APPLYING DECISION TREE FOR PRIORITIZATION OF INTERBANK FINANCIAL TRANSACTION

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A THEMATIC PAPER SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE MASTER DEGREE OF SCIENCE (INFORMATION TECHNOLOGY MANAGEMENT) FACULTY OF GRADUATE STUDIES MAHIDOL UNIVERSITY 2017

Thematic Paper
entitled

APPLYING DECISION TREE FOR PRIORITIZATION OF INTERBANK FINANCIAL TRANSACTION

15 มีนาคม 2021

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ACKNOWLEDGEMENTS

The success of this thesis can be succeeded by the attentive support from my major advisor Lect. Sotarat Thammaboosadee for his valuable advice and tracking all of process to making the benefits of doing this thematic completed

I would like to thank the experts who write the research and all of persons appearing in the thematic that the researcher reference. It makes the study of this thematic can be successful in intended

In addition, I am very grateful to my lovely family members for support and encouraged in every step and I would like to thanks other sisters in Management of Technology to assist me since the first day until now also thanks all of those who I have not listed above.

Finally, this successfulness I dedicate to my family and all the teachers who's the main source of inspiration to push me to future success.

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APPLYING DECISION TREE FOR PRIORITIZATION OF INTERBANK FINANCIAL TRANSACTION

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ABSTRACT

A cash management plays a huge role in businesses today. It constitutes a service that has been receiving widespread attention to help businesses manage cash effectively, plan financial to maintain liquidity, and able to operate continuously. This includes intermediaries in providing financial institutions that require a system that can handle the volume of transactions and support the base that will increase in the future. The present priority implementation results in problem of delays in Priority Domestic transactions involving foreign exchange. In this study, the researcher conducted a study on international financial transaction of a financial institution by prioritizing the transactions type. It was divided into 3 types of transactions: Urgent transactions (the ones that need to be quickly implemented), Domestic transactions (the ones related to the exchange rate) and Normal 50 transactions (the ones that can be implemented immediately). The researcher studied and grouped the transactions using the J48 Decision Tree method to create a grouping rule for an appropriate entry. The factors taken into consideration were the currency, fund amount, and exchange rate type. The overall model to create rules found that the Adjusted Region-Based Prioritizing Model to be better than traditional, the duration of the transaction was decrease by 22.86% of the total, This research could help reduce the transaction duration and solve the problem of delays related to the uncontrollable exchange rate fluctuations that may result in losses ensue. Other variables should be studied in the future such as the transaction cost, staff overtime including the relevant departments or agencies.

KEY WORDS: CASH MANAGEMENT/TRANSACTION PRIORITIZING/ INTERBANK TRANSACTION/DECISION TREE

36 pages

การปรับปรุงการจัดลำดับความสำคัญรายการทางการเงินระหว่างประเทศโดยใช้ต้นไม้ตัดสินใจ
APPLYING DECISION TREE FOR PRIORITIZATION OF INTERBANK FINANCIAL TRANSACTION

