening new account. The cardholder inserts an ATM card into the ATM terminal and enters PIN code. The cardholder can use the ATM services after access with the correct PIN code. Using ATM service is not complicated and accessible for the bank's customer, so ATM is one of the first ways when people need money (Mujtaba and Mahmood, 2011).

To provide comfort to customers, bank offers the ATM services which 24 hours available in accessible location. Besides, an ATM provide satisfaction to bank's customers by providing the

convenience to cardholder any time and any place, it also makes profit to bank from the transaction fees or cost charged by cardholder's bank when the cardholder uses different bank's ATM for the transaction. Due to the connectivity between banks through online networks, the cardholder can perform financial transaction via other branches which are not their own banks (Khawaja and Manarvi, 2009). There were ten main tasks of ATM banking in Thailand. However, the most seven frequently performed tasks on the ATM banking services including withdrawal, statement inquiry, transfer, mobile top-up, credit card payment, electronic bill payment and insurance payment respectively. The less three tasks of ATM banking services were barcode payment, pin code changing and changing the limitation of withdrawing money (Kamonwan Taohai et al., 2010).

Pissacha Somdee (2001) stated that there are both opportunity and limitation of ATM which banks have to consider. The strength point of ATM is providing the convenience to banks' customers without the assistance from tellers. Moreover, the cardholders can perform financial transactions after bank hour and 24 hours available. However, there is an important limitation of ATM which is high of investment cost. Thus before the banks decide to invest in ATM services, they have to do analysis even research. The important points that the banks should analyze are how many investment of ATM and the worthiness of ATM which depend on number of ATM usage. If the number of ATM usage is high, it can help bank reduce their manpower cost and create value to each ATM as well. Thus, the target of commercial banks in ATM investment is increasing number of ATM cardholder as much as possible in order to increase number of transaction through their ATMs. Each commercial bank determines their marketing strategies in order to increase number of ATM cardholders by setting up ATM cards' sales promotion. However, both ATM cards and ATM terminals services for all commercial banks are similar. Obviously seen ATM terminals any banks are quite same appearance, function and style, thus ATM services any banks are not differ from others. Therefore the best ATM location is the key factor of banking industry competition. Banks try to determine ATM locations and deploy their ATM terminals wherever the customers can access easily and enhance their capacity to deliver better services to their customers. At the beginning, ATMs placed at the bank branches which can be provided competitive advantage to the bank owners more than the other places. After that time, ATMs were allowed to place other places such as department stores, connection points or community places where crowded. However, there is limitation of ATM services which similar of services all banks thus it is hard for all banks to invest more ATM terminal to be their own.

Hence, to provide financial services bank's ATM customers, the commercial banks collaborate with the others to set up ATM pool system which cardholders can withdraw money from their banks even though they perform from the ATMs of other banks. Under ATM pool, bank's customers are able to make withdrawals and balance inquiries from any ATMs and anytime.

2.2 ATM Location

In addition ATM can help people to perform their transaction when they needed, in terms of benefit to bank, ATM reduces operating cost and creates customer's satisfaction by provide 24 hours service in accessible location. It is easy to find ATMs in many places such as shopping malls, convenient stores, airports, railway stations, universities, workplaces, even at the banks. The important service of bank is providing ATM services to their customers without problem to create customers' satisfaction and competitive advantage to the bank. The placement of ATM is one of the factors which bank has to consider before investment in order to controls the operational costs and meets customer requirements. Many factors such as the price of buying or leasing an ATM, cost of deployment, cost of operation, ATM characteristics to be deployed and ATM maintenance cost are concerned with ATM deployment of the bank. Determining appropriate locations of ATM can create benefit to bank in term of costs effective. However, where to place an ATM and how to choose the best location are the factors that the bank has to make decision (Qadrei and Habib, 2009).

There are many researchers studied the ATM placement problem. According to the study of Qadrei and Habib (2009), the purpose of the study was to formulate the ATM allocation problem into an optimization problem, where the objective function was to minimize deployment and operational costs subject to the customers' satisfaction and the bank's requirements. Then, the researchers applied the genetic algorithm (GA) to search the appropriate location of ATM automatically. ATM placement problem formulation in this study consisted of seven inputs which are ATM types, possible locations, maximum number of ATMs per location, distances between locations cost of distance unit, maximum delay time, and weights. Moreover, the researchers also determined the cost function and all constrains mathematically. After the optimization process, the genetic algorithm solver used about fifteen minutes to find a solution which can reduce the cost more than 91%. In conclusion, the researchers believed that the genetic algorithm solver will help the bank to find ATM's locations and also for solve other problems.

Moreover, the objective of solving the ATM's location is to minimize the cost of operation by placement appropriated number of ATMs. The study of Aldajani and Alfares (2009)

which they studied the problem about determining the optimum number of ATMs and their locations by using a mathematical model and then developed heuristic algorithm approach. In order to solve the ATM's location problem, the objective of this study was to minimize the total number of ATMs to cover the customer demands as well as finding the appropriated locations. The implementation of algorithm with the actual map of down-town area of Khubar City in Saudi Arabia which included shopping areas, main road and avoid-region, the results of this study were shown as follow:

1.) Number of ATM placement calculated by algorithm covered 95% of total demand space and 99.6% is the percentage demand coverage.

2.) By algorithm approach, the first place of ATMs are located at shopping areas, follow by along the main roads and there is no ATM was placed at avoid-region.

The proposed algorithm approach in solving ATM placement problem provided efficiency and flexibility of computation (Aldajani and Alfares, 2009).

From the study of Kisore and Reddy (2015), it was better for both bank and their customers if the ATM locations were covered in a geographical area. Even though customers of one bank could perform financial transactions at any other bank ATMs, they might pay for the extra charges. Purpose of ATM was to provide 24 hours services to customers, thus ATMs placement was more important for bank to satisfy customers. Moreover, deployment of an ATM concerned with costs liked cost of real estate, power, cost of cash loading operations and security. The purpose of this study was to verify the statistical relationship between personality traits of people living in a service area and their choice for ATM location. The necessary data for evaluation was collected by an online survey through Facebook, Twitter and mailing individuals present in their address book. A total of 1,090 responses were analyzed using Principal Component Analysis (PCA). In this study, the researchers created the questionnaire on Google Docs and the URL was shared across. Two types of questions were used in this study which consisted of Objective and Classifying. The choices for ATM locations provided in this study which contained of 23 places were workplace, home/residential area, gated communities, shopping malls, market places where card payment was not allowed, multiplexes, hospitals, bus stations, railway stations, airports, government offices, E-Seva centers, popular highway halts, gas stations, temples, stadiums, hotels, gaming zones, tourist spots, bar/clubs, convenience stores, pubs, places that charge customer for transaction fees. The result shown that the best choice for ATM location was logical grouping of places, however it was depended on the population

demographics of local community. Moreover, to find possible hidden factors from the data collected, the researchers also do Exploratory Factor Analysis (EFA) in this study.

There is the related literature which studied the factors of removing and relieving ATMs in order to increase efficiency and benefit to Kasikorn bank (Dulrada Wutthayagon, 2013). The researcher collected ATMs data from Kasikorn bank in Thailand in 2013 and then calculated profit and loss from ATMs deployment in order to analyze causes and find out the appropriate solutions to increase efficiency and benefit to bank. From the study, there were 65 ATMs which suffered a loss in 2013. Analysis result found the reasons which effected to loss of ATMs deployment were:

1.) ATMs locations were not appropriate and could not make profit to bank totally 9 machines which shown in Figure 2.1.

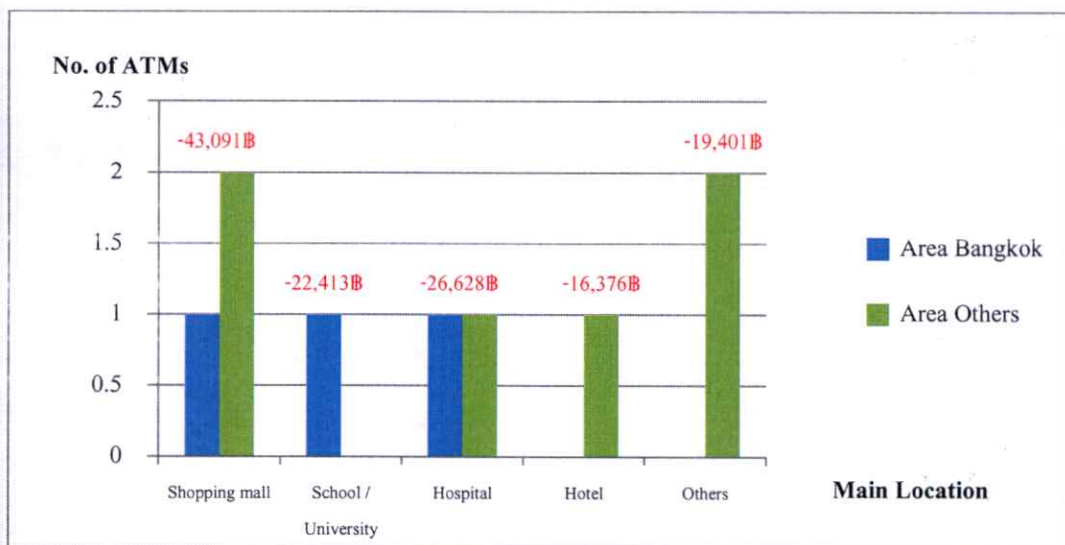


Figure 2.1 Number of ATMs which suffered a loss due to location was not appropriate

2.) ATMs efficiency could not achieved KPI of the bank totally 56 machines which summarized as Figure 2.2.

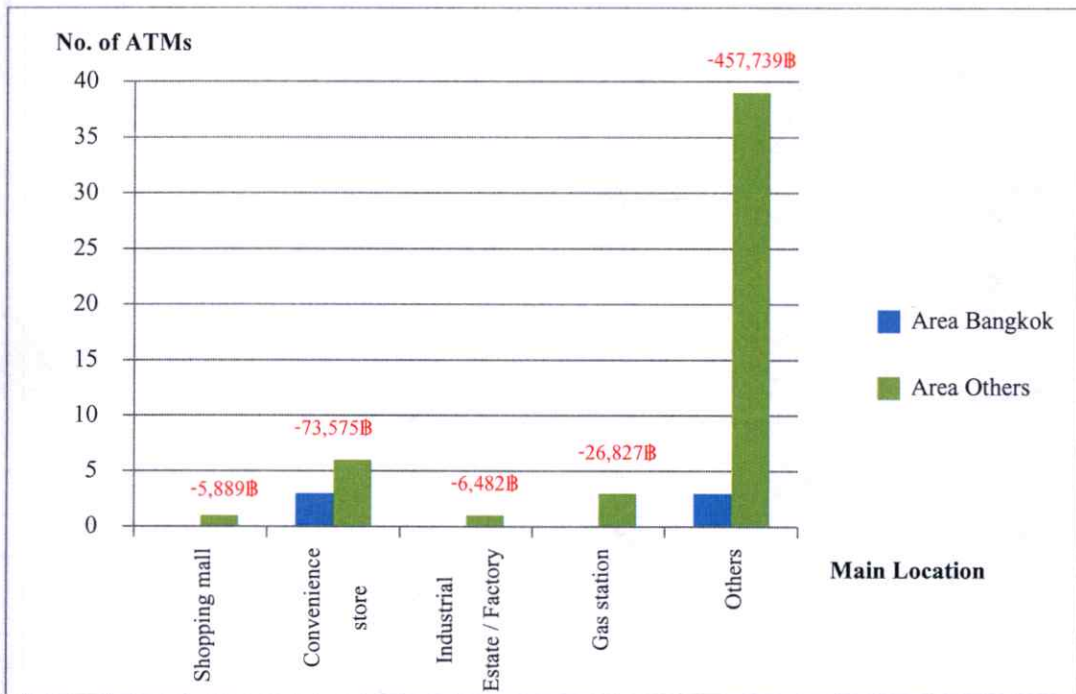


Figure 2.2 Number of ATMs which the efficiency was not achieved KPI of the bank

The researcher suggested 3 options of the solution to increase profit and reduce loss for bank which were:

1.) Relocated the ATM deployment in the same place to more suitable locations for customer convenience and accessibility. The researcher chose 1 ATM which suffered a loss at hospital by relocated from inside the hospital to the entrance of the hospital instead. The relocation created the bank profit about 4,506 Baht.

2.) Relocated the ATM location which suffered a loss to new location. However, there were many factors concerned.

3.) Improve ATM efficiency to meet KPI of bank.

Finally, the researcher selected changing point of the ATM deployment in the same place which was the best solution for this study.

2.3 ATM Cash Management and Cash Supply Chain

ATM location is one of the factors for decision making of the bank before investment. Cash management in ATM is also the factor which bank must be considered. The research of Castro (2009) studied about cash management in ATM which bank plan for future demand from historical data. A well-known problem faced by bank is cash management in ATMs. Currently, techniques which are used by bank based on simulation, experience or trial and error. To satisfy uncertain demand, bank has to manage cash in ATMs by determine the optimum amount of

money which will be placed each ATM. However, the process of refilling money in ATM will affect to costs because the refilling process is handled by external companies. The objective of the study was to find the amount of cash to be placed in ATM during period by using a stochastic programming approach. The stochastic programming approach used for decision making of uncertainty problem which is likely unknown ATM demand problem.

The study conducted by Armenise et al. (2010) stated that important factors for ATM network are ATM cash management and forecasting. Several factors which affect to ATM cash demand are period of time, position of ATM and socio-economic features of users. Stocking cash in ATM conducts to costs which are financial costs and operational costs. Unused stock rate by annual passive interests were affected to financial costs, while operational costs are mainly due to time to perform and supervise the task, maintenance, out-of-service and risk of robbery. Before holidays, the quantity of cash withdraw is become larger. During paydays or at the beginning of each month or at the end of each week, people tend to cash-out money more than usual. Even though period of time influence to the demand of cash, where the ATM located is also affected the ATM usage. For example, cash demand of ATMs which located at vacation destinations increase during holidays, while in shopping malls is largely increased on Friday and Saturday. The objective of ATM cash management is to meet customer demand with the minimal amount of cash. In general, ATM cash management relies on personnel experience and corporate policy. Decision making strategy about cash refilling in ATMs could be made upon many conditions not only forecasting the future demand of cash but also time, location, cash residual and other factors. The researchers adopted Genetic Algorithms (GA) as means for searching the best solution for cash management in ATMs.

Van Anholt and Vis (2012) studied a performance measurement system to actively control, monitor and improve performance of ATM. The researchers analyzed data from Dutch commercial banks in the Netherlands. Generally, in order to reduce the cost per processed banknote, banks try to improve the processes of cash supply chains. ATM and the related activities are caused of supply chain cost. Usually, cash supply chain includes with a central bank (responsible for cash quality), cash centers (responsible for distributing, checking, sorting and preparing cash), bank branches and ATMs (which dispense and take cash to or from customers), retailers (who receive cash from customers), and customers (who are the end-users of cash). For ATM activities such as maintenance and inventory control are responsible by the ATM manager, a commercial bank or an individual ATM deployer. One solution of reducing supply chain cost is

striving for economies of scale. For example, the three largest banks in the Netherlands have made decision to transfer the cash processing, distribution, and ATM maintenance to a single company to gain economies of scale by implementing a performance measurement system (PMS). In term of banking industry, a PMS can be used to monitor, measure and control ATM service quality. The importance of two key service quality dimensions of the commercial banks is cost and service. The objective of every bank is low operational cost and high perceived customer service quality. There are service level agreements (SLAs) which ATM cash manager have to comply with. Service level agreements involve a target fill rate which referred to needs to be fulfilled as an average for a network of ATMs within a period of time. The impact of not fulfilling customer demand can lead to customers' satisfaction. There are several causes of ATM unavailability such as an ATM is out of service due to a technical malfunction, an ATM might be down due to it run out of banknotes, and might be because of an ATM replenishment. The degree of customer dissatisfaction is determined by both the ATM characteristics and the moment of ATM unavailability. For example, ATM customer would be more disappointed when ATM is unavailable during a holiday or event than during a regular day. ATM's demand during daytime more than at night, and demand during Saturday more than during Sunday.

The study of Van Anholt and Vis (2012) also stated that paying a surcharge for withdrawal cash or other financial transactions by customers through the ATMs can be profitable to the banks. If banks missed ATM's demand, these can cause of lost income of the banks. The important ATM's costs consist of the holding and ordering costs. The holding cost stands for the interest cost or opportunity cost of cash due to cash which is stocked in ATMs do not provide interest income to cash owners. The ordering cost such as the order preparation cost at the cash center, the transport cost, insurance cost, and the cost of the actual replenishment. The transportation of cash is expensive due to cash is high value, high density product, thus transportation requires specialized armored trucks, delivery by two staffs at least and insurance is covered.






2.4 Banking Industry and ATM in Thailand

A Thai banking industry has become very competitive. To improve capacity and infrastructure of the banking system, many banks compete in using new technologies to provide convenience services to their customers (Jarunee Wonglimpiyarat, 2014).

2.4.1 Proportion of number of commercial banks in Thailand

Regarding to resources from (Bank of Thailand, 2015), commercial banks in Thailand in 2015 can be ranked base on number of all branches as Table 2.1.

Table 2.1 Proportion of number of commercial banks in Thailand (Mar-2015)

| Rank | Bank | Bangkok | Central | Northeast | North | South | Total |
|------|--|---------|---------|-----------|-------|-------|-------|
| 1 |  Siam Commercial Bank | 358 | 415 | 150 | 122 | 155 | 1200 |
| 2 |  Krung Thai Bank | 292 | 338 | 222 | 177 | 170 | 1199 |
| 3 |  Kasikornbank | 328 | 357 | 169 | 153 | 125 | 1132 |
| 4 |  Bangkok Bank | 302 | 348 | 164 | 168 | 137 | 1119 |
| 5 |  Bank of Ayudhya | 193 | 212 | 78 | 55 | 80 | 618 |

Source: Bank of Thailand

Thailand's five biggest banks by number of all branches according to report from (Bank of Thailand, 2015) in March 2015 include Siam Commercial Bank, Krung Thai Bank, Kasikornbank, Bangkok Bank and Bank of Ayudhya which divided into percentage as 22.78%, 22.76%, 21.49%, 21.24% and 11.73% respectively.

2.4.2 ATM in Thailand

The first ATM was introduced to Thailand by Siam Commercial Bank (SCB). The Siam Commercial Bank offered this advanced technology to serve its customers on March 24, 1983. Also, the first telephone banking service was offered by the bank. Both ATM and telephone

banking services led to huge changes of banking industry in Thailand (The Siam Commercial Bank, 2015). Two ATM terminals were deployed at their head office and service hour was during 8.30 a.m. to 3.30 p.m. After that Siam Commercial Bank (SCB) expanded the ATMs services at their branches, they also were allowed by Bank of Thailand to extend for the service hour to be 7.00 a.m. until 10.00 p.m. every day. Banks try to support customers' needs and make them satisfy with banks services thus they apply electronics banking system to the customers. Moreover, because of changing of consumer behavior in Thailand such as daily life concerns with computers and technologies more and more, more self-service activities, and fast learning new technology thus many commercial banks realize that ATM service can meet customers' requirement (Pissacha Somdee, 2001).

Kapfer et al. (2007) stated that in the Asia Pacific region, the ATM network in Thailand is one of the fastest growing. It was grown by 23.00% CAGR¹ between 2002 and 2006. ATM in Thailand rapidly expands due to the high level of cash usage. However, the factors that limit ATM growth in offsite and rural locations were security issues, while the rental cost has increased dramatically in the metropolitan areas and early closure of shopping malls prevents 24-hour access, so the returns of ATMs investment were reduced.

In Thailand, the payment system can be separated into two systems which are physical payment (cash and cheque payment) and e-payment (ATM, credit cards, Electronic Funds Transfer at Point Of Sale (EFTPOS), smart cards, internet banking and mobile banking) (Jarunee Wonglimpiyarat, 2014).

According to information from Financial Institutions Policy Group of the Bank of Thailand (2013), there were 16 Thai commercial banks with 6,601 branches and 15 foreign commercial banks with 19 branches in 2013. Number of Automated machines including both Automated Teller Machines (ATMs) and Cash Deposit Machines (CDM) were 52,242 and 56,851 terminals in 2012 and 2013, respectively which was increased 8.82%. Monthly average value of cash withdrawals via ATM card in 2012 and 2013 were 6,967 and 8,381 Baht per card, respectively which was increased about 20.30%. Table 2.2 provides a summary of the Thai payment statistics in 2012 – 2013.

¹ Compounded Annual Growth Rate

Table 2.2 Summary of the Thai payment statistics in 2012 – 2013

| | 2012 | 2013 | |
|--|------------|------------|-------------------------|
| Total population | 64.50 | 64.80 | million |
| Nominal Gross Domestic Product (GDP) | 11,363.00 | 11,897.40 | billion Baht |
| No. of Thai commercial banks: 16 banks | 6,391 | 6,601 | branches |
| No. of foreign commercial banks: 15 banks | 19 | 19 | branches |
| No. of Specialized Financial Institutions branches | 2,425 | 2,549 | branches |
| No. of post offices | 1,298 | 1,303 | branches |
| No. of ATMs | 52,242 | 56,851 | terminals |
| No. of EFTPOS | 264,236 | 311,289 | terminals |
| No. of ATM cards | 24,108,467 | 24,101,957 | cards |
| No. of debit cards | 42,988,140 | 45,241,477 | cards |
| No. of credit cards | 16,870,025 | 18,626,864 | cards |
| Currency in circulation per capita | 17,628 | 18,363 | Baht/person |
| Average cheque usage per capita | 1.9 | 1.8 | cheques/ person/year |
| Payment through credit cards average per month | 4,611 | 4,594 | Baht/card |
| Cash withdrawals through ATMs average per month | 6,967 | 8,381 | Baht/card |
| Payment through debit cards average per month | 183 | 194 | Baht/card |
| Cash withdrawals through debit cards average per month | 9,639 | 10,579 | Baht/card |

Source: Bank of Thailand

In terms of regional distribution, from the data of Bank of Thailand shown in 2013 the number of branches of Thai commercial banks, foreign banks and Specialized Financial Institutions (SFIs) in the northern, north-eastern, and southern parts of the country were 1,307, 1,564 and 1,248 branches, respectively. However, the highest number of branches this country was the central part including Bangkok and vicinities which had 5,050 branches, or 55.00% of the total number of branches. Moreover, the highest number of automated machines was located in

the central part of the country including Bangkok and vicinities which having 35,944 terminals or 63.00% of the total number of terminals or 56,851 terminals as shown in Figure 2.3.