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บทคัดย่อ

การจัดการเงินสดเข้ามามีบทบาทอย่างมากต่อการประกอบธุรกิจในปัจจุบัน ถือเป็นการบริการที่ได้รับความสนใจ อย่างแพร่หลาย ที่จะช่วยให้ธุรกิจจัดการเงินสดได้อย่างมี ประสิทธิภาพเพื่อการวางแผนทางการเงิน รักษาสภาพคล่อง และสามารถดำเนินธุรกิจได้ อย่างต่อเนื่อง ซึ่งตัวกลางในการให้บริการ ได้แก่ สถาบันการเงินที่จะต้องมีระบบและการดำเนินงาน ที่สามารถรองรับปริมาณธุรกรรมที่มากพอ และสามารถรองรับฐานที่จะเพิ่มขึ้น ในอนาคตได้ในงานวิจัยนี้ผู้วิจัยได้ทำการศึกษาการทำรายการทางการเงินระหว่างประเทศของสถาบันการเงินแห่งหนึ่ง ที่มีการดำเนินการโดยการจัดลำดับ Priority ตามประเภทของรายการ โดย แบ่งเป็น 3 ประเภท ของการดำเนินการ ได้แก่ Urgent รายการ ที่ต้องดำเนินการเร่งด่วน Domestic รายการที่เกี่ยวข้องกับอัตราแลกเปลี่ยน และ Normal 50 รายการทั่วไปที่สามารถดำเนินการได้ทันที ซึ่งการจัดลำดับ การดำเนินการในปัจุบัน พบปัญหาการตกค้างของรายการใน Priority Domestic ที่เกี่ยวข้องกับ อัตราแลกเปลี่ยน ผู้วิจัยจึงทำการศึกษาและจัดกลุ่มการทำรายการใหม่โดยใช้ Decision Tree วิธี J48 เพื่อให้ได้โมเดล ในการสร้างกฎการจัดกลุ่มการทำรายการที่เหมาะสม โดยมีตัวแปรที่นำมาพิจารณา ได้แก่ สกุลเงินที่ตัดบัญชี สกุลเงินที่ทำรายการ จำนวนเงินที่ทำรายการ ประเภทอัตราแลกเปลี่ยน ซึ่งงานวิจัยชิ้นนี้จะช่วยลด ระยะเวลาในการดำเนินการและแก้ไขปัญหาการตกค้างของรายการ ที่เกี่ยวข้องกับอัตราแลกเปลี่ยนที่มี ความผันผวน ไม่สามารถควบคุมได้ และอาจจะส่งผลเสียหาย ตามมา ซึ่งในอนาคตจะมีการศึกษา ตัวแปรอื่นๆไม่ว่าจะเป็นต้นทุน ต่อรายการ ค่าล่วงเวลาพนักงาน รวมไปถึงส่วนงานอื่นๆ ที่เกี่ยวข้อง

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CHAPTER I
INTRODUCTION

1.1 Background and Statement of problems

Cash Management refers to technique or the process of collecting and managing the cash of company to ensure that the company can manage cash effectively and sufficiently to operate the business. Its major purposes are to ensure company's financial stability, capability, and solvency that will lead to more profitability. Furthermore, it also helps the company to have appropriate amount of cash, not too much and not too less, to continue operating business [1]. A financial institution is an intermediary that provides services in cash management. It serves as a conduit for corporate clients in all financial transactions. These days, the service of financial institutions has been wide spread. Their clients are in all level such as large enterprises, medium-sized enterprises, and small and medium-sized enterprises (SMEs). International financial transaction is of significance in the management of cash. It has an important role for businesses that often incur risk. In the past, cash management was only concerned by multinational corporations, but these days, many corporations in Thailand have started to have more interest on cash management as it helps them reducing cost while increasing level of profits [2] Many financial institutions are ready to provide services on cash management. However, for each financial institution to become successful, they need to generate enough financial transactions to ensure that the cost per transaction will be reduced. This allows them to set lower transaction fees than other competitors. Financial institutions that have a good managing system will be able to offer more numbers of transactions effectively. To do so, most of institutions promote and offer, both existing customers and potential customers, the services that is called "Electronics Banking". Electronics Banking is an electronic system on customer's account and financial transactions that enables customers to conduct a range of transactions such as cash deposit, cash payment, and requesting for cash statement. The system will be updated regularly to ensure the ease

of use of the system whereby most of the branches are using the same system. There is a communication system that covers all financial transaction in the world that is called S.W.I.F.T. (Society for Worldwide Interbank Financial Telecommunication) is used to service for receiving and sending messages among financial institutions and other organizations which are the members of S.W.I.F.T. This organization has standard and unique sending messages' form which are speech, high security and acceptable from worldwide for example, transferring the money to the customer in both domestic country and foreign country. It is a network that enables financial institutions worldwide to send and receive information about financial transactions in a secure, standardized and reliable environment. There is a swift code or Bank identifier code (BIC) that each financial institution will use when transferring money between each other. This code consists of 8-11 characters that represented particular financial institution who registered as member. Only members can use the codes for exchanging other messages between them [3]. In each country, the system will be developed in such a way that matches the customer base. The system will be made available in local languages and appropriate to local laws in doing all financial transactions to prevent sanction, anti-money laundering, and prevent all other negative consequences. Fluctuations in currency exchange rates. It is difficult to predict because there are many factors that affect currency exchange. For the factors considered as obstacles which are economic fundamentals in the country, monetary, fiscal policies, global economy, predictions, speculation, political instability in domestic and foreign markets and other technical factors. Fluctuations in currency exchange rates can cause the business face the risk of problem especially in import and export products with the foreign countries. Although the business sector cannot control fluctuations in currency exchange rates, it can manage and protect the problems from currency exchange rates by using Forward Futures Options in order to manage costs and revenues more effectively.