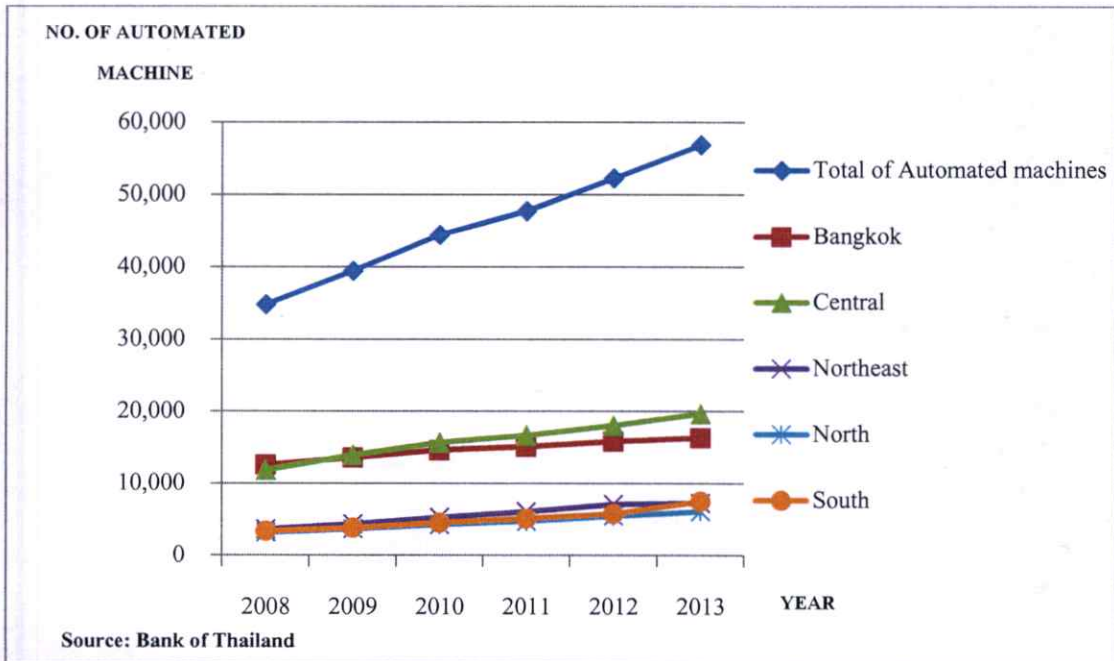


Figure 2.3 Number of Automated machines² in Thailand (2008-2013)

Overall image of number of ATM in Thailand is continuing to increase due to the commercial banks realize the importance of ATM. However, the percentage of the ATMs' increase is not high comparing to the past because banks try to control their operational cost of ATM thus they prefer to relocate ATM instead and deploy a few ATM in high demand location (Pissacha Somdee, 2001)

Figure 2.4 shows the proportion of number of ATMs in year 2014 of five leading banks. Number of ATMs was divided to 23.00% of Siam Commercial Bank and Kasikornbank, 21.00% of Krung Thai Bank and Bangkok Bank, and 12.00% of Bank of Ayudhya, respectively (The Siam Commercial Bank Public Company Limited., 2014), (Krung Thai Bank Pcl., 2014), (Kasikornbank Public Company Limited, 2014), (Bangkok Bank Public Company Limited, 2014), (Bank of Ayudhya Public Company Limited, 2014).

² Automated Teller Machines (ATM) and Cash Deposit Machines (CDM)

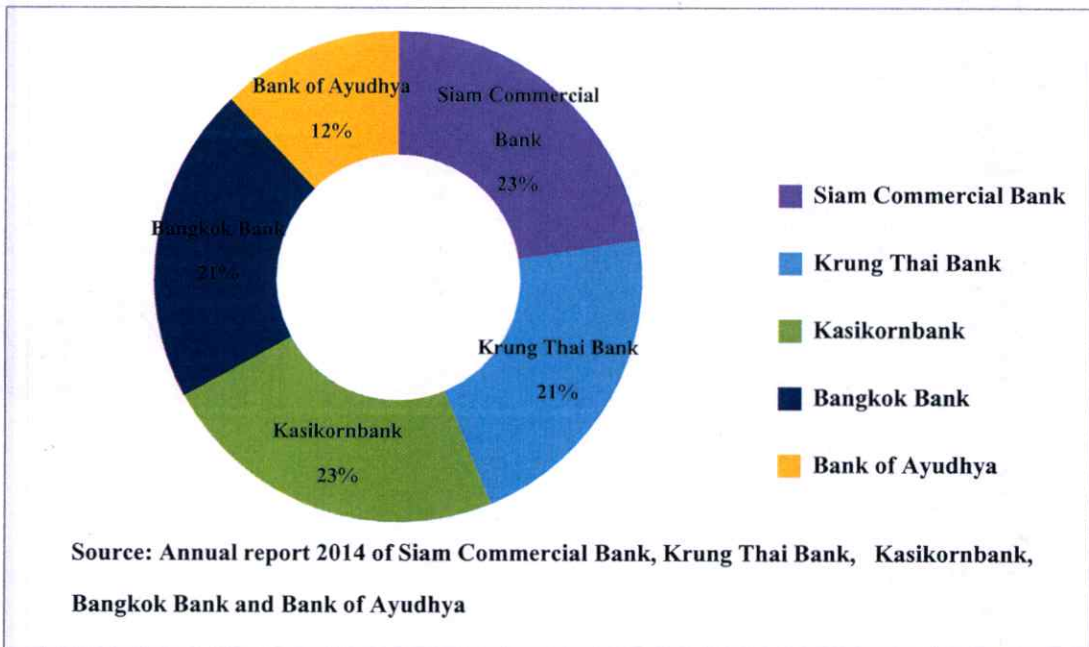


Figure 2.4 Proportion of number of ATMs of five leading banks in Thailand (2014)

2.4.3 ATM card in Thailand

According to Financial Institutions Policy Group of the Bank of Thailand (2013), the number of electronic cards, including ATM, debit and credit cards in Thailand rose continually in 2013. At the end of 2013, the number of debit cards was 45.2 million, growth rate reached 5.20% from the previous year. For the number of credit cards was 18.6 million, increasing by 10.40% from the previous year. However, the number of ATM cards decreasing by 0.60% from the previous year which totaled at 24.1 million cards in 2012 to 24.0 million cards in 2013 as shown in Figure 2.5.

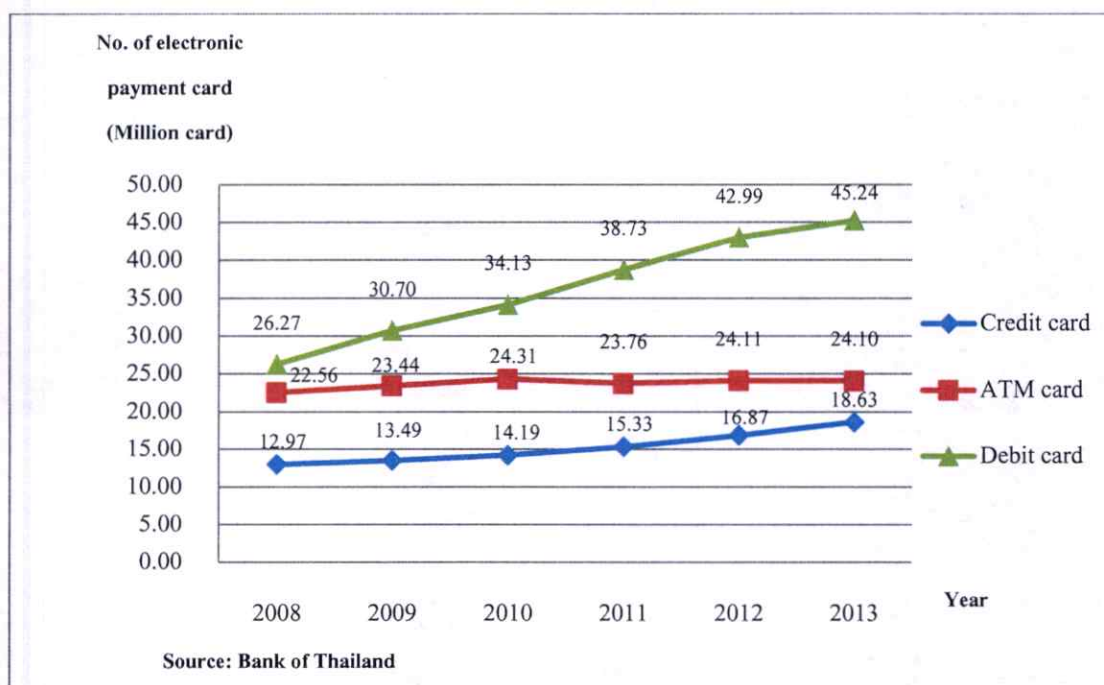


Figure 2.5 Number of electronic payment cards in Thailand (2008-2013)

The first type of electronic cards that most commercial banks offered to their customers in order to withdraw cash from automated machines were ATM cards. Recently data from Bank of Thailand shown that the total number of ATM cards decreased while the total number of debit cards increased because both ATM and debit cards could be used to perform the same function but the debit cards could also be used to pay for goods, services or internet purchases, so most commercial banks aimed to switch from issuing ATM cards to debit cards (Financial Institutions Policy Group of the Bank of Thailand, 2013).

ATM card transactions in Thailand amounted to 535.3 million transactions in 2013, increasing by 1.40% from the previous. In term of the total value of transactions, the value was 2,451.3 billion Baht, increasing by 0.80% from the previous year. The main task of ATM cards was cash withdrawal which accounted for 77.70% and 75.30% of the total volume and value of ATM card transactions respectively when compared to other types of task. The amount of cash withdrawal of ATM card was 1,845.6 billion Baht, declining by 0.40% from the previous year. The second most popular task was funds transfer, which accounted for 4.90% and 9.40% of the total volume of transactions and its value, respectively (Financial Institutions Policy Group of the Bank of Thailand, 2013).

2.4.4 The problem of ATM usage in Thailand

Pissacha Somdee (2001) stated that in Thailand, there are many problems of ATM usage which shown as following:

2.4.4.1 Lack of public relations

Some of bank's customers cannot perform financial transaction by themselves and they need support from other people, these are affected to security of cardholders. Moreover, many bank's customers are not familiar with ATM such as what is the benefit of ATM or what kind of services that ATM offers to the cardholders. Therefore, to create customer confidence in ATM services, banks should create the publication about how to use an ATM and publicize all the services that can perform through the ATM.

2.4.4.2 Less awareness in the importance of ATM card and PIN code

Many ATM users lack knowledge to effectively protect their personal information like PIN code when they are performing financial transaction through the ATM. Moreover, when they lost their ATM card, they do not restrain the ATM card immediately thus it affects to loss of money by the robber.

2.4.4.3 The risks of hacking ATM information

Normally the ATM terminal is stood at the place where allowing everyone access easily, however it is a risk to the cardholders' security. Therefore, when the cardholders are using the ATM, they should use their body to block the view of people behind from looking over the shoulder, always shield the key pad with hand when entering PIN code or use the ATM in place with good lighting and in very secure or high traffic area such as beside a 24 hour convenience store or inside a bank.

2.4.4.4 The ATM slip could be dangerous

Many of ATM users throw the ATM slip in the garbage once they finished the financial transaction, it can affect to the security of money in their bank account. This is because the ATM slips are a password to easy theft that could leave your account with no money.

2.4.4.5 No alarm system with ATM terminals

In Thailand, the banks do not activate the ATM alarm system which can provide protection against ATM theft due to banks apply the insurance to cover the risks instead.

2.4.4.6 No information of nearest ATM in the same area

In case of ATM cannot use or out of service, customers do not know where the nearest ATM is. The solutions of this problem are:

1) Setting up the telephone to contact directly with call center that control ATM services. However, it is quite difficult for applying this service in Thailand because of high of operational cost.

2) Preparing information board and map which ATMs are located in the nearest area in order to support necessary information to customers.

2.5 Population Demographic in Bangkok

Regarding to statistics data about demographic and number of residence in Thailand from Ministry of Interior, Department of Provincial Administration, The Bureau of Registration Administration, Official Statistics Registration Systems (2014) which is shown in Figure 2.6, in 2014 the population of Thailand was 65.12 million persons which increased about 2.74% from 2008. Meanwhile, the population in Bangkok was 5.69 million persons which quite fluctuated due to internal rural to urban migration. Generally, people from rural areas travels into the city for their jobs. The number of Bangkok metropolitan in 2014 increased about 0.11% from the previous year, however declining by 0.33% from 2008 due to out-migrants to vicinity or upcountry. The total population in Bangkok as of 2014 was 8.74% of the total population in Thailand. The number of residence in Thailand in 2014 was 24.09 million which increased about 16.90% from 2008, while number of residence in Bangkok was 2.67 million which rapid growth about 18.06% from 2008.

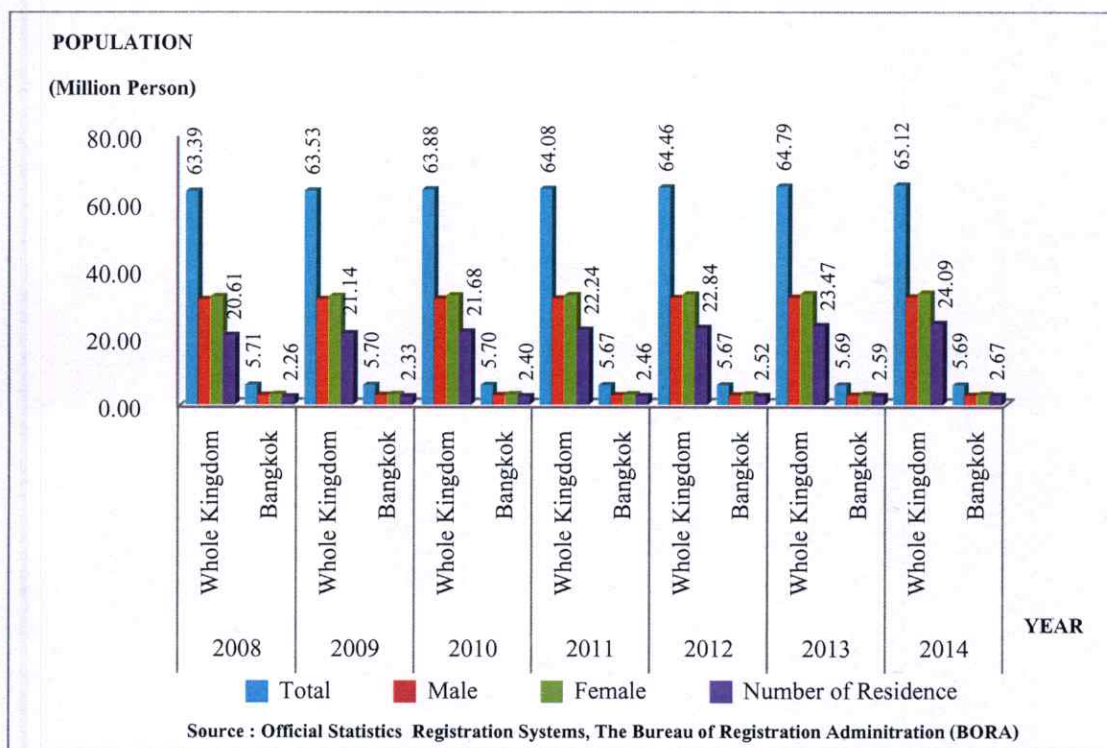


Figure 2.6 The number of population in Thailand, Bangkok and number of residence (2008-2014)

2.5.1 Age structure of population in Bangkok

According to information from Ministry of Interior, Department of Provincial Administration, The Bureau of Registration Administration, Official Statistics Registration Systems (2014), age structure of population in Bangkok year 2014 is shown in Figure 2.7. Most of Bangkok metropolitan or 74.00% were middle age group (15-65 year), followed by 16.00% of children group and 10.00% of elder group.

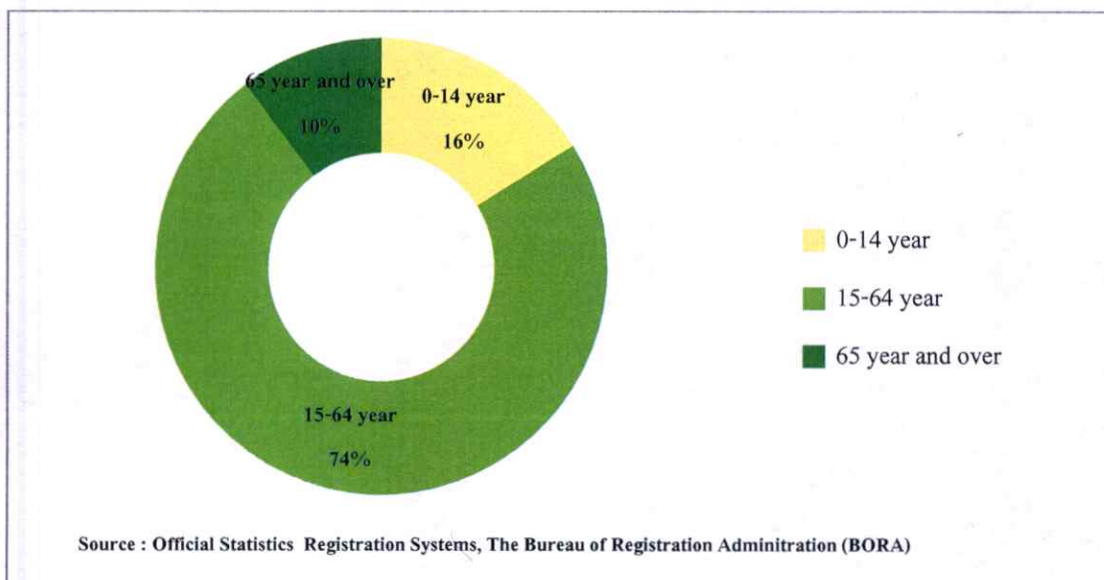


Figure 2.7 Age structure of population in Bangkok (2014)

2.5.2 Level of education in Bangkok

Ministry of Information and Communication Technology, The National Statistical Office (2015) reveals an education level in Bangkok during the first quarter of 2015, most of Bangkok residents completed university education or 39.24% from total population in Bangkok as shown in Figure 2.8.

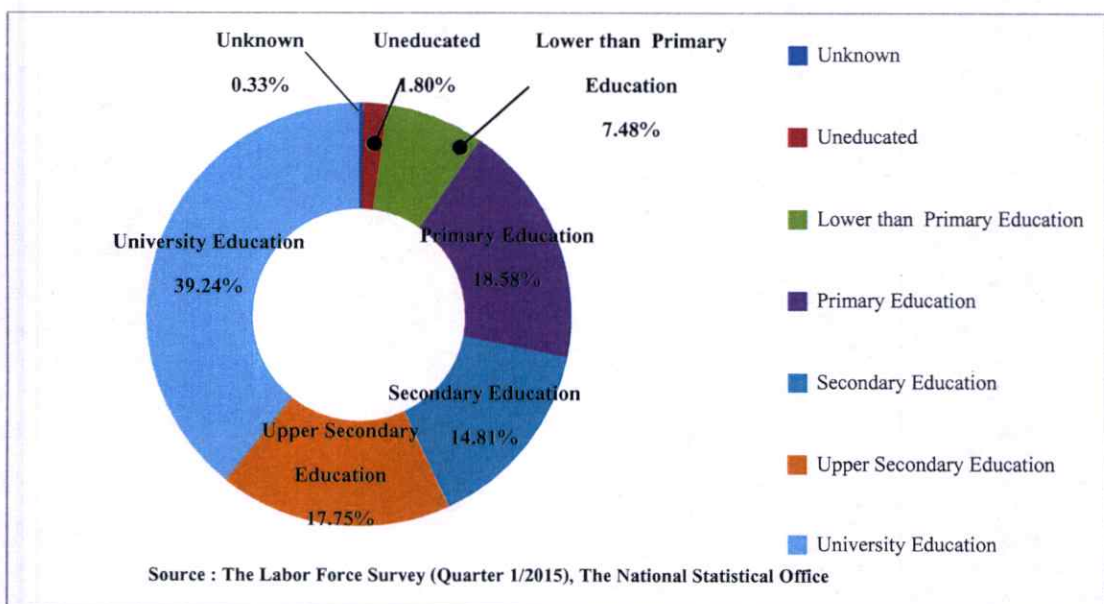


Figure 2.8 Level of education in Bangkok (Quarter 1/2015)

2.5.3 Labor Force in Bangkok

According to data from Ministry of Information and Communication Technology, The National Statistical Office (2015), about 10.00% of employed labor force is in Bangkok. Most of them are employees who work in a shop or market (1,287,500 peoples), follow by craft and associate professionals (694,500 peoples) and plant and machine controllers and assemblers (690,800 peoples) as shown in Figure 2.9.

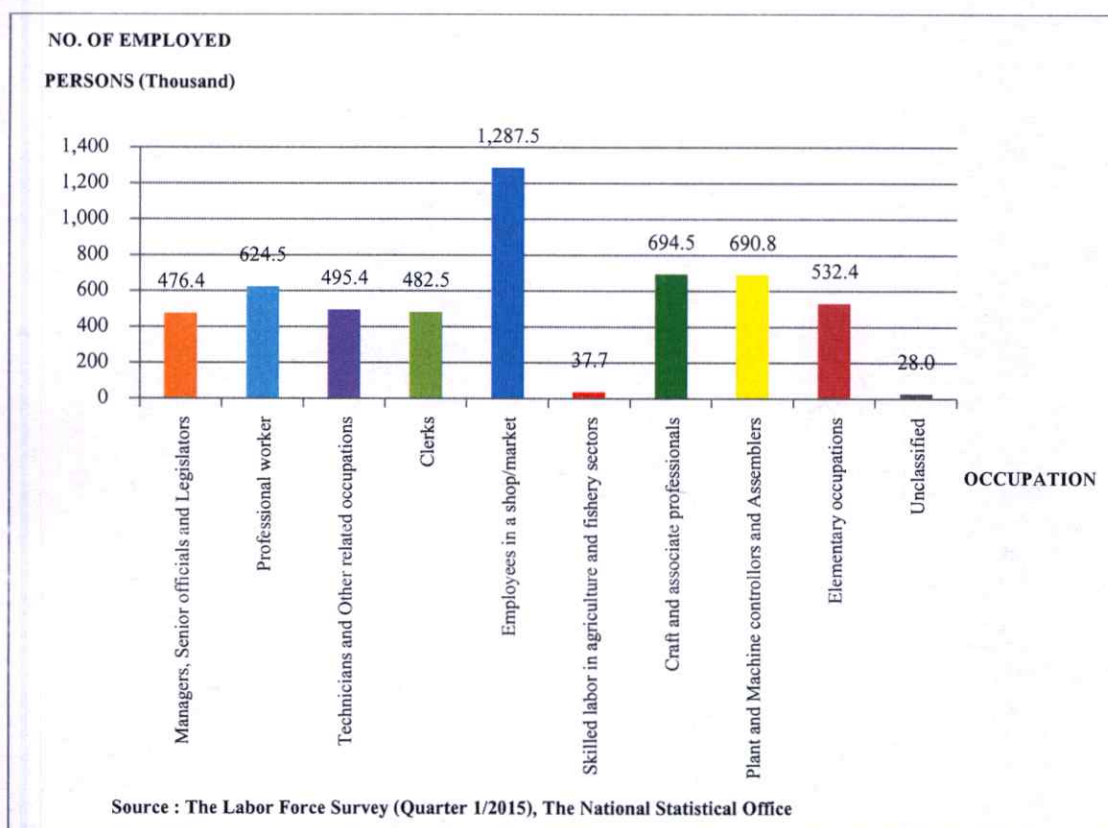


Figure 2.9 Labor Force in Bangkok (Quarter 1/2015)

2.5.4 Number of Department store, Supermarket and Convenience store in Bangkok

Bangkok has many kinds of shopping malls which located at accessible location (. At present, the shopping malls can provide services which suit all kinds of lifestyles and budgets of consumers. Inside the shopping malls, there are many stores where people can buy products, eat, or entertain themselves.

Department store is a large retail establishment which provides a large variety of products and services. In general, products featured in department stores are clothing, jewelry and accessories like handbags, belts and scarves, shoes, cosmetics, small appliances for the home, electronics, sports equipment, toys and furniture (Penn, 2015).

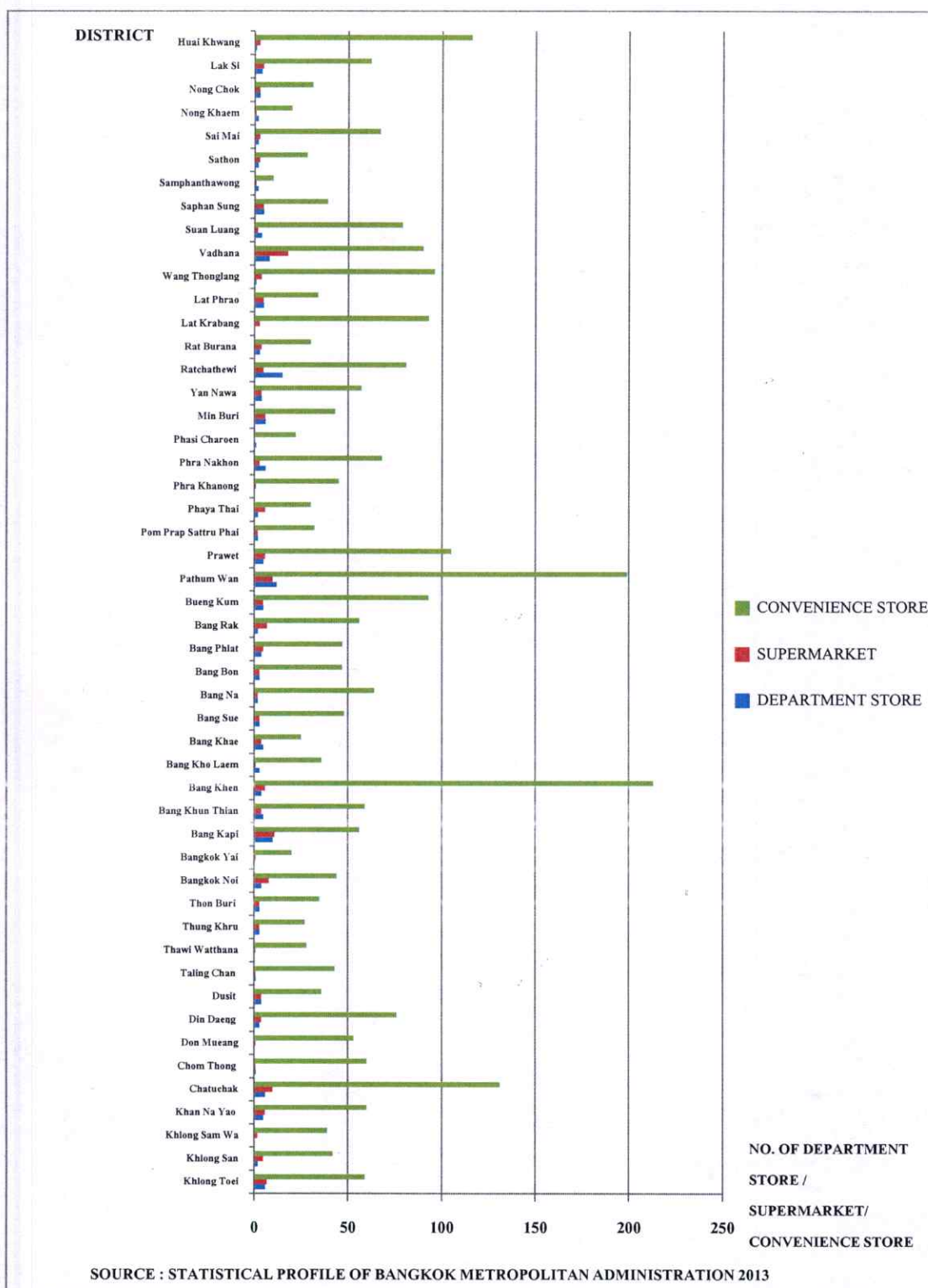


Figure 2.10 Number of Department store, Supermarket and Convenience store in Bangkok (2013)

According to data from Bangkok Metropolitan Administration, Strategy and Evaluation Department (2013), there are many department stores surrounding Bangkok area. Detail was shown in Figure 2.10.

2.6 Consumer Behavior

Understanding consumer behavior can create opportunities to company in order to satisfy their customers, it is important factor in term of banking industry as well. Studying consumer behavior can gain insights and will lead to more effective marketing strategies to the bank.

Hoyer and MacInnis (2010) mentioned about consumer behavior, they defined consumer behavior as “the totality of consumers’ decisions with respect to the acquisition, consumption, and disposition of goods, services activities, experiences, people and ideas by human decision-making units (over time)” Consumer behavior involves more than buying products of people, it also includes using of services, activities experiences and ideas. Moreover, it involves consumers make decisions about people, such as voting for politicians. Consumer behavior can occur over time in a dynamic order and it can involve many people such as a group of friends or a few coworkers. In addition, emotion of consumers like hope, fear, regret, guilt, embarrassment and general moods can affect how they think, the options the select or how they feel after making decision.

The four domains which affect acquisition, usage and disposition decisions can be classified as following (Hoyer and MacInnis, 2010):

1) The psychological core : Internal consumer processes

Most of consumers make decisions based on some source of their knowledge or information. The psychological core covers motivation, ability and opportunity; exposure, attention, and perception; categorization and comprehension of information; and attitudes about an offering.

2) The process of making decisions

The process of making consumption decisions involves 4 stages:

Problem recognition, information search, decision making, and post-purchase evaluation

2.1) Problem recognition and searching for information: when we have an unfulfilled need then problem recognition will occur. Then consumers will search for information gave their insight.

2.2) Making judgments and decisions: decision is characterized as a high-effort decision which the consumer will invest a lot of time and involve a lot of effort and low-effort decision which engage in less information search and process information less deeply.

2.3) Making post-decision evaluations: after the fact, this step allows the consumer to judge or evaluate the outcome of their decisions.

3) The consumer's culture: External processes

Generally, consumer's culture affects to their consumption decisions and how they process information. Culture relevant to the typical or expected behaviors, norms, and ideas which is characterized group of people. All aspects of human behavior are influenced by their culture such as religion, social class and household, personality or lifestyles.

4) Consumer behavior outcomes and issues

Even the psychological core, decision-making processes or the consumer's culture, they affect to consumer behavior outcome which are the symbolic use of products and the diffusion of ideas, products, or services through a market. Moreover, they are also influence.

2.6.1 Marketing implication of consumer behavior

It concerns about how the marketers apply the concepts of consumer behavior in the real world. The consumer research is valuable tool which helps the marketers to design their strategies such as the following (Hoyer and MacInnis, 2010):

2.6.1.1 Developing and implementing customer-oriented strategy

To understand the various groups of consumers within the marketplace, the marketers must conduct the research and then they will develop strategy and specific offerings to match with the consumers. Once the appropriate strategy was implemented, the marketers need to conduct the research again to determine how well the strategy is working or how does the expected results. Many marketers do the research to study whether consumers are currently satisfied with the offering. Moreover, the data from the research helps the company promote new product ideas to the customers.

2.6.1.2 Selecting the target market

To determine which consumer groups are appropriate target for marketing tactics, the marketer have to understand the consumer behavior.

2.6.1.3 Positioning

Deciding how an offering should be positioned in consumers' mind is another strategic choice of marketers. The marketers should understand how consumers view their own brand in comparison with the other brands.

2.6.1.4 Developing products and services

One of the important marketing activities is developing products and services which satisfy what consumers' wants and needs. When the marketers make decisions about products, they should apply the consumer research to match with what consumers want. Usually, the marketers use the consumer research to decide when and how to modify the products or services to meet the needs of consumers.

2.6.1.5 Making promotion and marketing communications decisions

The consumer research is very useful for companies to help them make decisions about promotional and marketing communications tools such as advertising, sales promotions, personal selling, and public relations.

2.6.1.6 Making pricing decisions

A critical influence on consumers' acquisition, usage and disposition decisions is the price of products or services. Therefore, to understand the reaction to pricing of consumers is an important tool for the marketer to use this information to determine pricing.

2.6.1.7 Making distribution decisions

The marketer can use consumer research to determine how the products are distributed and sold to consumers in retail stores. To make consumers satisfy with products or services, the marketers should develop distribution channels which allow consumers to acquire or use goods and services whenever and wherever they want.

2.6.2 Consumer diversity

Hoyer and MacInnis (2010) explained that there are 6 major aspects of consumer diversity which effects on consumer behavior consist of age, gender, sexual orientation, regional differences, ethnic differences and religious differences.

2.6.2.1 How age affects consumer behavior

Mostly the people in the same age have similar life experiences, share many common needs, symbols and memories which reach to similar consumption patterns. For example, consumers in generation Y or people who born during the year 1979 through 1994, their taste can change very quickly therefore the marketers should quickly respond. However, consumers in generation X or individuals born from 1965 to 1976, the people in this group take time when they research a purchase. The marketers can target this group through media vehicles such as popular or alternative music radio stations and network or cable TV.

2.6.2.2 How gender and sexual orientation affect consumer behavior

The difference in traits, attitudes, and activities of males and females can affect consumer behavior. Marketers often target a specific gender of their products. For example, women prefer to have shared brand stereotypes for fashion goods, whereas men prefer to their images of automobiles.

2.6.2.3 How regional influences affect consumer behavior

The patterns of consumer behavior depend on the region in which people live. The immigration patterns also can add ethnic affects to certain regions. For example, consumers in the Southwest of America prefer spicy food and dishes such as tortillas and salsa because of a strong Mexican influence. Cultural influences affect to consumer behavior as well, thus the marketers have to understand the different of global in consumer behavior before decide marketing strategy. To accommodate global consumer difference, many companies try to adjust their marketing activities.

2.6.2.4 How ethnic influences affect consumer behavior

Another major factor which affects consumer behavior is ethnic influences. The marketers can be addressed applying appropriate strategies and tactics by using consumer research which can identify specific characteristics and behavioral patterns of any consumer groups. African Americans consumers who live in the United States consist of many different levels of income and education, occupations, and regions, they have some similarities to the general population but differ in certain ways. For example, African Americans consumers are less likely to trust or buy products which are not advertised, they mostly respond to offering and communications targeted toward them. The marketers should focus on products for the unique needs of each consumer.

2.6.2.5 How religion influences affect consumer behavior

A structured set of beliefs and values which serve as a code of conduct or guide to behavior are provided by religion. For example, mostly of Americans are Protestant and Catholic, only the small groups of them identify themselves as being Jewish, Mormon, Muslim, or another religion and these difference can affect consumer behavior. The marketers should understand and respect for the targeted group's beliefs and customs before determining marketing tactics and strategy.

2.6.3 Social class and household influences

Social class hierarchy is the grouping of the members of society whose lifestyles and behaviors differ from the members of the other classes. Three major classes of social class system

are divided into high, middle, and lower. Social class structures strongly affect norms and values and, behavior. People in their own social class are more likely to be influenced by individuals than by the other classes. Moreover, the norms and behaviors of people in one class can also influence people in the other social classes. For examples, the lower classes copy trends that adopted by the upper classes because they may aspire to raise their social standing or it called the trickle-down effect. Another trend is the status float which started in the lower and middle classes and then spread upward liked the tattoo trend that began in the lower class first and moved into the upper classes (Hoyer and MacInnis, 2010).

The way to classify consumers into different social classes is a complex task. A variety of factors which determine social classes are including with income, occupation and education, other indicators of social class like area of residence or family background, and social class indexes. The greatest determinant of social class is occupation because some occupations require higher level of education, skill, or training which is viewed as higher in status than others. Moreover, consumers who are in the same occupation tend to have similar income, lifestyles, knowledge, and values. One of the key determinants of occupation and social class is education. The highly educated consumers can earn more and also read and travel more and healthier than others (Hoyer and MacInnis, 2010).

Hoyer and MacInnis (2010) also explained that the consumption patterns of specific social classes are different. The upper class consumers consist of aristocracy, the new social elite (or nouveaux riches) and the upper middle class (professionals) who tend to save and invest money more than consumers of the other classes. The resulting in purchase of the upper class consumers is to use products with high-quality and prestige brands in good taste. For the middle class consumers such as white-collar workers and many of whom have attended college (even through some have not earned a degree), they have vary patterns of consumption. Many of middle class consumers look to the upper class of guidance on certain behaviors. Another social class is the working class which mainly represented by blue-collar worker. Determining of the working class consumers for economic and social support, including job opportunities and advice, key purchases and help during difficult times is depended on family members. Consumers in this class are more likely to spend money than to save. And when they do save, they prefer savings accounts with the financial stability more than investments. Moreover, consumers in the working class judge the quality of product on the basis of price (higher price means higher quality). The last social class is homeless consumers who lack shelter and live on the streets or in makeshift

structures, cars, or vacant houses. Homeless consumers are not only unemployed, some of them were employed but not earning enough or little income. It is difficult for homeless consumers to acquire daily necessities such as food and medical care. Finding used or partially used goods that others have discarded or scavenging is an important survival activity for homeless consumers.

Some researchers said that the most important unit to analyze consumer behavior is the household because it influences more acquisition, consumption, and disposition decisions than individuals do. Family and household are different, family means a group of individuals living together who are related by marriage, blood, or adoption while household is a single person living alone or a group of individuals living together in a common resident whether they are related such as cohabiting couples (unmarried male and female who live together), gay couples, and singles who are roommates. In addition, households and family life cycle which can be characterized in term of age of family members, number of parents or children living at home, and so on can affect consumer behavior within households. For example, new parents spend more on health care, housing, food, and clothing and less on alcohol, education, and transportation; older single households and couples tend to spend more on home-based products, health care, and travel. Thus family members are an important factor which influence on household purchasing and spending (Hoyer and MacInnis, 2010).

2.7 Customer Trends That Will Affect the ATM Industry

Now-a-day, the expectation of customers has more than in the past and these will affect the ATM industry as well (Phillips, 2015).

2.7.1 The demand for the instantaneous and expectation of aggregation

According to information from Amazon, normally what customers will want to buy based on previous purchases and the smart phones or the applications will record relevant information based on habits of customers. Due to customer behavior has changed, sometime walking up to an ATM, insert ATM card, select amount of withdrawal and get your money is not the appreciate way for customer in some cases.

2.7.2 Customer empowerment and immediacy

Currently, the customer expectations are everything fast and convenient to them. They also want an interaction in a short lead time such as shaves days, hours, minutes or even seconds. Sometimes, ATM can't bring the money to you or the nearest ATM is far away.

2.7.3 Attached meaning and values-based buying

What customers want now is purchasing something if they know it benefits, a reason to buy or has some other “attached meaning.” For example, using an ATM where a percentage of every surcharges or transactions allow them to make a donation such as goes to support a local charity, cancer research or education.

2.7.4 Timelessness over trendiness

Even through ATMs are placed in good locations if they lack of trendiness such as cleaner facades, larger screens, more interactivity and a connection directly to a user’s everyday life, they still cannot meet a high level of customer service.

2.7.5 The greening customer

Now-a-day, most of customers are concerning and thinking more about environment or “going green” concept. Many company efforts to become environmentally friendly. In term of ATM service, providing a paperless receipt option is a good idea for eco-friendly issue.

2.7.6 The desire for self-service

More people prefer to do things for themselves even printing their own boarding passes or ordering food online. ATM is also one kind of self-service device that have been introduced for quite a long time. This is an opportunity for banks to expand other financial functions like loan and credit card applications to their customers.

CHAPTER 3

METHODOLOGY

At present, ATM services are widely available for banks' customers. Using ATM services can save time to customers and serve them more effectively thus bank's customers tend to use the ATM services rather than person base services (Sanhawaree, 2008). An Automatic Teller Machine or ATM is a self-service machine which is located in public places that bank allows the cardholders to perform financial transaction by themselves, especially cash withdrawal. The ATM services are not only cash withdrawal but also statement inquiry, transfer, mobile top-up, credit card payment, electronic bill payment or insurance payment through the ATM. ATM can provide greater customer convenience due to the cardholders can access their accounts and perform financial transactions after banking hours.

From the point of view of the banks, ATMs help the banks saving costs more than traditional tellers. Due to ATMs provide cost advantage on a per transaction basis to the banks thus many banks invest heavily in ATMs. In order to meet demands of customer, banks have to innovate in new technologies and expand magnitude of ATMs usage to their customers (Sanhawaree, 2008).

The placement of ATM is one of the factors which the bank has to consider before investment in order to control the operational costs and meet customer requirements. Determining the appropriate locations of ATM can create benefits to the bank in term of costs affective. However, where to place an ATM and how to choose the best location are the factors that the bank has to make decision (Qadrei and Habib, 2009). The location of ATM machine affects to a number of transactions which can make benefit to the bank because that transactions have the operation fees. On the other hand, if money in ATM machines has no movement it will affect to the bank as well because the bank may lost their income. Moreover, location of ATM machines which easily access can create customers' satisfaction with the services of the bank and also can increase number of financial transactions which lead to bank's benefit.

This research aims to study the following issues:

- 1.) To determine whether the ATM location has an impact on a number of ATM usage
- 2.) To study the effect of money movement in ATM machines on bank benefits and losses
- 3.) To study customer behavior on ATMs usage which relate to ATMs location

The research methodology is divided into two parts. Firstly, the ATMs' money movement data from one of top five banks in Thailand is used for the analysis. Furthermore for better result of whole research, a survey is conducted to study whether ATM location affect to a number of ATM usages and also study banks' customer behavior on ATM usage.

3.1 Bank's Information

The bank chosen for this study is one of top five banks in Thailand. In this study the name of the bank is anonymous, and hereafter will be referred to as Bank A. Data of money movement in ATMs from Bank A which contains with 8 ATM terminals in 2 different types of shopping center was obtained. Both shopping centers are located in Chatuchak area of Bangkok.

Bank A was founded in year 1945 with registered capital of Baht 5 Million and 21 employees. The Thanon Sua Pa Main Branch is the first office of the bank. Bank offers financial products with excellent services to serve their customers. In year 1993 among Thai commercial banks, they were the first bank in Thailand to employ the re-engineering system or redesign of branches and service delivery in order to improve operations and services. Until now, the bank has registered capital of Baht 30,486 Million, total assets of Baht about 23,891 Million, total deposits of Baht about 16,298 Million, and total loans of Baht about 15,270 Million. There are totally 1,124 branches and sub-offices operate across the country as shown below in Table 3.1.

Table 3.1 : Summary of domestic service network of Bank A

| | |
|-----------------------------|-----------------------|
| Domestic Branch | 884 Branches |
| - Bangkok | 292 Branches |
| - Upcountry | 592 Branches |
| Domestic Sub-office | 240 Branches |
| - Bangkok | 32 Branches |
| - Upcountry | 208 Branches |
| Total Branch Network | 1,124 Branches |

Source: Annual report 2014 Bank A

In addition, Bank A has 14 overseas offices which facilitate international trade and financial service transactions between Thailand and trade partners worldwide, consist of the Los Angeles International Branch, Hong Kong Branch, Cayman Islands Branch, Shenzhen Branch, Chengdu Branch, Longgang Sub-Branch and the Representative Offices in Beijing, Shanghai, Kunming, Tokyo, Yangon, Hanoi, Ho Chi Minh and Locally Incorporated Institution in Vientiane, Lao PDR.