1.2 Priority management

System or process that cannot be able to support large amount of transactions, especially at the end of the month, might cause several problems such as the currency fluctuation that will result in Gain/loss of paying fines for not making payment for products and services on time or loan interest. Therefore, it is necessary for the financial institutions to have effective system and appropriate to the number of existing customers and potential customers in the future. According to a successful financial institution that can support large transactions, they manage those transaction by categorizing transactions into 5 priority, including Urgent , Domestic ,Normal 50 , Normal 0, and Terminate respectively. From this priority, the transactions that are related to the currency exchange are categorized in Domestic type. This type of transaction requires long time working process which leads to the transaction backlog. As the currency is always fluctuate and unable to be controlled, the transaction that backlog in the queue might be negatively affected.

1.3 Solutions

By categorizing transactions based on priority, the backlog transaction can be immediately managed. For example, in the case that the customers have already reserved the currency exchange rate with the bank and with the amount less than 30,000.00 USD or equivalent, priority management can help reducing operating time and number of transaction backlog in the system within the date and time that have been set. This is a good way to reduce currency fluctuation that cannot be controlled. However, there might not have only 1 factor, but other. Therefore, the analysis through the use of Decision Tree in order to set priority might be implemented.

1.4 Objective

This research is to appropriately regroup the transaction priority by through the use of Decision Tree. In order to reduce the processing time and the cost,

ensure that people at the destination would receive the money on time, as well as reducing the problem of currency fluctuation.

1.5 Scope of Works

The researcher has studied on priority management by categorizing transaction total 6,520, focus by priority Urgent Domestic and Normal50

1.6 Expected Results

The expected results are to get priority management pattern by categorizing transactions into group for

- Reducing the processing time,
- Reducing the financial institutions cost,
- Reducing the damages caused by the currency fluctuation,
- Reducing the damages caused by transaction backlog in the system,

CHAPTER II
LITERATURE REVIEW

This research on the international monetary priority list improvement was conducted by using decision trees. The researchers conducted studies on relevant theories and researches including presentation from various sources. To be used in the research as follows:

2. 1 The exchange rate and international currency market

Foreign currency refers to the currency of other countries, which are in possession of a private sector and government of a country such as the US dollar, Pound sterling, Yen, etc that is possessed by the Thais and Thailand government is considered to be foreign currency. Thailand attitude on currency exchange rate is the price or value of 1 foreign currency unit.

International currency market refers to the intermediary that purchases, sells, or exchanges currency [4] financial institutions can be called a foreign currency exchange market that facilitates international transaction and also reduces the risk of exchange rate being changed. The factors which affect the constant exchange rate are small and medium enterprise. All of these factors can affect profits and losses of the business sector even though it can protect the risk of problems from exchange rates.