There are four key product domains which consist of operation and transaction, saving and investing, funding and borrowing, and protection and information. Bank A has offered those products and services to the customers. The products and services can be categorized as Table 3.2.

Table 3.2 : Summary products and services of Bank A

| Product Domains | Products and Services |
|----------------------------|---|
| Operation and Transaction | Financial Transaction Services for Business Customers |
| | Securities Service Businesses |
| | Card-Accepting Merchant Services |
| | Debit and ATM Cards |
| | Funds Transfer and Bill Payments |
| | Others (i.e. Promotional campaigns for Transaction Alert service) |
| Saving and Investing | New Mutual Funds |
| | Deposits |
| Funding and Borrowing | New Loan Products |
| | Loan Products for SMEs |
| | Home Loans |
| | Credit Card Loans |
| | Personal loans |
| | Retail Loans (Including Home Loans, Credit Card Loans and Personal Loans) |
| Protection and Information | Bancassurance |

Source: Annual report 2014 Bank A

Moreover, Bank A also has many channels in order to delivery excellent services to customers which include with electronic banking services. Table 3.3 provides a summary of electronic banking machines of the bank in year 2013 – 2014.

Table 3.3 : Summary of electronic banking machines of Bank A in 2013 – 2014

| | Number of Units | |
|--------------------------------|-----------------|-------|
| | 2014 | 2013 |
| ATMs | 9,853 | 8,740 |
| CDMs (Cash Deposit Machines) | 2,775 | 2,195 |
| PUM (Passbook Update Machines) | 1,308 | 1,118 |

Source: Annual report 2014 Bank A

ATM services which Bank A allows customers to perform financial transaction through bank's ATM machines nationwide can make customer life easier. In year 2014, there are 9,853 ATM terminals available all across the country such as leading department stores, entertainment venues, etc. The main services available on ATM machines are withdrawal, balance inquiry, funds transfer, purchase or payment, and changes in PIN. If compare the number of ATM terminals in year 2013 and 2014, the number of ATM terminals year 2014 increased about 12.73% from year 2013.

Regarding to transaction fees on ATM machine, they can make benefit to the bank. Because transactions through the ATM have the operation fees, thus if money in ATM machines has no movement it will affect to bank in term of loss income. The summarized ATM fees of the bank are shown in Table 3.4.

Table 3.4 : Summary transaction fees of Bank A via ATM

| ATM Services | Details | Fees (Baht) |
|----------------------------|---|--|
| ATM Withdrawal Transaction | Withdrawal via bank's ATM | |
| | - Within the same clearing district | None |
| | - Across other clearing districts | THB15 / transaction |
| | Withdrawal via other banks' ATM within ATM POOL | |
| | - Accounts and ATMs within Bangkok Metropolitan Region (BMR) ³ | None ⁴ |
| | - Accounts and ATMS outside BMR | THB20 / transaction |
| | Withdrawals via ATMs abroad ⁵ | THB100 / transaction Fee from changes in exchange rate is not over than 2.5 percent |
| Funds Transfer via ATM | Transfer to bank account funds transfer | |
| | - Within the same clearing district | - None |
| | | - THB10 / transaction with SMS alert |
| | - Across other clearing districts | None for the first transaction of each month and thereafter THB10 / transaction with/without SMS alert |
| | Interbank funds transfer via bank's ATM | |
| | - Up to THB10,000 | THB25 / transaction |
| | - More than THB10,000 but less than THB50,000 | THB35 / transaction |

(Table continues)

³ Bangkok, Pathumthani, Nonthaburi and Samutprakarn are Bangkok Metropolitan Region.

⁴ If five or more transactions are made via other banks' ATM within ATM Pool, the Bank will charge THB10 on the 5th transaction of each month onward, except for interbank funds transfer

⁵ Not include transaction fee charged from the bank owned ATMs

Table 3.4 : Summary transaction fees of Bank A via ATM (Continued)

| ATM Services | Details | Fees (Baht) |
|--------------|--|---|
| Bill Payment | E channels: ATM, Contact Center, Mobile Banking, Cyber Banking, ATM SIM | |
| | - Within the same clearing district | THB10 / transaction |
| | - Across other clearing districts | - THB20 / transaction for payment of up to THB50,000 |
| | | - For payment exceeding THB50,000 THB1 for each THB1,000 transferred; a fraction of THB1,000 is discarded. Maximum of THB1,000 / transaction. |
| | Tax and utility payment (fee is charged to payer) | |
| | - Metropolitan Electricity Authority: Bank counter and e-channels | THB10 / invoice |
| | - TOT Corp PCL.: Bank counter and e-channels | THB10 / invoice |
| | - Excise Department, Ministry of Finance 00929-5: (Payment via e-channels) | |
| | • Within the same clearing district | THB10 / transaction |
| | • Across other clearing district | THB20 / transaction |

Source: Announcement of servicing fees and fines for deposits, loans and other service charges of Bank A

Due to limitation of the money movement data from the bank, the questionnaire is another tool to study whether ATM location affect to the number of ATM usages. Moreover, consumer behavior on ATM usage in department store is also studied.

3.2 Sample Size

According to this research which studies the effect of ATM location in department stores on a number of ATM usages, the sample for this study was taken from bank's customers who live in Bangkok and have experience with the financial transaction through ATMs which located in department stores.

However, the population in this study is unknown or approximated. If no estimate of population proportion (p) is available prior to the survey, a worse-case p value is 0.5 can be used to determine the sample size (Thompson, 2002). The formula shows as Equation (3.1).

$$n = \frac{z^2 p(1-p)}{d^2} \quad (3.1)$$

where

n is the sample size

z is confidence level (95% confident - Z Score = 1.96)

p is the proportion in the population (0.5)

d is the error not larger than 0.05

$$\begin{aligned} n &= \frac{(1.96)^2(0.5)(0.5)}{0.05^2} \\ &= 384.16 \end{aligned}$$

Thus, a sample size is 385 people. However for this study, we use 400 people as our sample size.

3.3 Survey Design and Data Collection

The questionnaire survey was carried out among residents in Bangkok. The target respondents of this study were male and female consumers, who are familiar with the financial transaction through ATMs which located in department stores. The researcher used the questionnaire as another instrument to gather the information from the target respondents and to support the analysis result from Bank A's data. The questionnaire was created on Google Docs. Data was collected by sending an online survey through E-mail, Facebook or LINE. The surveys were conducted from May to June, 2015 via the researcher's network.

3.4 Questionnaire Development

The researcher developed the questionnaire through Google Docs in Thai because the respondents were Thai. The design of the questionnaire was based on review of the result from the previous or related the literatures. A pre-test of the questionnaire was also conducted on a random sample of ATM consumers who were aged 18 years or over and familiar with the financial transaction through ATMs which located in department stores. After the questionnaires had completed, the result information used to adjust for improve the questionnaire and made final adjustment by discussion with advisor and the expert.

The survey questionnaire used in this study consists of three parts as follows:

Part 1: General information

This part is composed of six questions, which are about the general information of the respondents such as gender, age, education, occupation and income per month.

Part 2: Consumer behavior in department store

This part is composed of five questions to observe consumer behavior towards the activities in department store. The scale in this part is nominal scales.

Part 3: Information of ATM usage in department store

This part is composed of eight questions to identify consumer behavioral background characteristics, how frequently they use ATM services, which ATM service is the most frequently performed task on the ATM, the ATM location and transaction behavior and consumer attitude towards ATM locations. Multiple measures, including nominal scales, ordinal scales, Likert scales on scale of 5 (highest) to 1 (lowest), and pairwise comparison were employed in the questionnaire. In order to obtain the weights of importance of the decision criteria, the pairwise comparison questions are applied (Triantaphyllou and Mann, 1995). (Note that the completed questionnaire can be found in Appendix A and B)

3.5 Data Analysis

3.5.1 Hypothesis Testing

From the money movement data, the hypothesis testing was applied to explore the relationship's statistical significance. The balance amount in ATMs from Bank A is used for this test. The hypothesis test in this research is to find out whether ATM location has significantly used ATM of bank's customers. The hypothesis is stated as follows:

H_0 : Location of ATM is not significantly used ATM of bank's customers

H_1 : Location of ATM is significantly used ATM of bank's customers

To test hypothesis, the researcher applies One-Way Completely Randomized Design (One-Way CRD) method in this research. Completely Randomized Design (CRD) is an experimental design which the key feature is the randomization must be carried out throughout the data layout. In CRD method, all factors must be fixed factors (Casella, 2008). Lawal (2014) stated that in terms of analysis and experimental layout, CRD is the simplest method of all experimental designs. Normally the CRD is used when we believe that the experimental material is homogeneous. The simplicity and tolerance of unequal numbers in each group are the main advantage of CRD method (Festing and Altman, 2002).

To analyze the results of the ATMs' money movement data, the researcher uses a one-way analysis of variance (ANOVA) and run by using excel. For the analysis of data, the ANOVA method is one of the most powerful and general techniques. It can be applied to a variety of experimental situations (Schwarz, 2015). In order to test for the difference between the means when having three or more groups in the research, we can apply the ANOVA test (Quirk, 2012). The one-way ANOVA table is given in Table 3.5 (Casella, 2008).

Table 3.5 : The one-way ANOVA table

| Source of Variation | Sum of Squares | Degrees of Freedom | Mean Square | F-Statistic |
|-----------------------------|--|--------------------|--|--|
| Between Groups (Treatments) | $SS(\text{Trt}) = \sum_i r(\bar{y}_i - \bar{y})^2$ | $t-1$ | $MS(\text{Trt}) = \frac{SS(\text{Trt})}{t-1}$ | $F = \frac{MS(\text{Trt})}{MS(\text{Within})}$ |
| Within Groups | $SS(\text{Within}) = \sum_i \sum_j (y_{ij} - \bar{y}_i)^2$ | $t(r-1)$ | $MS(\text{Within}) = \frac{SS(\text{Within})}{t(r-1)}$ | |
| Total | $SS(\text{Total}) = \sum \sum (y_{ij} - \bar{y})^2$ | $rt-1$ | | |

The decision rule for the ANOVA F-test is stated as follows (Quirk, 2012):

If the value for F is less than the critical F-value, accept the null hypothesis. or

If the value of F is greater than the critical F-value, reject the null hypothesis, and accept the research hypothesis.

Festing and Altman (2002) stated that the significance level or the chance of obtaining a false-positive result due to sampling error is normally set at 5%. Thus, the significance level is set at 5% in this study.

3.5.2 Questionnaire Data Analysis

After gathering the questionnaires, the data was converted into data file in excel program. The data obtained from completed questionnaires were analyzed by using basic statistical analysis and the Analytic Hierarchy Process (AHP) for pairwise comparison questions. The AHP was developed by Saaty which is a kind of decision-making approach. It uses for solving complex decision problem in order to get good judgement. The structure of decision matrix can be shown as follows (Triantaphyllou and Mann, 1995):

Table 3.6 : The structure of decision matrix

| | <u>Criterion</u> | | | | |
|---------------------|------------------|----------|----------|----------|----------|
| | C_1 | C_2 | C_3 | ... | C_N |
| <u>Alternatives</u> | W_1 | W_2 | W_3 | ... | W_N |
| A_1 | a_{11} | a_{12} | a_{13} | ... | a_{1N} |
| A_2 | a_{21} | a_{22} | a_{23} | ... | a_{2N} |
| A_3 | a_{31} | a_{32} | a_{33} | ... | a_{3N} |
| \vdots | \vdots | \vdots | \vdots | \vdots | \vdots |
| A_M | a_{M1} | a_{M2} | a_{M3} | ... | a_{MN} |

where

M denote as the number of alternatives

N denote as the number of decision criteria

W_j denote as the weight of the criterion C_j

a_{ij} denote as the performance value of the i -th alternative (i.e., A_i) in term of the j -th criterion (i.e., C_j) ($i = 1, 2, 3, \dots, M$, and $N = 1, 2, 3, \dots, N$)

According to the decision matrix from Table 3.6, each alternative can be assessed in term of the decision criteria and also the weight of each criterion can be assessed (Triantaphyllou and Mann, 1995). In order to make comparisons, the scale of numbers that identifies how many times one element more important than another element needs to score. Table 3.7 reveals the scale is used to compare (Saaty, 2008)

Table 3.7 The fundamental scale of relative importance

| Intensity of Importance | Definition | Explanation |
|-------------------------------|--|--|
| 1 | Equal Importance | Two activities contribute equally to the objective |
| 2 | Weak or slight | |
| 3 | Moderate importance | Experience and judgement slightly favour one activity over another |
| 4 | Moderate plus | |
| 5 | Strong importance | Experience and judgement strongly favour one activity over another |
| 6 | Strong plus | |
| 7 | Very strong or demonstrated importance | An activity is favoured very strongly over another; its dominance demonstrated in practice |
| 8 | Very, very strong | |
| 9 | Extreme importance | The evidence favouring one activity over another is of the highest possible order of affirmation |
| Reciprocals of above non-zero | If activity i has one of the above non-zero numbers assigned to it when compared with activity j, then j has the reciprocal value when compared with i | |
| 1.1–1.9 | If the activities are very close | May be difficult to assign the best value but when compared with other contrasting activities the size of the small numbers would not be too noticeable, yet they can still indicate the relative importance of the activities |

Khwanruthai Bunruamkaew (2012) stated that after make pairwise comparison between each criterion and provide the score, the results of the comparison were expressed in term of integer values from 1 (equal importance) to 9 (extreme different). The higher number means the chosen factor is given more important than another factor being compared with. In order to give the scale, we always enter the whole number in its appropriate position and automatically enter its reciprocal in the transpose position (Saaty, 2008).

Finally, the frequency tables and descriptive statistics were constructed to display results from the questionnaires.

CHAPTER 4

RESULTS

This chapter shows the analysis result of ATMs' money movement data of Bank A. The result was analyzed based on ATMs' money movement data from 8 machines in 2 different kinds of shopping center. In addition, the results of hypothesis test that determines whether ATM location has significance on customer usage is also presented in this chapter. Due to the limitation of data from the bank, the questionnaire was another tool for this study. The results of questionnaire on attitudes and behaviors of bank customers toward ATM usage with ATM terminals in different location in department stores are also presented in this chapter. The survey was conducted in year 2015 by using an electronic form. Four hundred respondents were analyzed.

The results of this study are presented in four parts, including with the analysis result of ATMs' money movement data and hypothesis testing result, general information of the respondents from the questionnaire, information about behavior of the respondents or activities of the respondents in department stores, and information of ATM usage in department store of the respondents.

4.1 Bank A ATM Data Analysis

The researcher analyzed 3 month historical data from 8 ATMs continuously operating in department stores and shopping mall. The period of the data was between October to December 2014. Our sample was ATMs which located in 2 different types of shopping center in Chatuchak area of Bangkok. The researcher defined the shopping centers as the department store A and the shopping mall B.

There are 5 ATMs located in the department store A, which is one of the most popular department stores in Bangkok. There are various products sale in the department store such as beauty and health, clothes, shoes, bags and luggage, jewelry and watches, home and kitchen, books, movies and music, sports and outdoors. Moreover, there are restaurants, fast food chains, movie theater, shops, and supermarket there. Another 3 ATMs are located in the shopping mall B. The shopping mall B is popular for Bangkok metropolitans who are young adults. There are many fashionable products sale in the shopping mall such as clothes, accessories, shoes and bags. There are food court, fast food chains, tutorial schools, and fitness canter there. If compare between the

department store A and the shopping mall B, the department store A has various kinds of product more than the shopping mall B.

Eight ATMs are located in different location and position. They have different for cash capacity. The analysis results of ATMs' money movement show as follows:

Table 4.1 ATMs money movement data in average 3 months of department store A (Oct-Dec 2014)

| ATM No. | Fill-in (THB) | Withdraw (THB) | Balance (THB) | Replenishment Cycle (Days) |
|----------------|--------------------------|---------------------------|--------------------------|---------------------------------------|
| ATM1 | 2,411,765 | 2,183,765 | 228,000 | 2.58 |
| ATM2 | 2,775,610 | 2,331,512 | 444,098 | 2.28 |
| ATM3 | 2,671,591 | 2,180,655 | 490,936 | 2.12 |
| ATM4 | 3,125,000 | 2,677,834 | 447,166 | 2.12 |
| ATM5 | 3,142,857 | 2,276,281 | 866,576 | 2.22 |

Table 4.1 illustrates the three month average of ATMs in the department store A. Note that the daily movement is given in Appendix C. From the table, it is seen that the average fill-in amount of ATM1 is the lowest, follow by ATM3, ATM2 and ATM4, while ATM5 has the highest fill-in amount in average. The average replenishment cycle of all ATMs in department store A is 2.25 days. To compare the replenishment cycle each ATM in the department store A, the cycle time of ATM1 is the longest (2.58 days), followed by ATM2 (2.28 days), ATM5 (2.22 days), and the cycle time of ATM3 and ATM4 is same (2.12 days) which is the shortest cycle time. From refilling money in ATMs, the bank refills money in ATMs about three times per week because it is not enough for the customer demands. Moreover, to compare the fill-in amount with other ATMs in the same day, the fill-in amount of ATM1 is the lowest.

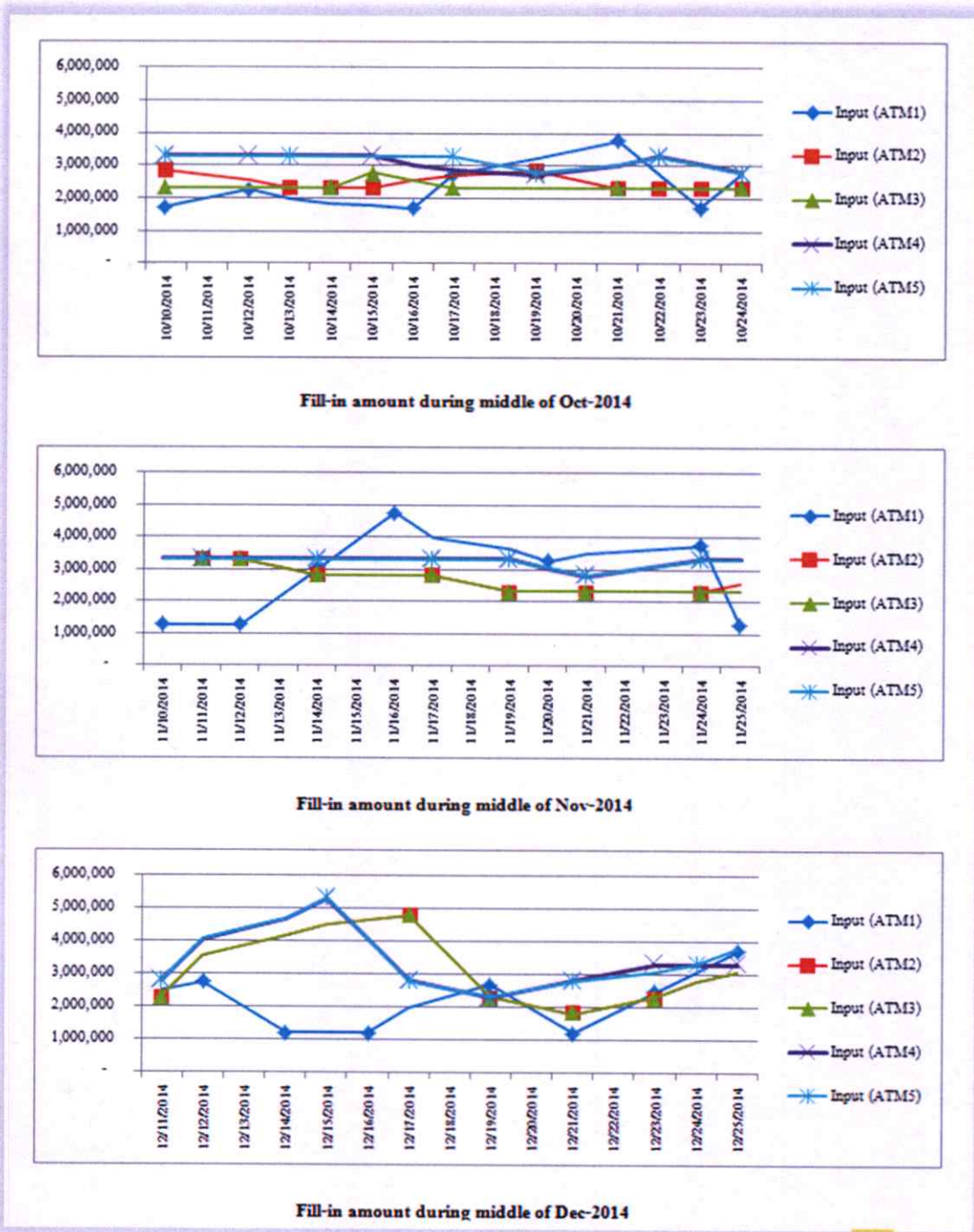


Figure 4.1 Fill-in amount during middle of month of ATMs in department store A

From Figure 4.1, it is seen that fill-in amount in each ATM is quite stable during the middle of month, except in the middle of December. In December the fluctuation of fill-in amount is apparent due to many factors like public holidays, events and festivals. Moreover, fill-in amount is also fluctuated during the beginning of month as it is high demand period. In order to support customer demands which higher at the beginning of each month, the bank tends to fill

cash in more frequently and also with higher amount to the ATMs. Obviously during high demand period, the policy of money replenishment of the bank is not fixed. The bank fills money in ATMs base on customer demands, so the data at that time is unstable.