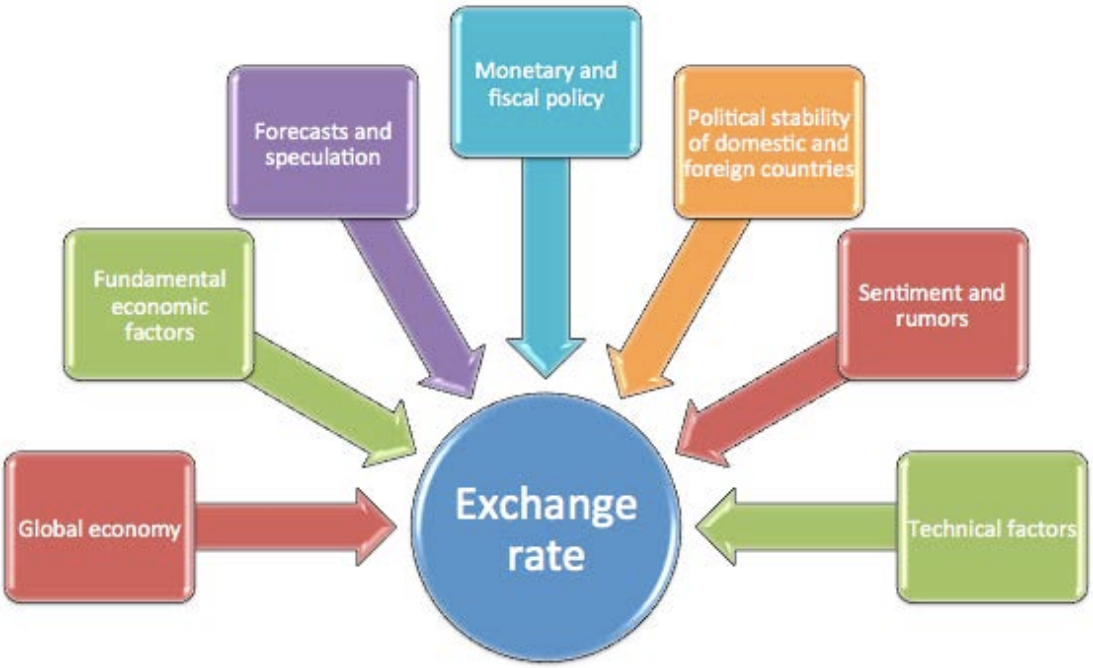

Figure 2.1 The factors affecting currency exchange rates.

The exchange rate policy of Bank in Thailand has been using the floating exchange rate system since 2540(1997) by no determination of the exchange rate. Therefore, the value of Baht currency will be driven by market forces that are affected by factors inside and outside the countries. The Bank of Thailand will control fluctuations in Baht currency exchange rates to be stable because it affects the ability of competitiveness of the business sector in the short term to keep the stability of the value's Baht in long term. Moreover, it is the way to improve potentiality of the economy in Thailand, and it can help entrepreneurs respond to fluctuations in the global economy sustainably. Thus, every business should manage the risk caused from the currency exchange rate.

The tools used to manage the risk caused from the exchange rate can be classified into 2 major groups deepened on the period of delivery of foreign currency.

2.1.1 Currency forward contract

The forward contract of purchase and sale of foreign currency is an agreement to buy or sell foreign currency with a bank like US dollars on the date that the bank is set in the future together with the exchange rate and money agreed at the current. For the time to deliver is spent more than two days.

2.1.2 Currency option

It is the agreement to purchase the ownership to buy and sell the foreign currency by using the currency exchange rates and money which the owner agreed with a bank. The buyer needs to pay for the option premium to a financial institution within two days after agreement to purchase the ownership finished.

Forwards and Options are different in terms of flexibility. They are explained that the option is more flexible than the forward because the ownership does not need to be used on the due date, but buying the ownership is required to pay the option premium on the date of buying the ownership. In the opposite way, forward needs to comply with the contract. However, both of two tools can be used to reduce the risk cased from fluctuations in currency exchange rates.

There are many aspects of foreign exchange risk management: opening a foreign currency deposit account is considered as an alternative for dealing with the risks of uncontrollable exchange rate fluctuations [5]

2.2 Prioritization

It refers to prioritizing based on devices that can be applied depending on the circumstances and suitability such as:

2.2.1 Pareto Analysis

Analysis of the priorities based on Pareto's 80/20 rule means that if we can sort data by descending from more to less, it can be found that important topics or issues are combined 80 %. There would be only a few issues that are the thing that really matters, such as the top customers made up to only 20 % that may generate up

really matters, such as the top customers made up to only 20 % that may generate up to 80 % of the business profit while the remaining 80 % of customers generate only 20 %. Therefore, if we perform CRM or loyalty program, the key customers should be especially taken care of.