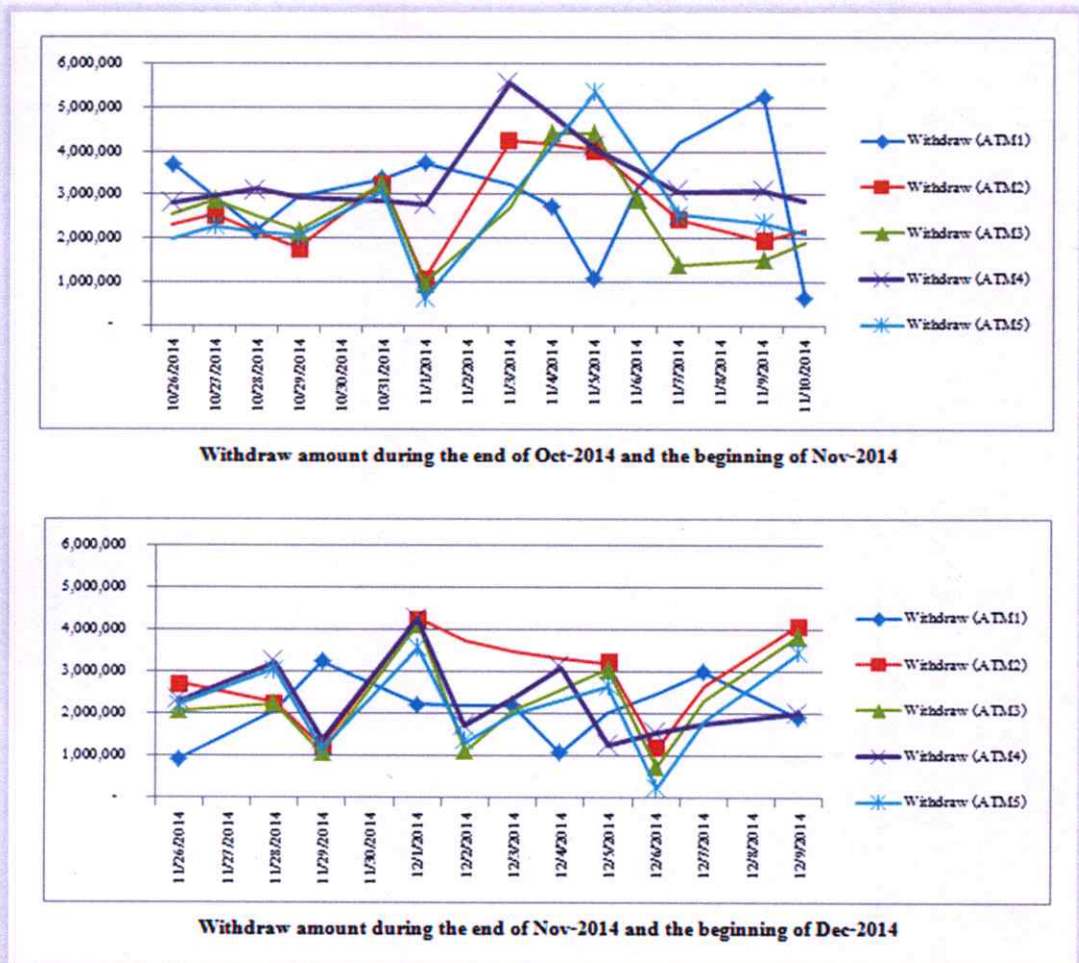


Figure 4.2 Withdraw amount during the end and the beginning of month of ATMs in department store A

The average amount of cash withdrawn from Table 4.1 shows that ATM4 has the highest average amount withdrawn, followed by ATM2, ATM5, ATM1 and ATM3. During middle of the month, amount of withdrawal is not fluctuated. On the other hand, amount of withdrawal is fluctuated during the end and the beginning of each month. It can be assumed that demands of money increase during the end and the beginning of month. Detail is shown in Figure 4.2. The amount of withdrawal is fluctuated not only at the end and the beginning of month, but also in some periods like the middle of November and December. Detail is shown in Figure 4.3.

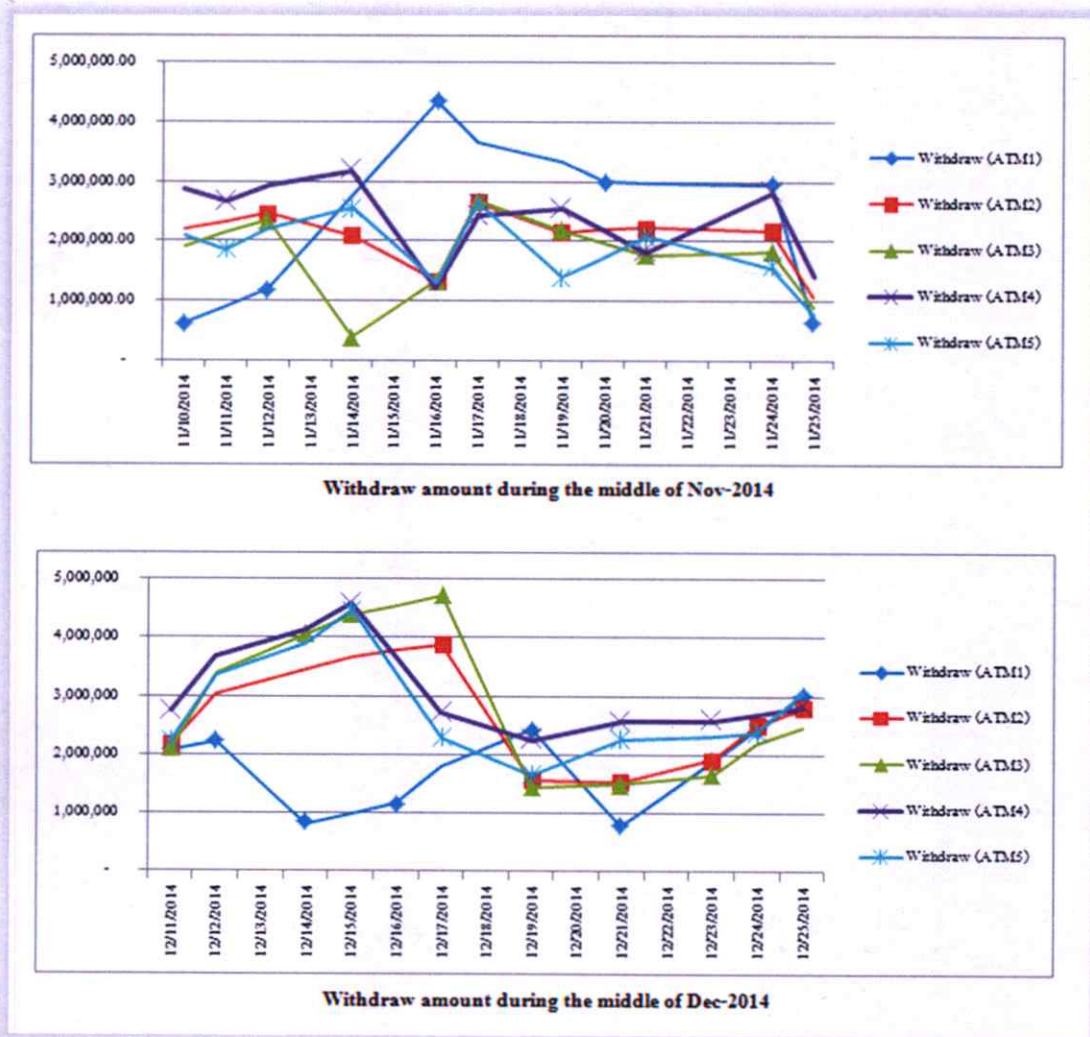
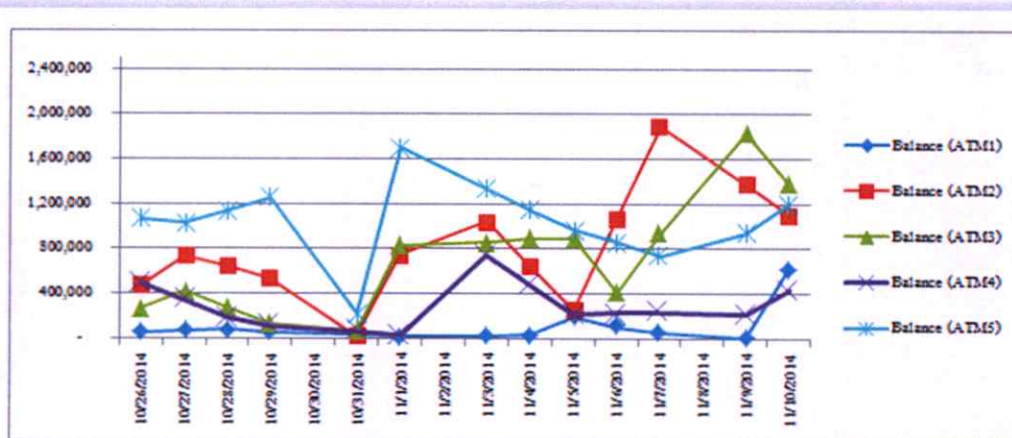
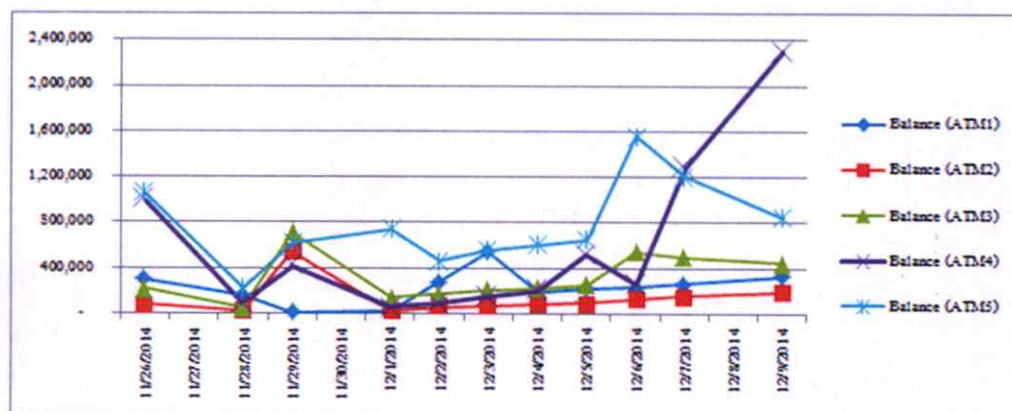


Figure 4.3 Withdraw amount during the middle of November and December 2014 of ATMs in department store A

Many factors affect to increasing of the amount withdrawn such as public holidays, special events, festivals even sale promotions of the department store A. In addition from the withdrawal data of the bank, the amount withdrawn of ATM1 is different from the others in the same day. Interestingly from the amount withdrawn of ATM1, it might be depended on the ATM's location which affect to number of ATM usage.



Balance amount during the end of Oct-2014 and the beginning of Nov-2014



Balance amount during the end of Nov-2014 and the beginning of Dec-2014

Figure 4.4 Balance amount during the end and the beginning of month of ATMs in department store A

From the Table 4.1 and the Figure 4.4, the balance of ATM1 is the lowest in average, while the balance of ATM5 is the highest in average. However, the balance of ATM2, ATM3 and ATM4 are similar. During middle of month, some ATMs have large amount of money which remain in ATMs. However, the remaining money of all ATMs is almost empty during the end and the beginning of month which is the highest demand period. From the balance data of ATMs, the remaining money of ATM2, ATM3 and ATM4 is not different, thus the location of the ATMs might be no different.

In summary, Table 4.1 and from the graph in Appendix C imply that groups of ATM location can be divided in to 3 groups. The first group is ATM1, the second group is ATM5, and the third group is ATM2, ATM3, and ATM4. The average fill-in amount of ATM1 is the lowest

and the amount of withdrawal is quite low, but the balance amount is the lowest in average. It seems the bank can manage their inventory of money quite appropriately because of the lowest balance in ATM. The bank can create their opportunity by the investment that money. On the other hand, the average fill-in amount of ATM5 is the highest and the amount of withdrawal is normal (not large amount if compare with the others), but the balance amount is the highest in average. The inventory of money in ATM5 is not appropriate due to there is much money stock in the ATM. If the money stays in ATM for long period, the bank may lose the opportunity for the investment. Moreover, money that stock in ATM cannot create any income or benefit to the bank. The location of the ATM2, ATM3 and ATM4 might be no different because fill-in amount, withdrawal amount, and balance amount are quite similar. Obviously from fill-in amount each ATM, the bank did not review statistic data when determine the replenishment policy. The replenishment policy of the bank was determined by customer demands because there are the fluctuated data in many periods.

Table 4.2 ATMs money movement data in average 3 months of shopping mall B (Oct-Dec 2014)

| ATM No. | Fill-in (THB) | Withdraw (THB) | Balance (THB) | Replenishment Cycle (Days) |
|----------------|--------------------------|---------------------------|--------------------------|---------------------------------------|
| ATM1 | 2,153,030 | 1,633,748 | 519,282 | 2.84 |
| ATM2 | 2,780,303 | 2,181,121 | 599,182 | 2.81 |
| ATM3 | 3,008,621 | 2,497,983 | 510,638 | 3.07 |

Table 4.2 illustrates the three month average of ATMs in the shopping mall B. Note that the daily movement is given in Appendix D. From the table it is seen that the average fill-in amount of ATM1 is the lowest, followed by ATM2, while ATM3 has the highest fill-in amount in average. The average replenishment cycle of all ATMs in the shopping mall B is 2.90 days. To compare the replenishment cycle each ATM in the shopping mall B, the cycle time of ATM3 is the longest (3.07 days), followed by ATM1 (2.84 days), and ATM2 (2.81 days). From refilling data of ATMs for the shopping mall B, the bank refills money in ATMs about twice per week. Figure 4.5 shows that the fill-in amount of all ATMs in the shopping mall B is quite stable if compare with the department store A. We can see the pattern of filling money in all ATMs, it means that the bank tends to fill-in money with fixed amount or the demands of money are not

fluctuated. The average fill-in amount all ATMs are higher than usual during the end and the beginning of month.

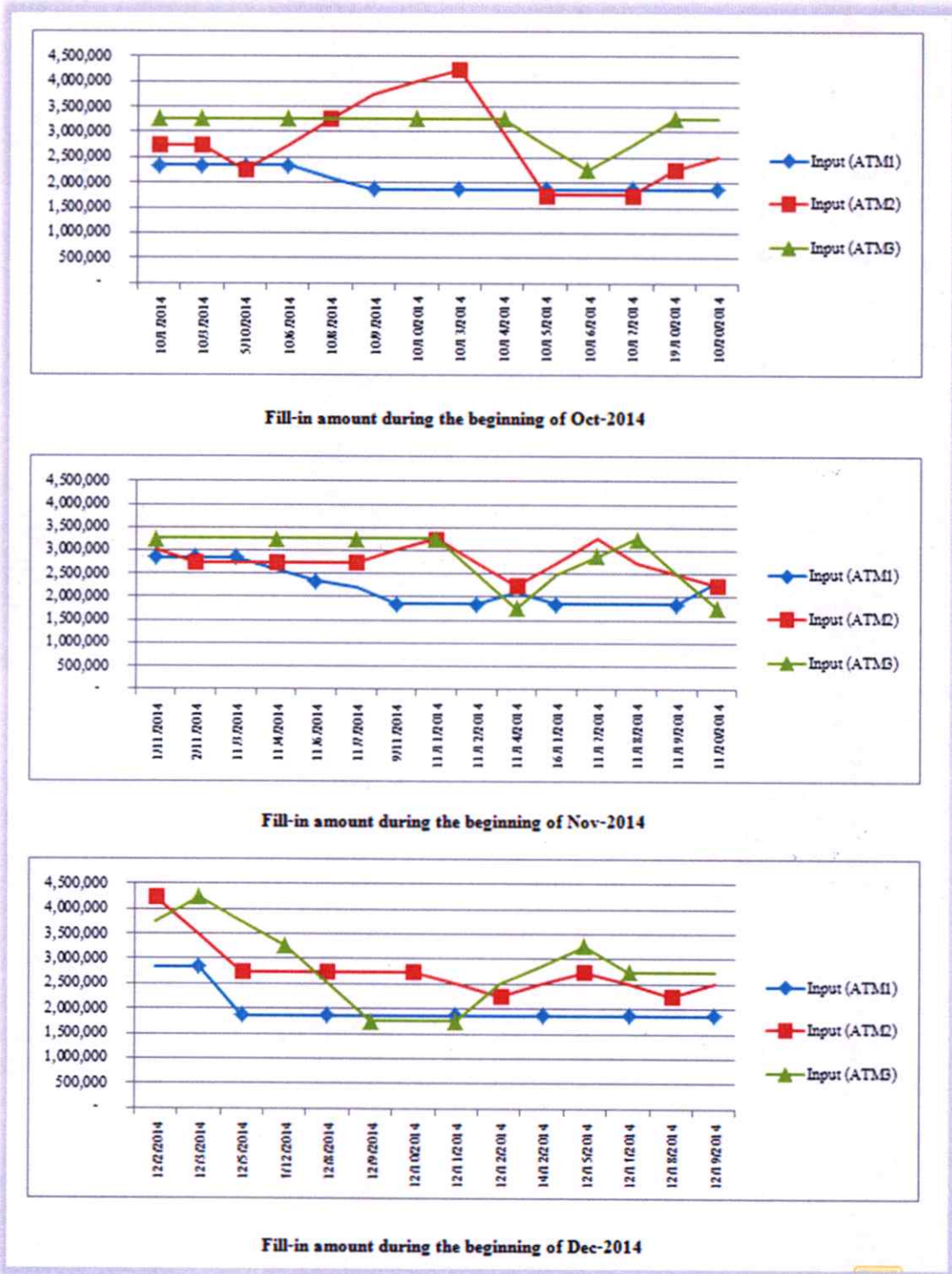


Figure 4.5 Fill-in amount during the beginning of month of ATMs in the shopping mall B

The average amount of cash withdrawn from Table 4.2 shows that, ATM1 has the lowest average amount withdrawn, followed by ATM2, and ATM3. The amount of cash withdrawn of all ATMs in the shopping mall B is not fluctuated much. The reason might be because price of the products, category of the products, or payment method are similar.

For the balance all ATMs in the shopping mall B are quite the similar. At the beginning of month and at the end of month, the balance of money in ATMs is lowest. Thus, we can assume that at the beginning of month and at the end of month are the highest money demand periods for bank customers.

In summary from Table 4.2 and from the graph in Appendix D imply that the average fill-in amount, amount of cash withdrawn, and the balance of all ATMs in the shopping mall B are not different. We can assume that there is no significant correlation between ATMs location and the ATMs usage in the shopping mall B because three ATMs are located in different locations, but the patterns of fill-in, withdraw, and balance amount are quite similar. The reason that there is no relationship between ATMs location and the ATMs usage in the shopping mall B might be because kinds of the product which sale in that shopping mall and the price are not too different. Moreover, the customer behavior when they pay for their products is also one of the factors that might be affected.

To compare the analysis results between the department store A and the shopping mall B, we notice that the average money replenishment cycle of ATMs in the department store A is shorter than in the shopping mall B. This means that money demand in the department store A is higher than money demand in the shopping mall B, thus the bank tends to fill money in ATMs more frequently to meet customer demands. Besides, the reasons might be because there are many kinds of product and activity in the department store A, and the price of those products are different too much, or the consumer behavior when they paid for products or services is different from the shopping mall B. Thus, the money movement rate of ATMs in the department store A is higher than in the shopping mall B. Moreover, we notice that both fill-in amount and withdrawn amount of ATMs in the department store A are more fluctuated than the shopping mall B. The fill-in amount in ATMs involves mainly with the bank, this means that the bank has no plan for filling money in the ATMs. The withdrawn amount in ATMs concerns with consumer behavior and other factors such as products, prices of product, promotion of the department store, or what is the activity customers do when they go to the department store.

After analysis results of ATMs' money movement data from Bank A were analyzed, the researcher explored the relationship between location of ATM and ATM usage of bank's customers by using the same set of data from Bank A. The balance amount in ATMs is used for this test. To test the hypotheses, the researcher applies One-Way Completely Randomized Design (One-Way CRD) method as described in Section 3.5 (Casella, 2008). The hypothesis is stated as follows:

H_0 : Location of ATM is not significantly used ATM of bank's customers

H_1 : Location of ATM is significantly used ATM of bank's customers

Hypothesis testing results were shown as follows:

Table 4.3 One-way ANOVA table from ATMs' money movement data in the department store A ANOVA

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---------------------|-----------------------|-----|-----------------------|------|-----------------------|--------|
| Between Groups | 8.41×10^{12} | 4 | 2.10×10^{12} | 9.24 | 7.17×10^{-7} | 2.42 |
| Within Groups | 4.55×10^{13} | 200 | 2.27×10^{11} | | | |
| Total | 5.39×10^{13} | 204 | | | | |

Here, the calculated F-value (9.24) is larger than F_{critical} (2.42) for $\alpha = 0.05$. $F \geq F_{\text{critical}}$ (significant result), thus the test is significant at $\alpha = 5\%$. The H_0 is rejected. It means that there is a significant between locations of ATM and ATM usage of bank's customers in the department store A.

Table 4.4 One-way ANOVA table from ATMs' money movement data in the shopping mall B

| ANOVA | | | | | | |
|---------------------|-----------------------|----|-----------------------|------|-----------------------|--------|
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between Groups | 1.53×10^{11} | 2 | 7.65×10^{10} | 0.38 | 6.90×10^{-3} | 3.10 |
| Within Groups | 1.86×10^{13} | 92 | 2.02×10^{11} | | | |
| Total | 1.88×10^{13} | 94 | | | | |

Here, the calculated F-value (0.38) is less than F_{critical} (3.10) for $\alpha = 0.05$. $F < F_{\text{critical}}$ (non-significant result), thus the H_0 is accepted. It means that there is no significant between locations of ATM and ATM usage of bank's customers in the shopping mall B.

According to the hypothesis results, the locations of ATM in the department store A affect to ATM usages of bank customers. However, there is no effect of ATMs' location on ATM usages of bank customers in the shopping mall B.

Finally the results show that the analysis results of ATMs' money movement data from Bank A and the hypothesis results are in the same direction. However, the actual locations of ATMs are unknown.