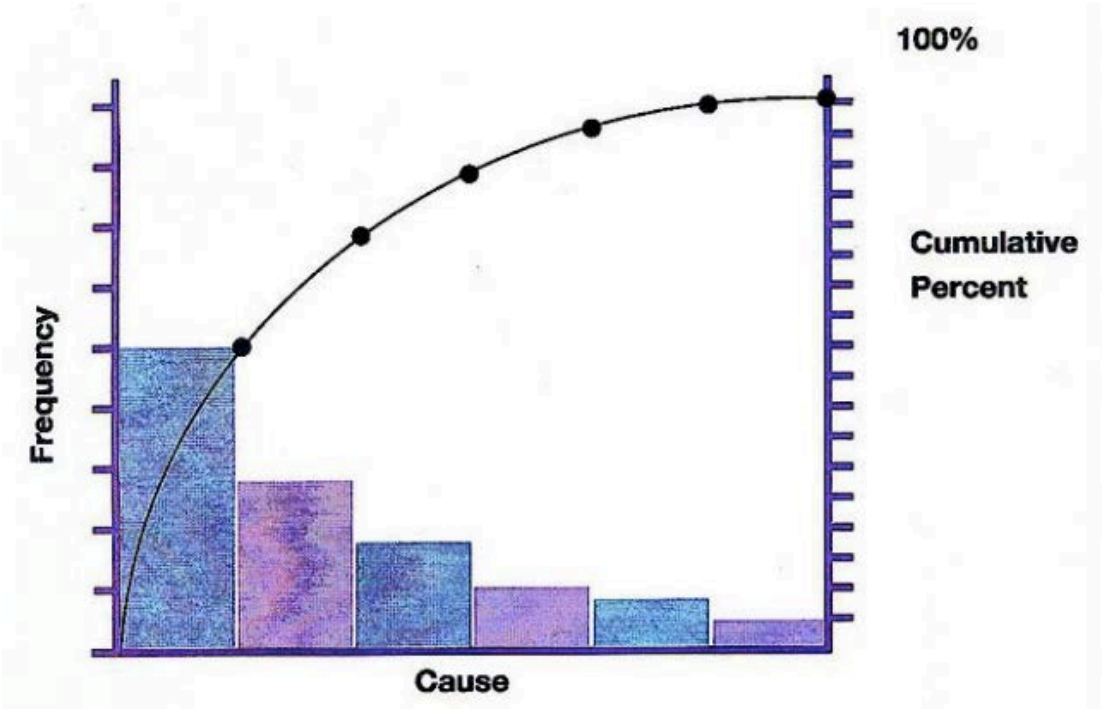

Figure 2.2 Pareto Analysis.

2.2.2 Action Priority Matrix

Matrix table is for action to consider the matter prioritization. It is divided into 2 dimensions;

Quick wins

These activities are characterized by a high Impact in combination with a low Effort. They are the most attractive activities/ projects that give good returns for relatively little effort. These activities can be completed routinely without affecting quality and they support the business continuity process. It is advisable to focus on these quick wins as much as you can.

Major Projects

These activities have both a high Impact and a High Effort. They give good returns for a company but they take a long time to complete. Make sure that major projects do not crowd out the Quick Wins. It is important to pay much attention to these Major Projects, so that the execution of the activities can be mastered well. Working quickly and efficiently can be helpful in this.

Fill ins

The so-called ‘fill ins’ have a low Impact and a low Effort. These are low-priority activities that can be dealt with at a later time. Often ‘fill ins’ stagnate activities with a higher priority. Eventually, these will have to be carried out. It is therefore advisable to make a list with ‘fill ins’ and you should only perform these tasks when you have got the time to do so.

Hard slogs

The thankless tasks have a low Impact but require a high Effort. When a computer programme is not functioning properly and an employee spends all day trying to make this work, this must be seen as a waste of time and energy. It is therefore advisable to avoid thankless tasks and outsource them to experts. If you do not do this, thankless and energy consuming tasks will yield low returns and there will be too little time for more important business.