Due to limitation of the money movement data from Bank A and for better result of whole study, the questionnaire is another tool for this study. The questionnaire is developed as discussed in Section 3.4. The next parts are the results of questionnaire on attitudes and behaviors of bank customers toward ATM usage with ATM terminals in different locations in department stores. The questionnaire results were shown as follow:

4.2 General Information of the Respondents

General information of the respondents includes gender, age, education, marital status, occupation, and average income per month. It can be concluded as follows:

4.2.1 Gender of respondents

Table 4.5 Number and percentage of respondents classified by gender

| Gender | Number of respondents | Percentage (%) |
|---------------|------------------------------|-----------------------|
| Male | 148 | 37.00 |
| Female | 252 | 63.00 |
| Total | 400 | 100.00 |

Table 4.5 shows the number of respondent's gender that answered the questionnaires. Total numbers of respondents are 400 respondents which are 148 males and 252 females. This can be converted into percentage for both male and female which are 37.00% and 63.00%, respectively.

4.2.2 Age of respondents

Table 4.6 Number and percentage of respondents classified by age

| Age | Number of respondents | Percentage (%) |
|-------------------------------|------------------------------|-----------------------|
| 18-22 years old | 36 | 9.00 |
| 23-30 years old | 236 | 59.00 |
| 31-40 years old | 112 | 28.00 |
| More than 40 years old | 16 | 4.00 |
| Total | 400 | 100.00 |

For the age of the respondents, there are 9.00% of the respondents who are age between 18-22 years old. There are 59.00% of the respondents who are age between 23-30 years old. There are 28.00% of respondents aged between 31-40 years old and only 4.00% of the respondents who are age over 40 years old.

4.2.3 Level of education of respondents

Table 4.7 Number and percentage of respondents classified by level of education

| Level of education | Number of respondents | Percentage (%) |
|--|-----------------------|----------------|
| Primary education | 0 | 0.00 |
| Junior high school education | 6 | 1.50 |
| Senior high school education / Vocational Certificate | 38 | 9.50 |
| High Vocational Certificate | 20 | 5.00 |
| Bachelor's degree | 270 | 67.50 |
| Postgraduate | 66 | 16.50 |
| Total | 400 | 100.00 |

For their level of education, most of the respondents got Bachelor's degree which is 67.50% from total respondents, follow by 16.50% which is postgraduate group, 9.50% is group of the respondents who got senior high school education or vocational certificate, 5.00% is group of the respondents who got high vocational certificate, 1.50% is group of the respondents who got junior high school education and none of respondent who got primary education responded the questionnaire.

4.2.4 Marital status of respondents

Table 4.8 Number and percentage of respondents classified by marital status

| Marital status | Number of respondents | Percentage (%) |
|----------------|-----------------------|----------------|
| Single | 290 | 72.50 |
| Married | 108 | 27.00 |
| Widowed | 2 | 0.50 |
| Separated | 0 | 0.00 |
| Total | 400 | 100.00 |

The result from survey shows that 72.50% of the respondents are single, while 27.00% of the respondents are married, 0.50% of the respondents are widowed, and none of respondent is separated.

4.2.5 Occupation of respondents

Table 4.9 Number and percentage of respondents classified by occupation

| Occupation | Number of respondents | Percentage (%) |
|----------------------------------|------------------------------|-----------------------|
| University student | 52 | 13.00 |
| Self-employed | 62 | 15.50 |
| Government officer | 20 | 5.00 |
| State enterprise employee | 40 | 10.00 |
| Company employee | 210 | 52.50 |
| Agriculturist | 1 | 0.25 |
| Other | 15 | 3.75 |
| Total | 400 | 100.00 |

For the occupation of the respondents, most of them are company employees which are 52.50% from total respondents, follow by 15.50% and 13.00% which are self-employed and university student groups, respectively. There are 10.00% of the respondents who work for state enterprise and 5.00% of the respondents who are government officers. Agriculturist group is about 0.25% from total respondents. Moreover, there are 3.75% for other which is freelancers, architects, and housewives.

4.2.6 Average income per month of respondents

Table 4.10 Number and percentage of respondents classified by average income per month

| Average income per month (THB) | Number of respondents | Percentage (%) |
|---|------------------------------|-----------------------|
| Below 10,000 | 44 | 11.00 |
| 10,000 - 15,000 | 58 | 14.50 |
| 15,001 - 20,000 | 78 | 19.50 |
| 20,001 - 30,000 | 120 | 30.00 |
| 30,001 - 50,000 | 63 | 15.75 |
| Above 50,000 | 37 | 9.25 |
| Total | 400 | 100.00 |

The result from survey shows that 30.00% of the respondents earn 20,001 - 30,000 Baht per month, follow by 19.50% of the respondents earn 15,001 - 20,000 Baht per month, 15.75% of the respondents earn 30,001 - 50,000 Baht per month, 14.50% of the respondents earn 10,000 - 15,000 Baht per month, 11.00% and 9.25% of the respondents earn below 10,000 and above 50,000 Baht per month, respectively.

4.3 Information about Behavior of the Respondents in Department store

According to result from online survey in the second part of the questionnaire which study about respondents' behavior in department store, it can be concluded as follows:

4.3.1 Purpose going to department store of respondents

Table 4.11 Number and percentage of respondents classified by purpose going to department store

| Purpose going to department store | Number of respondents | Percentage (%) |
|---|------------------------------|-----------------------|
| Buy products in department store | 253 | 63.25 |
| Have lunch or dinner | 59 | 14.75 |
| Appointment place | 26 | 6.50 |
| Window-shopping | 28 | 7.00 |
| Pay bill for products/services in department store | 34 | 8.50 |
| Total | 400 | 100.00 |

From this question, there are 5 nominal variables that respondents can choose as the purpose of going to department store. The results from Table 4.11 shows that, the majority of respondents go to department store for buying products which is 63.25%, follow by 14.75% of respondents which have lunch or dinner in department store, 8.50% of respondents go to department store for payment bill of products or services in department store, 7.00% and 6.50% of respondents go to department store for window-shopping and appointment place purposes, respectively.

4.3.2 Type of product when the respondents purchase in department store

Table 4.12 Number and percentage of respondents classified by type of product when they purchase in department store

| Type of product when the respondents purchase in department store | Number of respondents | Percentage (%) |
|--|------------------------------|-----------------------|
| Clothes | 94 | 23.50 |
| Consumer products | 248 | 62.00 |
| Furniture / Home Décor | 1 | 0.25 |
| Books / Magazines | 31 | 7.75 |
| Electric appliances | 10 | 2.50 |
| Other | 16 | 4.00 |
| Total | 400 | 100.00 |

Most of the respondents purchase consumer products when they go to the department store which is 62.00% from total respondents, follow by clothes which is 23.50% from total respondents, 7.75% of the respondents purchase books or magazines, 2.50% of the respondents purchase electric appliances, 0.25% of the respondents purchase furniture or home décor when they go to department store, and 4.00% of the respondents purchase other products which are sport equipment, cosmetics, or coffee and bakery.

4.3.3 Spending amount for a shopping of respondents

Table 4.13 Number and percentage of respondents classified by spending amount for a shopping

| Amount for a shopping (THB) | Number of respondents | Percentage (%) |
|-----------------------------|-----------------------|----------------|
| Less than 1,000 | 98 | 24.50 |
| 1,000 - 4,000 | 253 | 63.25 |
| 4,001 - 7,000 | 36 | 9.00 |
| 7,001 - 10,000 | 4 | 1.00 |
| 10,001 - 13,000 | 1 | 0.25 |
| More than 13,000 | 8 | 2.00 |
| Total | 400 | 100.00 |

The results from Table 4.13 reveals that the majority of respondents spend about 1,000 - 4,000 Baht per a shopping which is 63.25%, follow by 24.50% of respondents spend less than 1,000 Baht per a shopping. There are 9.00% of respondents spend about 4,001 - 7,000 Baht, 2.00% of respondents spend more than 13,000 Baht, 1.00% of respondents spend about 7,001 - 10,000 Baht, and 0.25% of respondents spend about 10,001 - 13,000 Baht per a shopping at department store, respectively.

4.3.4 Frequency of times going to department store per month of respondents

Table 4.14 Number and percentage of respondents classified by frequency of times going to department store per month

| Frequency of times going to department store per month | Number of respondents | Percentage (%) |
|--|-----------------------|----------------|
| Less than 1 time (i.e. 1 time/2 months) | 38 | 9.50 |
| 1 - 2 times | 232 | 58.00 |
| 3 - 4 times | 78 | 19.50 |
| More than 4 times | 52 | 13.00 |
| Total | 400 | 100.00 |

The results from Table 4.14 show that, the majority of respondents or about 58.00% go to department store 1 – 2 times within a month, follow by 19.50% of respondents go to department store 3 – 4 times per month, 13.00% of respondents go to department store more than 4 times a month, and 9.50% of respondents go to department store less than 1 time per month (for example, 1 time in 2 months).

4.3.5 Payment method of respondents

Table 4.15 Number and percentage of respondents classified by payment method

| Payment method | Number of respondents | Percentage (%) |
|---------------------------|------------------------------|-----------------------|
| Cash | 297 | 74.25 |
| Credit card | 91 | 22.75 |
| Debit card | 12 | 3.00 |
| Pay by installment | 0 | 0.00 |
| Other | 0 | 0.00 |
| Total | 400 | 100.00 |

For payment method at the department stores, most of the respondents or 74.25% pay by cash, 22.50% of respondents pay by credit card, 3.00% of respondents pay by debit card, and none payment by installment and other method.

4.4 Information of ATM Usage in Department Store of the Respondents

The information of ATM usage which located in the department stores is consisted of the information about type of ATM transaction, frequency of times using ATM per month, the number of using ATM services in each period of time, the average amount of withdrawal from ATM, the purposes for ATM usage in department stores, which ATM location is used the most, attitude toward the ATM fee and level of satisfaction with each ATM location toward ATM accessible. The respondents were asked to pairwise comparison for the questions about type of ATM transaction (4.4.1), the purposes for ATM usage in department stores (4.4.5), and which ATM location is used the most (4.4.6). These comparison questions were performed and evaluated by the Analytic Hierarchy Process (AHP) method. The AHP is used in weighting the importance. The results are shown as tables and figures below.

4.4.1 Types of ATM transaction

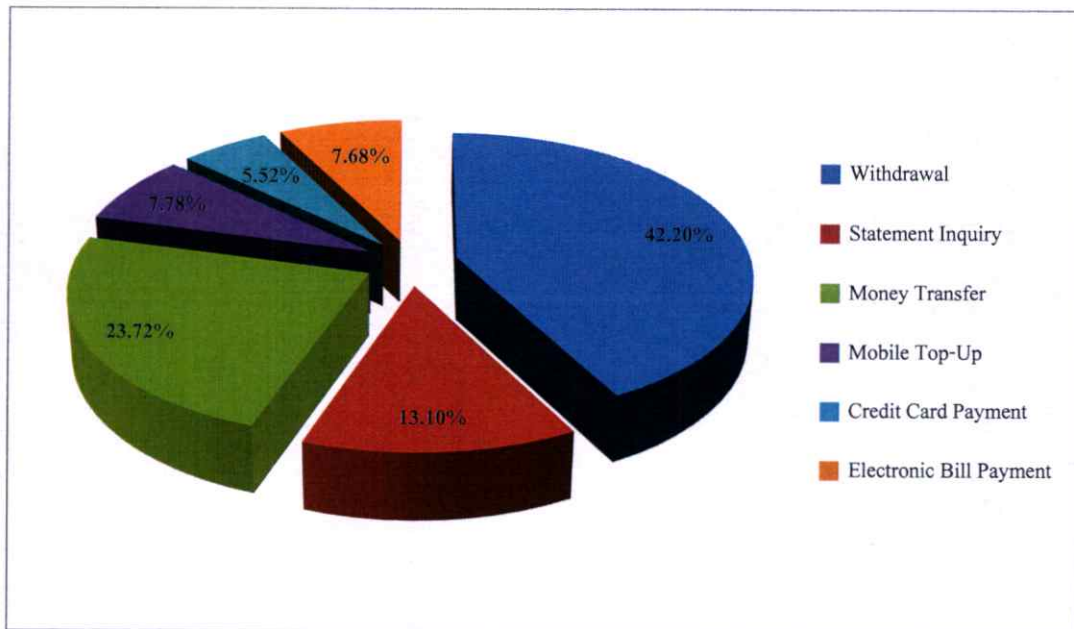


Figure 4.6 Percentage of respondents ranked by types of ATM transaction

The respondents were asked to pairwise comparison for this question. In order to investigate, the scores were provided by entering the whole number in its appropriate position and its reciprocal in the transpose position (Saaty, 2008). (Note that the example of the scores in excel can be found in Appendix E) According to the analysis result in Figure 4.6, withdrawal is ranked as the first type of ATM transaction by 42.20%, followed by money transfer which is 23.72%, statement inquiry (13.10%), mobile top-up (7.78%), electronic bill payment (7.68%), and credit card payment (5.52%), respectively.

4.4.2 Frequency of times using ATM per month

Table 4.16 Number and percentage of respondents classified by frequency of times using ATM a month

| Frequency of times using ATM per month | Number of respondents | Percentage (%) |
|---|------------------------------|-----------------------|
| 1 - 2 times | 176 | 44.00 |
| 3 - 4 times | 118 | 29.50 |
| 5 - 6 times | 56 | 14.00 |
| More than 6 times | 50 | 12.50 |
| Total | 400 | 100.00 |

According to Table 4.16, most of the respondents or 44.00% perform ATM services in department store about 1 – 2 times per month, followed by 29.50% of respondents perform ATM services about 3 – 4 times per month, 14.00% and 12.50% of respondents perform ATM services per month about 5 – 6 times and more than 6 times, respectively.

4.4.3 The number of using ATM services in each period of time

Table 4.17 Number and percentage of respondents classified by using ATM services in each period of time

| ATM usage each period of time | Number of respondents | Percentage (%) |
|--------------------------------------|------------------------------|-----------------------|
| Weekday | 180 | 45.00 |
| Weekend | 220 | 55.00 |
| Total | 400 | 100.00 |

The results from Table 4.17 show that the majority of respondents or about 55.00% use ATM services during weekend and 45.00% of respondents use ATM services during weekday.

4.4.4 The average amount of withdrawal from ATM

Table 4.18 Number and percentage of respondents classified by the amount of withdrawal from ATM

| Amount of withdrawal from ATM (THB) | Number of respondents | Percentage (%) |
|--|------------------------------|-----------------------|
| 1,000 or lower | 79 | 19.75 |
| 1,100 - 3,000 | 156 | 39.00 |
| 3,100 - 5,000 | 81 | 20.25 |
| 5,100 - 7,000 | 32 | 8.00 |
| 7,100 - 9,000 | 5 | 1.25 |
| More than 9,100 | 47 | 11.75 |
| Total | 400 | 100.00 |

Refer to Table 4.18, 39.00% of respondents withdraw money from ATM approximately 1,100 - 3,000 Baht a time, 20.25% of respondents withdraw money from ATM approximately 3,100 - 5,000 Baht, 19.75% of respondents withdraw money from ATM 1,000 Baht or lower, 11.75% of respondents withdraw money from ATM more than 9,100 Baht, 8.00% and 1.25% of respondents withdraw money from ATM approximately 5,100 - 7,000 Baht and 7,100 - 9,000 Baht, respectively.

4.4.5 The reason to use ATM in department store of respondents

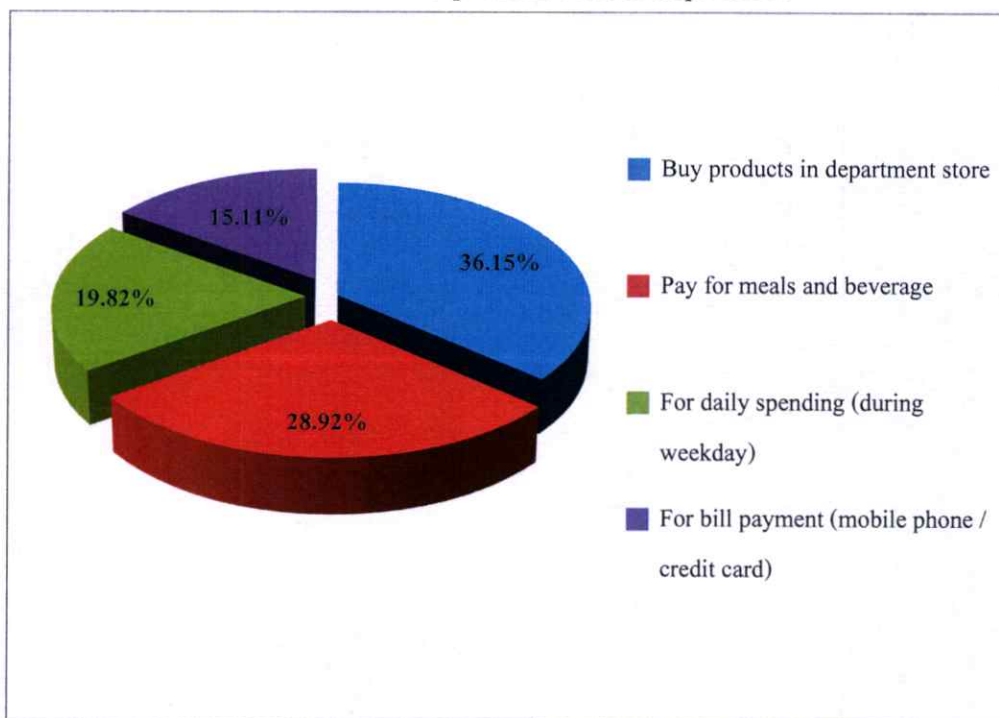


Figure 4.7 Percentage of respondents classified by the reason to use ATM in department store

The respondents were also asked to pairwise comparison for this question. In order to investigate, the scores were provided by entering the whole number in its appropriate position and its reciprocal in the transpose position (Saaty, 2008). (Note that the example of the scores in excel can be found in Appendix E) According to the analysis result in Figure 4.7 about the reasons to use ATM in department store, the results show that most of the respondents prefer to use ATM in department store for buying products in department store (36.15%), followed by paying for meals and beverage in department store (28.92%), for daily spending (during weekday) (19.82%), and for bill payment (mobile phone or credit card payment) (15.11%)

4.4.6 Which ATM location in department store to be used most?

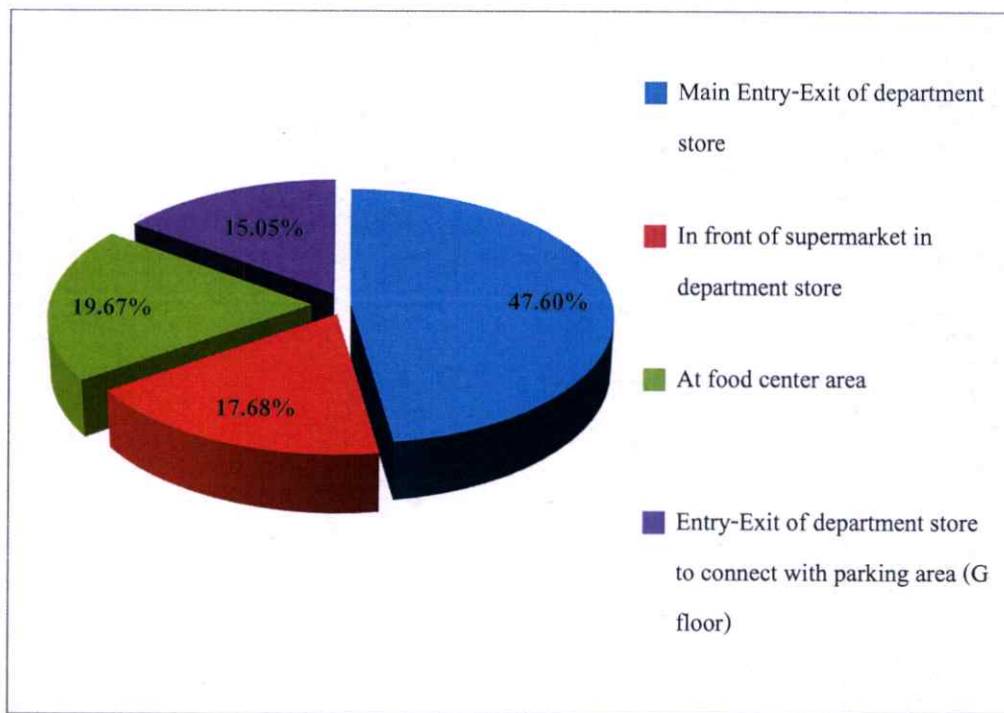


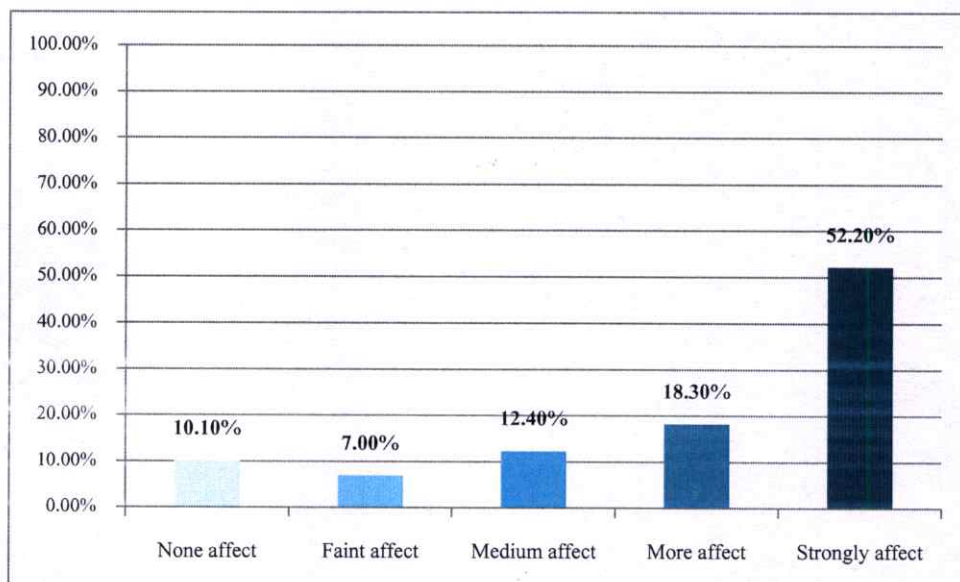
Figure 4.8 Percentage of respondents classified by the ATM locations in department store to be used most

The respondents were also asked to pairwise comparison for this question. In order to investigate, the scores were provided by entering the whole number in its appropriate position and its reciprocal in the transpose position (Saaty, 2008). (Note that the example of the scores in excel can be found in Appendix E) According to Figure 4.8, the results from comparison between each ATM location in department store show that 47.60% of respondents prefer to use ATM at main entry-exit of department store, followed by 19.67% of the respondents prefer to use ATM at food center area, 17.68% of the respondents prefer to use ATM which located in front of supermarket in department store, and 15.05% of the respondents prefer to use ATM at the entry-exit of department store which connect with parking area (G floor), respectively.

4.4.7 How does ATM fees affect to the usage of respondents?

Table 4.19 Level of effect about ATM fees on ATM usage of respondents

| Level of the effect | | | | |
|----------------------|--------------|---------------|-------------|-----------------|
| None affect | Faint affect | Medium affect | More affect | Strongly affect |
| (1) | (2) | (3) | (4) | (5) |
| Frequency/Percentage | | | | |
| 10.10% | 7.00% | 12.40% | 18.30% | 52.20% |

**Figure 4.9** Level of effect about ATM fees on ATM usage of respondents

The results according to Table 4.19 and Figure 4.9 show that, ATM fees strongly affect to the usage of the respondents about 52.20% while about 10.10% of respondents say that ATM fees none affect on their usages. This means that most of the respondents will use the ATM terminal which they are the bank's customer to avoid the ATM fees.

4.4.8 Level of satisfaction to ATM locations in department store of respondents toward the accessibility

Table 4.20 Level of satisfaction to the accessibility of ATM classified by locations in department store

| | Level of satisfaction | | | | |
|---|-------------------------------|--------------------------|------------------------------------|--------------------------|-------------------------------|
| | Very hard to access (1) | Hard to access (2) | Neither easy nor hard (3) | Easy to access (4) | Very easy to access (5) |
| Location of ATM | Frequency/Percentage | | | | |
| Main Entry-Exit of department store | 4.00% | 3.50% | 33.30% | 31.30% | 27.90% |
| In front of supermarket in department store | 3.00% | 10.00% | 33.30% | 31.80% | 21.90% |
| At food center area | 4.50% | 11.40% | 34.80% | 34.30% | 15.00% |
| Entry-Exit of department store to connect with parking area (G floor) | 13.40% | 16.90% | 35.30% | 22.40% | 12.00% |

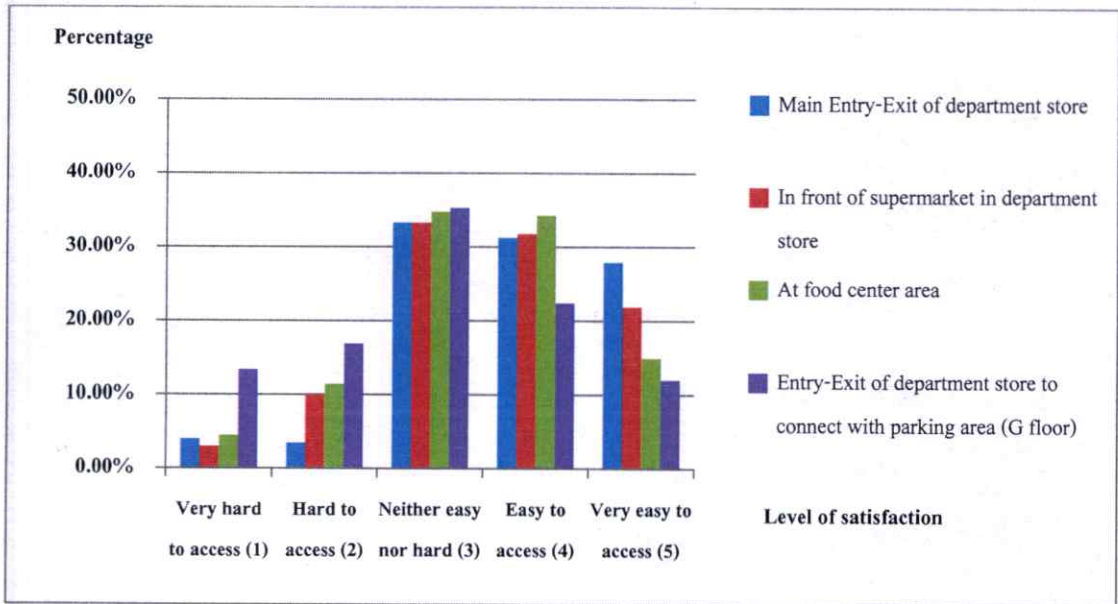


Figure 4.10 Level of satisfaction to the accessibility of ATM each location in department store

The result toward level of satisfaction of respondents to the accessibility of ATM each location in department store from Table 4.20 and Figure 4.10 shows that, 27.90% of respondents think that ATM at the main Entry-Exit of department store is very easy to access the most, followed by 21.90% of respondents think that ATM which located in front of supermarket in department store is very easy to access, 15.00% of respondents think that ATM at food center area is very easy to access, and 12.00% of respondents think that ATM located at Entry-Exit of department store which connect with parking area (G floor) is very easy to access.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

This chapter presents a summary of the study, conclusions, and recommendation for further research.

5.1 Summary of the Study

Location of ATM machine is one of the most important factors that the bank should consider. The location of ATMs can affect to a number of ATMs usage which make the benefit or loss to the bank. Thus, this research has aimed to study the relationship between location of the ATMs and number of ATMs usage. In particular, the study has focused on the relationship between location of ATM and ATM usage of bank's customers in the shopping centers in Chatuchak area of Bangkok. Two different types of the shopping center were considered with different target customers. The data of money movement in the ATMs from one of top five banks in Thailand were analyzed. For better results, the questionnaire was another tool for this study. The questionnaire was used to study customer behavior on ATMs usage which relate to ATMs location in department store. The subjects of this research were limited people who live in Bangkok and familiar with the financial transaction through ATMs located in department stores.

In Chapter 2, the relevant literature, previous studies, and related statistic data have been reviewed and analyzed. There exist several studies which have studied the location of ATMs on a number of ATM usages. The closely related study was the study of (Dulrada Wutthayagon, 2013) which has the factors of removing and relieving ATMs in order to increase efficiency and benefit to Kasikorn bank in Thailand. That study has investigated profit and loss from ATMs deployment and find out the appropriate solutions to increase efficiency and benefit to the bank. However, there are several studies about determining the optimum number of ATMs and their locations (Qadrei and Habib, 2009) and (Aldajani and Alfares, 2009). Those studies applied the genetic algorithm, using a mathematical model and heuristic algorithm approach. One study (Kisore and Reddy, 2015) has evaluated the statistical relationship between personality traits of people living in a service area and their choice for ATM location by using an online survey. Moreover, another studies (Castro, 2009), (Armenise et al., 2010) and (van Anholt and Vis, 2012) focused on ATM cash management, cash forecasting, and cash supply chain. The statistics data about banking industry and ATMs in Thailand were also reviewed to support the chapter.

In Chapter 3, the research methodology has been discussed with focus on two aspects. Firstly, the ATMs' money movement data from Bank A was used for analysis. The data of money movement in ATMs from Bank A consisted of eight ATM terminals in two different types of shopping center which locate in Chatuchak area of Bangkok. Three-month data were analyzed by using basic statistics. Then, the researcher applied One-Way Completely Randomized Design (One-Way CRD) method to test the relationship between ATM's location and the usage of ATMs. Furthermore for more in depth analysis, a questionnaire survey was conducted to study the bank's customer behavior when using the ATM in department stores and to study whether the ATM location affect to a number of ATM usages. The questionnaires were distributed to 400 people who are familiar with the financial transaction through ATMs which located in department stores. The surveys were conducted from May to June, 2015, and the data was collected by sending an online survey through E-mail, Facebook or LINE via the researcher's network. The data obtained from completed questionnaires were analyzed by using basic statistical analysis and the Analytic Hierarchy Process (AHP).

In Chapter 4, several results have been shown and related analysis has been given. Firstly, the results related to ATMs' money movement data of Bank A are shown that the ATM locations in the department store A have significant impact on ATM usages of bank customers. This means that ATM usage is influenced by the locations of ATM which located in the department store A. The ATM locations in the shopping mall B do not have any significant impact on ATM usages of bank customers. This means that ATM usage is not influenced by the locations of ATM which located in the shopping mall B.

It has been noticed that the locations of ATM has affected on ATM usages of bank customers in shopping centers. However, there were other factors concerned such as type of shopping center, type of products and services, price of products, consumer behaviors, and also payment methods. Moreover, if we looked into detail of ATMs' money movement data, we noticed that withdrawal patterns between the department store A and the shopping mall B were different. The withdrawal pattern of ATMs in the department store A was fluctuated in many periods of time. On the other hand, the withdrawal pattern of ATMs in the shopping mall B was quite stable. If we looked into detail of balance in ATMs, we found that some ATM terminal had high balance amount remained in machine while the average fill in amount was the highest and the amount of withdrawal is normal. This means that the money inventory management of the bank for that ATM was not appropriated, or that ATM was located at less accessible point. The

bank might be lost the opportunity for the investment that money which has stocked long time in ATM terminal. The money that stocked in ATM terminal could not create any income or benefit to the bank. Moreover, inappropriate ATM location could not make profit to the bank due to the ATM deployment concerned with many operation fees.

The results from the survey which studied about bank's customer behavior when using the ATM in department stores and studied whether ATM location affected to a number of ATM usages shown that the purpose going to department store of the respondents were to buy products in the department store (63.25%), most of them bought consumer products (62.00%), and they spent money approximately 1,000-4,000 THB per time for shopping (63.25%). Most of the respondents went for shopping 1-2 times per month (58.00%), and they used cash for the payment (74.25%). Most of the respondents frequently withdrawn money through the ATM (42.20%), which meant that cash withdrawal was the most important transaction when using ATM services in the department store. Most of the respondents frequently used ATM 1-2 times a month (44.00%), and they preferred to withdraw money approximately 1,100-3,000 THB per time. For the reason they used the ATM in department store was buying products in department store (36.15%). The ATM location which most of the respondents preferred to use was ATM at main entry-exit of department store (47.60%), and they thought that ATM terminal which located at the main Entry-Exit of department store was the easiest ATM to access. According to result from survey about ATM fee, most of the respondents thought that the ATM fee had strongly affected to their usage. It meant that they preferred to use their own bank's ATM even the location of ATM was not inconvenience for them.

5.2 Recommendation

Based on the results obtained from both money movement data from Bank A and from the questionnaire, the following recommendations are hereby stated.

1.) The bank should review statistics data for better determination of the replenishment policy to avoid opportunity loss or customer dissatisfaction.

2.) The ATM location has significant impact on ATM usages of bank customers, the bank should review and consider the ATMs location in the shopping centers as one of key strategies for the bank in term of benefit and also for customer satisfaction.

3.) The bank should coordinate with a department store to plan for money replenishment during some periods which have higher demand such as end of season sale, end of year sale, or during the special event.

4.) The bank should reconsider about location of some ATM which might be located in inappropriate point in the department store to create customer satisfaction and more benefit to the bank.

5.3 Future Work

The money movement data from the bank is short term period (three month), thus in the future research may consider extending the period of data for goodness of result. Future research should also consider the advance method to analyze statistic data from the bank and may consider applying statistical packages such as SPSS in order to get more accurate result.

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Questionnaire (English)

**The questionnaire to study attitudes and behaviors of bank customers toward ATM usage with ATM terminals in different locations
in department store**

This study is part of an Independent Study (13027131) required for a Master degree of Science in Logistics and Supply Chain Management (International Program), International College, King Mongkut's Institute of Technology Ladkrabang. The objective of this questionnaire is to study attitudes and behaviors of bank customers toward ATM usage with ATM terminals in different locations in department store. Your response will be strictly confidential and will be used for the research purpose only. Your cooperation in answering is highly appreciated.

Part 1 : General Information

Instruction : Please select the answer which is suitable for you

1. Gender

- Male
 Female

2. Age

- 18-22 years old
 23-30 years old
 31-40 years old
 More than 40 years old

3. Level of education

- Primary education
 Junior high school education
 Senior high school education / Vocational Certificate
 High Vocational Certificate
 Bachelor's degree
 Postgraduate

4. Marital status

- Single
 Married
 Widowed
 Separated

5. Occupation

- University student
 Self-employed
 Government officer
 State enterprise employee
 Company employee
 Agriculturist
 Other (Please specify).....

The questionnaire to study attitudes and behaviors of bank customers toward ATM usage with ATM terminals in different locations
in department store

6. Average income per month (THB)

- Below 10,000 THB
- 10,000 - 15,000 THB
- 15,001 - 20,000 THB
- 20,001 - 30,000 THB
- 30,001 - 50,000 THB
- Above 50,000 THB

Part 2 : Information about Behavior in Department store

Instruction : Please select the answer which is suitable for you

7. What is your purpose going to department store?

- Buy products in department store
- Have lunch or dinner
- Appointment place
- Window-shopping
- Pay bill for products/services in department store

8. What is type of product you purchase in department store?

- Clothes
- Consumer products
- Furniture / Home Décor
- Books / Magazines
- Electric appliances
- Other (Please specify).....

9. How much money you spend for a shopping in department store?

- Less than 1,000 THB
- 1,000 - 4,000 THB
- 4,001 - 7,000 THB
- 7,001 - 10,000 THB
- 10,001 - 13,000 THB
- More than 13,000 THB

10. How frequency of times going to department store per month?

- Less than 1 time (i.e. 1 time/2 months)
- 1 - 2 times
- 3 - 4 times
- More than 4 times

The questionnaire to study attitudes and behaviors of bank customers toward ATM usage with ATM terminals in different locations
in department store

11. How is your payment method when shopping in department store?

- Cash
- Credit card
- Debit card
- Pay by installment
- Other (Please specify).....

Part 3 : Information of ATM Usage in Department Store

12. Types of ATM transaction

(Pairwise Question : In your opinion, what is the most importance to you when using the ATM services?)

| No. | Criteria | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Criteria |
|-------|---------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-------------------------|
| 12.1 | Withdrawal | | | | | | | | | | | | | | | | | | Statement Inquiry |
| 12.2 | Withdrawal | | | | | | | | | | | | | | | | | | Transfer |
| 12.3 | Withdrawal | | | | | | | | | | | | | | | | | | Mobile Top-Up |
| 12.4 | Withdrawal | | | | | | | | | | | | | | | | | | Credit Card Payment |
| 12.5 | Withdrawal | | | | | | | | | | | | | | | | | | Electronic Bill Payment |
| 12.6 | Statement Inquiry | | | | | | | | | | | | | | | | | | Transfer |
| 12.7 | Statement Inquiry | | | | | | | | | | | | | | | | | | Mobile Top-Up |
| 12.8 | Statement Inquiry | | | | | | | | | | | | | | | | | | Credit Card Payment |
| 12.9 | Statement Inquiry | | | | | | | | | | | | | | | | | | Electronic Bill Payment |
| 12.10 | Transfer | | | | | | | | | | | | | | | | | | Mobile Top-Up |
| 12.11 | Transfer | | | | | | | | | | | | | | | | | | Credit Card Payment |
| 12.12 | Transfer | | | | | | | | | | | | | | | | | | Electronic Bill Payment |
| 12.13 | Mobile Top-Up | | | | | | | | | | | | | | | | | | Credit Card Payment |
| 12.14 | Mobile Top-Up | | | | | | | | | | | | | | | | | | Electronic Bill Payment |
| 12.15 | Credit Card Payment | | | | | | | | | | | | | | | | | | Electronic Bill Payment |

13. How frequency of times using ATM in department store per month?

- 1-2 times
- 3-4 times
- 5-6 times
- More than 6 times

14. What is the period of time you use ATM services the most?

- Weekday
- Weekend

The questionnaire to study attitudes and behaviors of bank customers toward ATM usage with ATM terminals in different locations
in department store

15. How much money you withdraw from ATM in average?

- 1,000 THB or lower
 1,100 - 3,000 THB
 3,100 - 5,000 THB
 5,100 - 7,000 THB
 7,100 - 9,000 THB
 More than 9,100 THB

16. The reason to use ATM in department store

(Pairwise Question : In your opinion, what is the most important reason to you when using the ATM in the department store?)

| No. | Criteria | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Criteria |
|------|-------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.1 | Buy products in department store | | | | | | | | | | | | | | | | | | Pay for meals and beverage |
| 16.2 | Buy products in department store | | | | | | | | | | | | | | | | | | For daily spending (during weekday) |
| 16.3 | Buy products in department store | | | | | | | | | | | | | | | | | | For bill payment (mobile phone / credit card) |
| 16.4 | Pay for meals and beverage | | | | | | | | | | | | | | | | | | For daily spending (during weekday) |
| 16.5 | Pay for meals and beverage | | | | | | | | | | | | | | | | | | For bill payment (mobile phone / credit card) |
| 16.6 | For daily spending (during weekday) | | | | | | | | | | | | | | | | | | For bill payment (mobile phone / credit card) |

17. The ATM locations in department store to be used most

(Pairwise Question : In your opinion, which ATM location in department store to be used most?)

| No. | Criteria | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Criteria |
|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17.1 | Main Entry-Exit of department store | | | | | | | | | | | | | | | | | | In front of supermarket in department store |
| 17.2 | Main Entry-Exit of department store | | | | | | | | | | | | | | | | | | At food center area |
| 17.3 | Main Entry-Exit of department store | | | | | | | | | | | | | | | | | | Entry-Exit of department store to connect with parking area (G floor) |
| 17.4 | In front of supermarket in department store | | | | | | | | | | | | | | | | | | At food center area |
| 17.5 | In front of supermarket in department store | | | | | | | | | | | | | | | | | | Entry-Exit of department store to connect with parking area (G floor) |
| 17.6 | At food center area | | | | | | | | | | | | | | | | | | Entry-Exit of department store to connect with parking area (G floor) |

The questionnaire to study attitudes and behaviors of bank customers toward ATM usage with ATM terminals in different locations
in department store

18. How does ATM fees affect to the usage?

| | 1 | 2 | 3 | 4 | 5 | |
|-------------|---|---|---|---|---|-----------------|
| None affect | | | | | | Strongly affect |

19. Level of satisfaction to ATM locations in department store toward the accessibility

| | | Very hard to access | | | | Very easy to access |
|------|---|------------------------------|---|---|---|------------------------------|
| | | 1 | 2 | 3 | 4 | 5 |
| 19.1 | Main Entry-Exit of department store | | | | | |
| 19.2 | In front of supermarket in department store | | | | | |
| 19.3 | At food center area | | | | | |
| 19.4 | Entry-Exit of department store to connect with parking area (G floor) | | | | | |

Questionnaire (Thai)

ศึกษาคำแห่งที่ตั้งของเครื่อง ATM ในห้างสรรพสินค้าต่อการปริมาณการใช้บริการของลูกค้า

แบบสอบถามนี้เป็นส่วนหนึ่งของงานวิจัย กระบวนวิชา Independent Study (13027131) Program : Logistics and Supply Chain Management-International Program วิทยาลัยนานาชาติ สถาบันเทคโนโลยีพระจอมเกล้าเจ้าคุณทหารลาดกระบัง ทั้งนี้เพื่อให้บรรลุวัตถุประสงค์ของการวิจัย จึงขอความกรุณาจากท่านโปรดให้ข้อมูลแบบสอบถามตามความเป็นจริง ข้อมูลจากแบบสอบถามนี้จะถูกปิดเป็นความลับ และนำมาใช้ในการประมวลผลในภาพรวมเท่านั้น ดังนั้นข้าพเจ้าหวังเป็นอย่างยิ่งว่าจะได้รับความกรุณาในการตอบแบบสอบถามจากทุกท่าน และขอขอบพระคุณท่านเป็นอย่างสูงที่ได้กรุณาสละเวลาให้ข้อมูล ณ โอกาสนี้

ส่วนที่ 1 : ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม

คำชี้แจง กรุณาเลือกคำตอบที่ตรงกับความเป็นจริงของท่านมากที่สุด

1. เพศ

- เพศชาย
 เพศหญิง

2. อายุ

- 18-22 ปี
 23-30 ปี
 31-40 ปี
 40 ปีขึ้นไป

3. ระดับการศึกษา

- ประถมศึกษา
 มัธยมต้น
 มัธยมปลาย / ปวช.
 ปวส.
 ปริญญาตรี
 สูงกว่าปริญญาตรี

4. สถานภาพสมรส

- โสด
 สมรส
 ม่าย
 แยกกันอยู่

5. อาชีพ

- นักเรียน/นักศึกษา
 ธุรกิจส่วนตัว/ค้าขาย
 ข้าราชการ
 พนักงานรัฐวิสาหกิจ
 พนักงานบริษัทเอกชน
 เกษตรกร
 อื่นๆ (โปรดระบุ).....

ศึกษาดำเนินที่ตั้งของเครื่อง ATM ในห้างสรรพสินค้าต่อการปริมาณการใช้บริการของลูกค้า

6. รายได้ต่อเดือน

- น้อยกว่า 10,000 บาท
- 1,0000 - 15,000 บาท
- 15,001 - 20,000 บาท
- 20,001 - 30,000 บาท
- 30,001 - 50,000 บาท
- มากกว่า 50,000 บาท

ส่วนที่ 2 : พฤติกรรมการใช้บริการในห้างสรรพสินค้า

คำชี้แจง กรุณาเลือกคำตอบที่ตรงกับความเป็นจริงของท่านมากที่สุด

7. วัตถุประสงค์สำคัญที่สุดของท่านในการใช้บริการห้างสรรพสินค้า

- ซื้อสินค้าภายในห้างสรรพสินค้า
- รับประทานอาหาร
- จุดนัดพบ
- เดินดูสินค้า
- ชำระค่าสินค้าและบริการ

8. ท่านมักซื้อสินค้าประเภทใดมากที่สุด

- เสื้อผ้า
- เครื่องอุปโภคบริโภค
- อุปกรณ์ตกแต่งบ้าน
- หนังสือ
- เครื่องใช้ไฟฟ้า
- อื่นๆ (โปรดระบุ).....