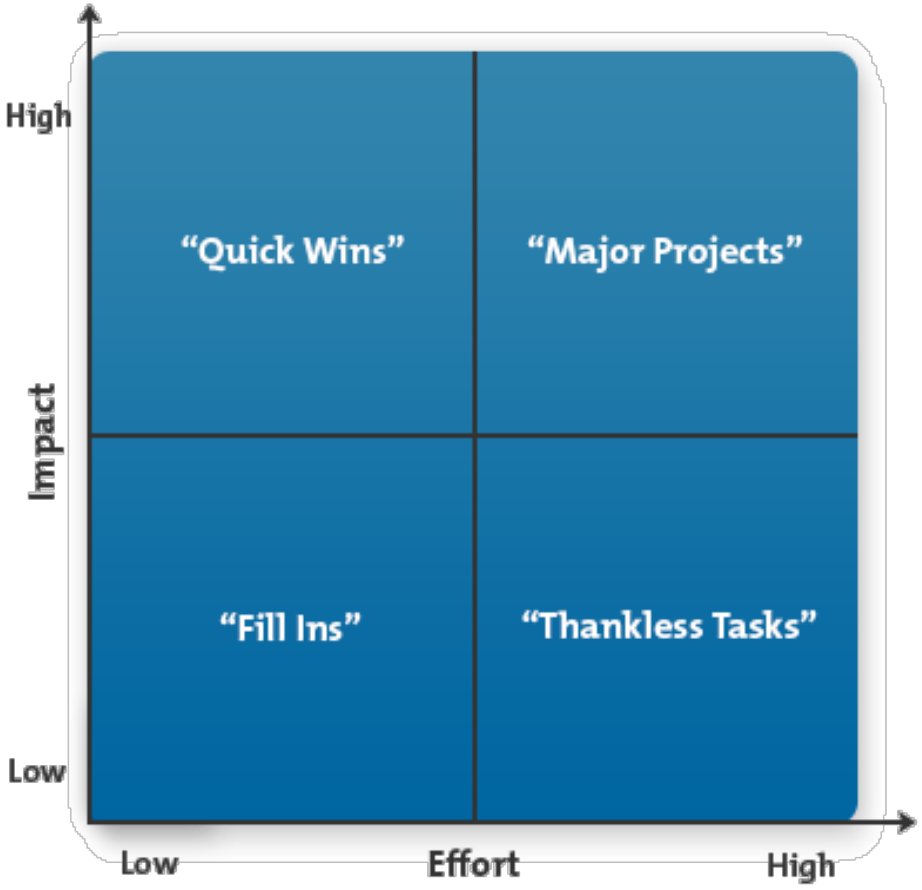

Figure 2.3 Action Priority Matrix.

2.2.3 Time Priority Matrix

Metric table for time management is divided into 2dimensions: urgency and importance to be used for prioritizing time to be spent on each issue. The grouping of tasks must be made in four categories

Urgent and Important

This quadrant is for the highest priority tasks, Need to do urgently and must be done immediately. Try to keep as few tasks as possible here, with the aim to eliminate. If we spend too much of our time in this quadrant, we are working solely as a trouble shooter, and never finding time to work on longer-term plans.

Not Urgent but Important

This is where we want to spend most of our time. This quadrant allows us to work on something important and have the time to do it properly. This will help to produce high quality work in an efficient manner. In this quadrant can include strategic thinking, deciding on goals or general direction and planning It be a parts of running a successful business.

Urgent but not important

These tasks are usually demands originated by team members. We need to scrutinize and question them, and then help those who made the demands re-assess the importance of these tasks. It must be assigned to others to be performed

Not Urgent and Not Important

This quadrant doesn't really include tasks, but rather habits that provide comfort, and a refuge from being disciplined and rigorous with our time management. They may often be stress-related activities, so we might want to take some time to understand if there's a root cause for these habits. It can be or not be done or delayed [6]