9. ค่าใช้จ่ายโดยเฉลี่ยต่อครั้ง ในการใช้ซื้อสินค้าและบริการต่างๆ ที่ห้างสรรพสินค้า

- ต่ำกว่า 1,000 บาท
- 1,000 - 4,000 บาท
- 4,001 - 7,000 บาท
- 7,001 - 10,000 บาท
- 10,001 - 13,000 บาท
- 13,001 บาทขึ้นไป

10. ความถี่ในการเลือกซื้อสินค้า หรือใช้บริการในห้างสรรพสินค้า

- ต่ำกว่า 1 ครั้ง / เดือน (ตัวอย่างเช่น 2 เดือนครั้ง)
- 1 - 2 ครั้ง / เดือน
- 3 - 4 ครั้ง / เดือน
- มากกว่า 4 ครั้ง / เดือน

ศึกษาคำแหน่งที่ตั้งของเครื่อง ATM ในห้างสรรพสินค้าต่อการปริมาณการใช้บริการของลูกค้า

11. ส่วนใหญ่ท่านชำระเงินในการซื้อสินค้าในห้างสรรพสินค้าด้วยวิธีการใด

- เงินสด
- เครดิตการ์ด
- เดบิตการ์ด
- ผ่อนชำระผ่านสินเชื่อต่างๆ
- อื่นๆ (โปรดระบุ).....

ส่วนที่ 3 : ข้อมูลเกี่ยวกับการใช้บริการผ่านเครื่อง ATM (ในห้างสรรพสินค้า)

12. รูปแบบของธุรกรรมการเงินที่ใช้ผ่านเครื่อง ATM

(คำถามเปรียบเทียบ : โปรดเลือกคำตอบที่ตรงกับพฤติกรรมของท่านมากที่สุด หากทั้งสองปัจจัยมีความสำคัญเท่ากัน ผู้ตอบจะเลือกหมายเลข 1 คือบริเวณกลางตาราง หากความสำคัญถูกให้ไปทางด้านใด ผู้ตอบจะทำเครื่องหมายในช่องด้านที่เห็นว่าสำคัญกว่า โดยหมายเลข 9 หมายถึงผู้ตอบให้ความสำคัญไปทางด้านนั้นมากที่สุด)

| No. | Criteria | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Criteria |
|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| 12.1 | บริการถอนเงินสด | | | | | | | | | | | | | | | | | | บริการสอบถามยอดบัญชี |
| 12.2 | บริการถอนเงินสด | | | | | | | | | | | | | | | | | | บริการโอนเงิน |
| 12.3 | บริการถอนเงินสด | | | | | | | | | | | | | | | | | | บริการเติมเงินโทรศัพท์มือถือผ่านเครื่อง ATM |
| 12.4 | บริการถอนเงินสด | | | | | | | | | | | | | | | | | | บริการชำระค่าบัตรเครดิต |
| 12.5 | บริการถอนเงินสด | | | | | | | | | | | | | | | | | | ชำระค่าสินค้าและบริการ (Electronic Bill Payment) |
| 12.6 | บริการสอบถามยอดบัญชี | | | | | | | | | | | | | | | | | | บริการโอนเงิน |
| 12.7 | บริการสอบถามยอดบัญชี | | | | | | | | | | | | | | | | | | บริการเติมเงินโทรศัพท์มือถือผ่านเครื่อง ATM |
| 12.8 | บริการสอบถามยอดบัญชี | | | | | | | | | | | | | | | | | | บริการชำระค่าบัตรเครดิต |
| 12.9 | บริการสอบถามยอดบัญชี | | | | | | | | | | | | | | | | | | ชำระค่าสินค้าและบริการ (Electronic Bill Payment) |
| 12.10 | บริการโอนเงิน | | | | | | | | | | | | | | | | | | บริการเติมเงินโทรศัพท์มือถือผ่านเครื่อง ATM |
| 12.11 | บริการโอนเงิน | | | | | | | | | | | | | | | | | | บริการชำระค่าบัตรเครดิต |
| 12.12 | บริการโอนเงิน | | | | | | | | | | | | | | | | | | ชำระค่าสินค้าและบริการ (Electronic Bill Payment) |
| 12.13 | บริการเติมเงินโทรศัพท์มือถือผ่านเครื่อง ATM | | | | | | | | | | | | | | | | | | บริการชำระค่าบัตรเครดิต |
| 12.14 | บริการเติมเงินโทรศัพท์มือถือผ่านเครื่อง ATM | | | | | | | | | | | | | | | | | | ชำระค่าสินค้าและบริการ (Electronic Bill Payment) |
| 12.15 | บริการชำระค่าบัตรเครดิต | | | | | | | | | | | | | | | | | | ชำระค่าสินค้าและบริการ (Electronic Bill Payment) |

ศึกษาคำแหน่งที่ตั้งของเครื่อง ATM ในห้างสรรพสินค้าต่อการปริมาณการใช้บริการของลูกค้า

13. ความถี่ในการใช้บริการธุรกรรมทางการเงินผ่านเครื่อง ATM ในบริเวณห้างสรรพสินค้า ในช่วง 1 เดือน

- 1-2 ครั้ง
- 3-4 ครั้ง
- 5-6 ครั้ง
- มากกว่า 6 ครั้ง

14. ช่วงระยะเวลาที่ทำธุรกรรมทางการเงินผ่านเครื่อง ATM มากที่สุด

- ช่วงระหว่างสัปดาห์ (weekday)
- ช่วงสุดสัปดาห์ (weekend)

15. จำนวนเงินสดโดยเฉลี่ยที่ทำรายการต่อกรรอน 1 ครั้ง

- 1,000 บาทหรือน้อยกว่า
- 1,100 - 3,000 บาท
- 3,100 - 5,000 บาท
- 5,100 - 7,000 บาท
- 7,100 - 9,000 บาท
- 9,100 บาทขึ้นไป

16. เหตุผลที่ท่านทำธุรกรรมทางการเงินผ่านเครื่อง ATM ในห้างสรรพสินค้า

(คำถามเปรียบเทียบ : โปรดเลือกคำตอบที่ตรงกับพฤติกรรมของท่านมากที่สุด หากทั้งสองปัจจัยมีความสำคัญเท่ากัน ผู้ตอบจะเลือกหมายเลข 1 คือบริเวณกลางตาราง หากความสำคัญถูกให้ไปทางด้านใด ผู้ตอบจะทำเครื่องหมายในช่องด้านที่เห็นว่าสำคัญกว่า โดยหมายเลข 9 หมายถึงผู้ตอบให้ความสำคัญไปทางด้านนั้นมากที่สุด)

| No. | Criteria | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Criteria |
|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.1 | ซื้อสินค้าต่างๆในห้างสรรพสินค้า | | | | | | | | | | | | | | | | | | ใช้สำหรับชำระค่าอาหารและเครื่องดื่ม |
| 16.2 | ซื้อสินค้าต่างๆในห้างสรรพสินค้า | | | | | | | | | | | | | | | | | | ใช้สำหรับการใช้จ่ายในชีวิตประจำวัน (ระหว่างสัปดาห์) |
| 16.3 | ซื้อสินค้าต่างๆในห้างสรรพสินค้า | | | | | | | | | | | | | | | | | | ใช้ชำระค่าบริการต่างๆ (ค่าโทรศัพท์ / ค่าบัตรเครดิต) |
| 16.4 | ใช้สำหรับชำระค่าอาหารและเครื่องดื่ม | | | | | | | | | | | | | | | | | | ใช้สำหรับการใช้จ่ายในชีวิตประจำวัน (ระหว่างสัปดาห์) |
| 16.5 | ใช้สำหรับชำระค่าอาหารและเครื่องดื่ม | | | | | | | | | | | | | | | | | | ใช้ชำระค่าบริการต่างๆ (ค่าโทรศัพท์ / ค่าบัตรเครดิต) |
| 16.6 | ใช้สำหรับการใช้จ่ายในชีวิตประจำวัน (ระหว่างสัปดาห์) | | | | | | | | | | | | | | | | | | ใช้ชำระค่าบริการต่างๆ (ค่าโทรศัพท์ / ค่าบัตรเครดิต) |

ศึกษาคำแนะนำที่ตั้งของเครื่อง ATM ในห้างสรรพสินค้าต่อการปริมาณการใช้บริการของลูกค้า

17. เครื่อง ATM บริเวณใดในห้างสรรพสินค้าที่ท่านมักใช้บริการบ่อยที่สุด

(คำถามเปรียบเทียบ : โปรดเลือกคำตอบที่ตรงกับพฤติกรรมของท่านมากที่สุด หากทั้งสองปัจจัยมีความสำคัญเท่ากัน ผู้ตอบจะเลือกหมายเลข 1 คือบริเวณกลางตาราง หากความสำคัญถูกให้ไปทางด้านใด ผู้ตอบจะทำเครื่องหมายในช่องด้านที่เห็นว่าสำคัญกว่า โดยหมายเลข 9 หมายถึงผู้ตอบให้ความสำคัญไปทางด้านนั้นมากที่สุด)

| No. | Criteria | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Criteria |
|------|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| 17.1 | ประตูทางเข้า-ออกของห้างสรรพสินค้า | | | | | | | | | | | | | | | | | | บริเวณจุดชำระเงินด้านหน้า supermarket |
| 17.2 | ประตูทางเข้า-ออกของห้างสรรพสินค้า | | | | | | | | | | | | | | | | | | บริเวณหน้าศูนย์อาหาร / จุดศูนย์กลางของโซนร้านอาหาร |
| 17.3 | ประตูทางเข้า-ออกของห้างสรรพสินค้า | | | | | | | | | | | | | | | | | | บริเวณทางเข้า-ออกหลักไปยังที่จอดรถหลัก ชั้น G |
| 17.4 | บริเวณจุดชำระเงินด้านหน้า supermarket | | | | | | | | | | | | | | | | | | บริเวณหน้าศูนย์อาหาร / จุดศูนย์กลางของโซนร้านอาหาร |
| 17.5 | บริเวณจุดชำระเงินด้านหน้า supermarket | | | | | | | | | | | | | | | | | | บริเวณทางเข้า-ออกหลักไปยังที่จอดรถหลัก ชั้น G |
| 17.6 | บริเวณหน้าศูนย์อาหาร / จุดศูนย์กลางของโซนร้านอาหาร | | | | | | | | | | | | | | | | | | บริเวณทางเข้า-ออกหลักไปยังที่จอดรถหลัก ชั้น G |

18. ค่าธรรมเนียมในการทำธุรกรรมทางการเงินผ่านเครื่อง ATM มีผลต่อการใช้บริการของท่านมากน้อยเพียงใด

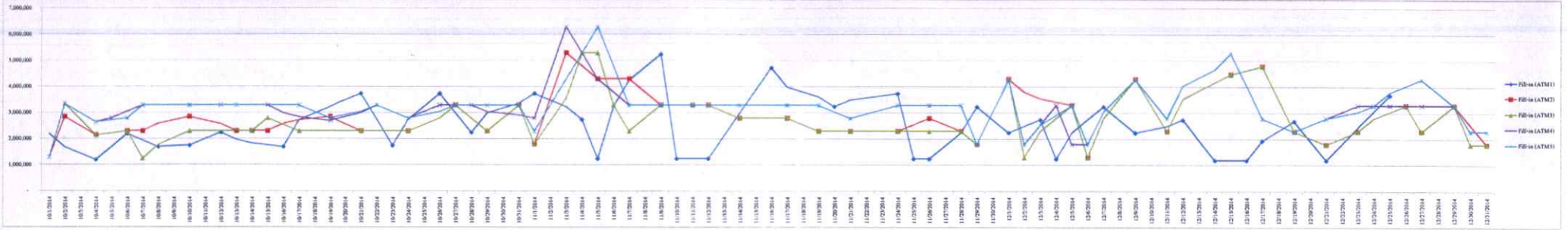
| | 1 | 2 | 3 | 4 | 5 | |
|------------------------|---|---|---|---|---|------------------------------|
| ไม่มีผลต่อการใช้บริการ | | | | | | มีผลต่อการใช้บริการมากที่สุด |

19. ท่านได้รับความสะดวกในการเข้าถึงเครื่อง ATM บริเวณประตูทางเข้า-ออกของห้างสรรพสินค้า มากน้อยเพียงใด

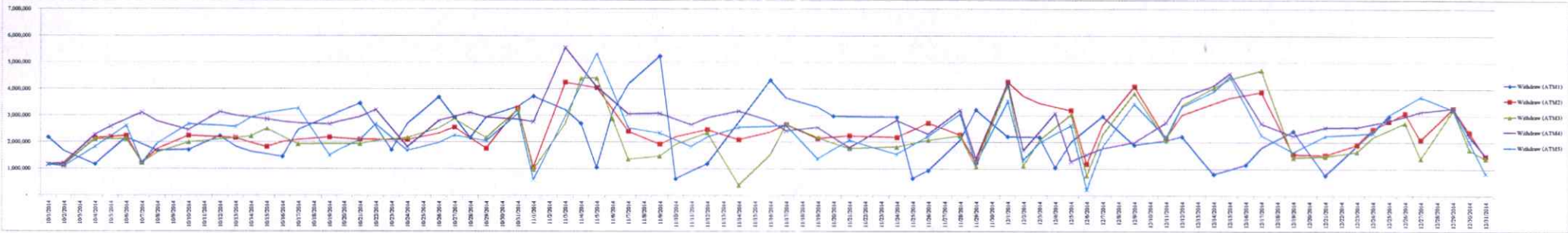
| | สะดวก น้อย ที่สุด | | | | สะดวก มาก ที่สุด | |
|------|-------------------------|---|---|---|------------------------|--|
| | 1 | 2 | 3 | 4 | 5 | |
| 19.1 | | | | | | ประตูทางเข้า-ออกของห้างสรรพสินค้า |
| 19.2 | | | | | | บริเวณจุดชำระเงินด้านหน้า supermarket |
| 19.3 | | | | | | บริเวณหน้าศูนย์อาหาร / จุดศูนย์กลางของโซนร้านอาหาร |
| 19.4 | | | | | | บริเวณทางเข้า-ออกหลัก ไปยังที่จอดรถหลัก ชั้น G |

APPENDIX C

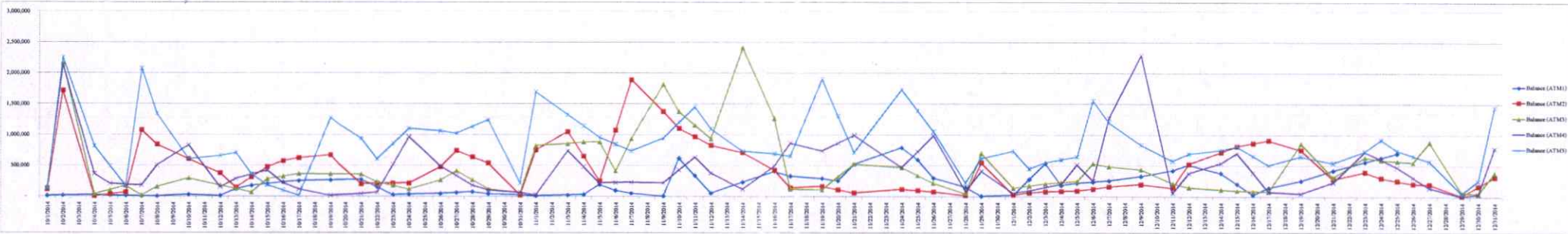
Graph of ATMs Money Movement in the Department Store A (Oct-Dec 2014)



Graph of fill-in amount of ATMs in department store A (Oct-Dec 2014)



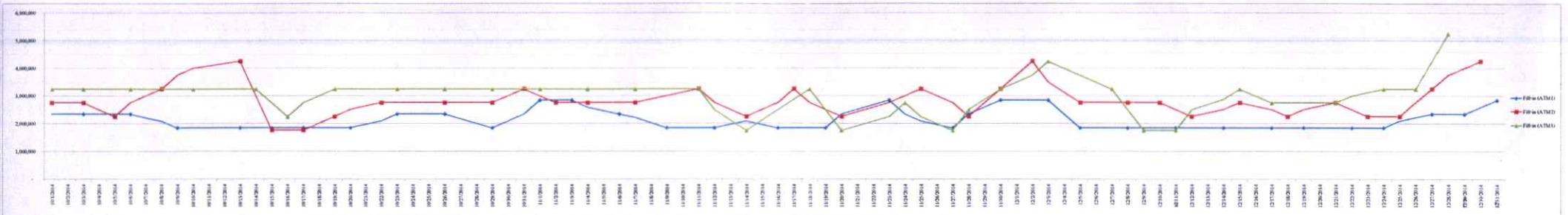
Graph of withdraw amount of ATMs in department store A (Oct-Dec 2014)



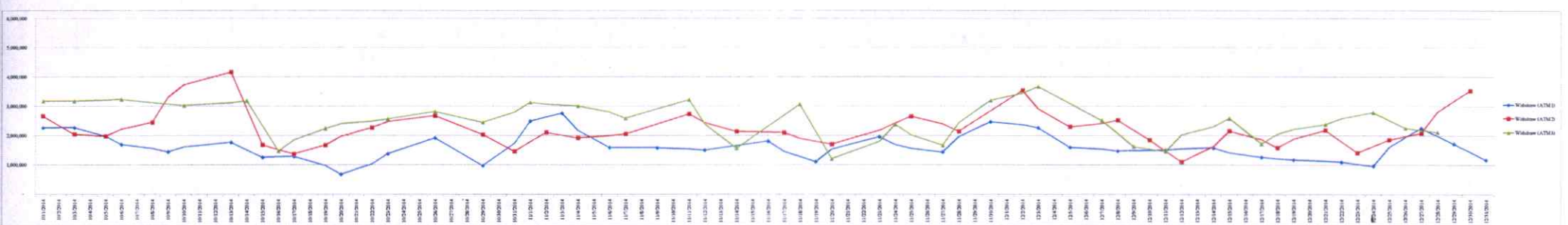
Graph of balance amount of ATMs in department store A (Oct-Dec 2014)

APPENDIX D

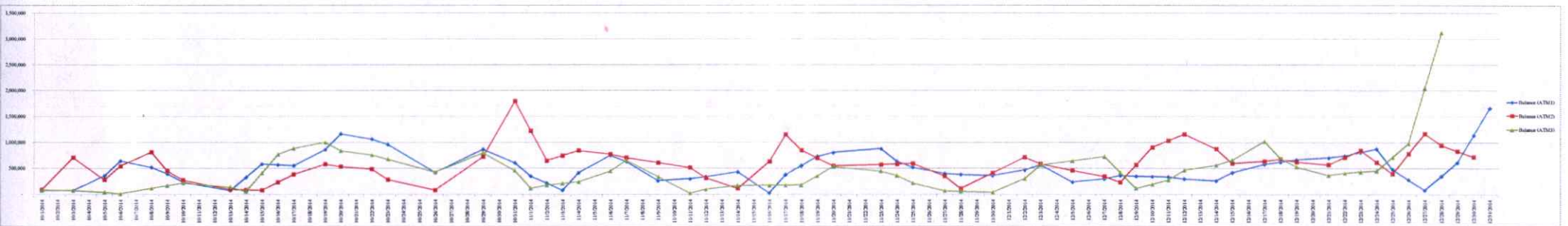
Graph of ATMs Money Movement in the Shopping Mall B (Oct-Dec 2014)



Graph of fill-in amount of ATMs in shopping mall B (Oct-Dec 2014)



Graph of withdraw amount of ATMs in shopping mall B (Oct-Dec 2014)



Graph of balance amount of ATMs in shopping mall B (Oct-Dec 2014)

APPENDIX E

Making Comparison Matrix (How to make reciprocal matrix)

1. An example score in excel from the respondent for the question about type of ATM transaction (4.4.1)

| | Withdrawal | Statement Inquiry | Money Transfer | Mobile Top-up | Credit Card Payment | Electronic Bill Payment |
|-------------------------|------------|-------------------|----------------|---------------|---------------------|-------------------------|
| Withdrawal | 1 | 9 | 1.00 | 9.00 | 5 | 9.00 |
| Statement Inquiry | 0.11 | 1 | 0.11 | 1.00 | 0.2 | 1.00 |
| Money Transfer | 1.00 | 9.00 | 1 | 9 | 1 | 9.00 |
| Mobile Top-up | 0.11 | 1.00 | 0.11 | 1 | 0.11 | 1.00 |
| Credit Card Payment | 0.20 | 5.00 | 1.00 | 9.00 | 1 | 9.00 |
| Electronic Bill Payment | 0.11 | 1.00 | 0.11 | 1.00 | 0.11 | 1 |
| Total | 2.53 | 26.00 | 3.33 | 30.00 | 7.42 | 30.00 |

2. An example score in excel from the respondent for the question about the reason to use ATM in department store (4.4.5)

| | Buying products in department store | Pay for meals and beverage | For daily spending (during weekday) | For bill payment (mobile phone or credit card) |
|---|--|-----------------------------------|--|---|
| Buying products in department store | 1 | 1.00 | 9.00 | 9.00 |
| Pay for meals and beverage | 1.00 | 1 | 8.00 | 9.00 |
| For daily spending (during weekday) | 0.11 | 0.13 | 1 | 5.00 |
| For bill payment (mobile phone or credit card) | 0.11 | 0.11 | 0.20 | 1 |
| Total | 2.22 | 2.24 | 18.20 | 24.00 |

3. An example score in excel from the respondent for the question about location of ATM location in department store to be used most (4.4.6)

| | Main Entry-Exit of department store | In front of supermarket in department store | At food center area | Entry-Exit of department store to connect with parking area (G floor) |
|---|-------------------------------------|---|---------------------|---|
| Main Entry-Exit of department store | 1 | 8 | 8.00 | 5.00 |
| In front of supermarket in department store | 0.13 | 1 | 5.00 | 5.00 |
| At food center area | 0.13 | 0.20 | 1 | 5.00 |
| Entry-Exit of department store to connect with parking area (G floor) | 0.20 | 0.20 | 0.20 | 1 |
| Total | 1.45 | 9.40 | 14.20 | 16.00 |

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