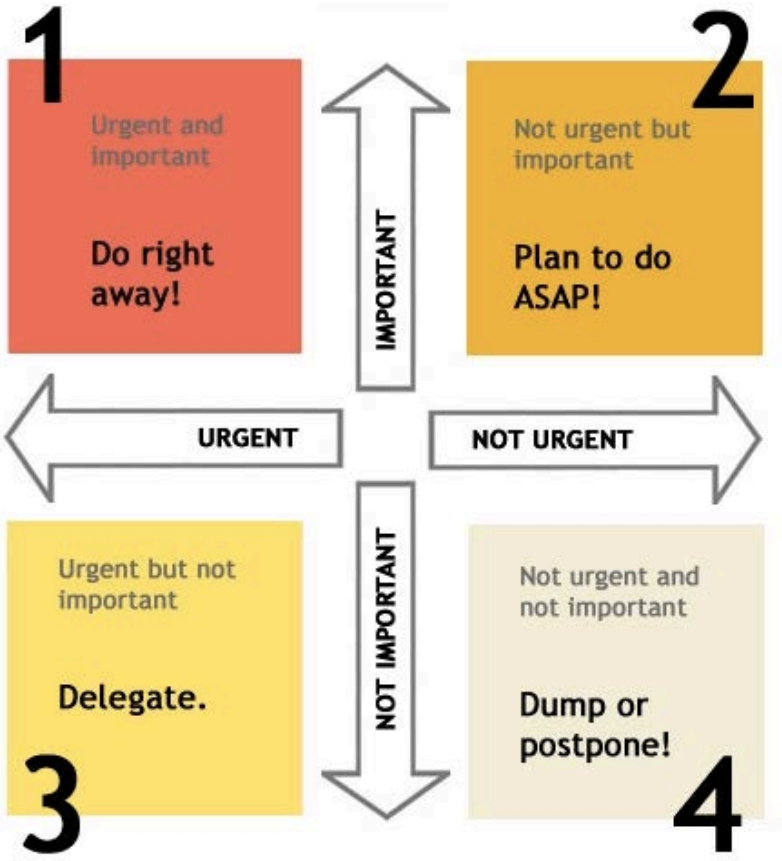

Figure 2.4 Time Priority Matrix.

2.3 Decision Tree

Decision Tree refers to learning by means of classification based on class by using the attributes. The information used in the classification on the Supervise Learning technique, which is not very uncomplicated. The structure consists of leaves as part of the results obtained. The branch is a link between the node and the root, the beginning of the event [7].

The decision process is in the form of a diagram with the step by step as below

2.3.1. Internal Node is any qualities of any data. When this node has received any data, the direction of that data will be considered by this node. Therefore, the internal node is considered as the beginning of tree root or called the root node.

2.3.2. Branch or link is the properties of the nodes within each of branches. The internal node will branch equal as the number of the properties within that branch.

2.3.3. Leaf node is the result after the data has been analyzed and classified.

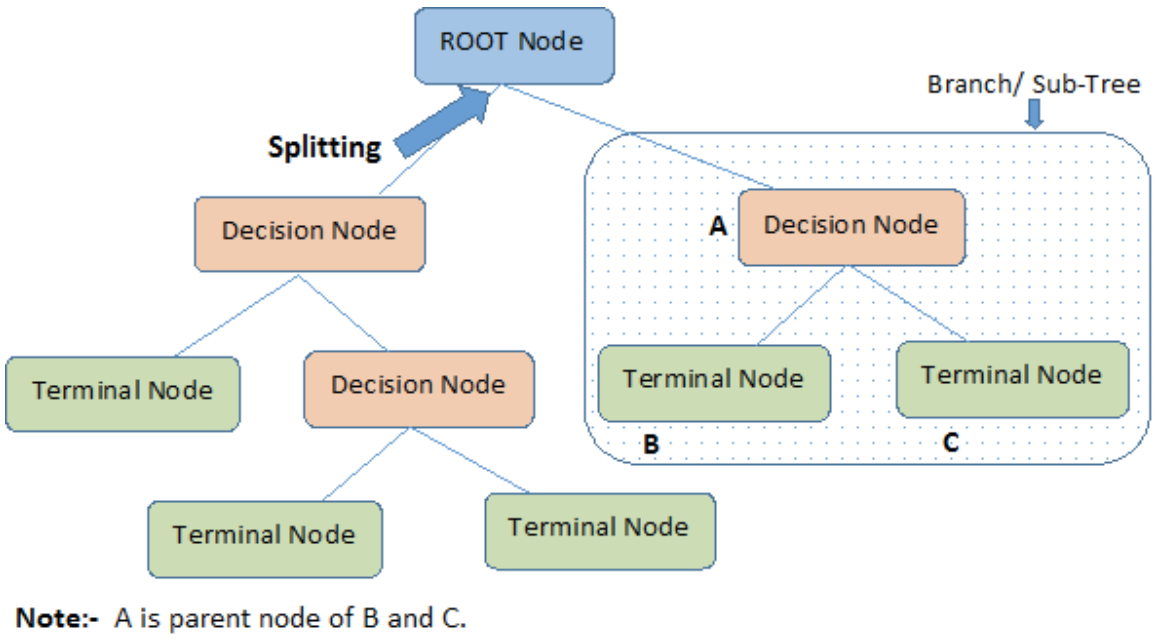

Figure 2.5 Decision Tree.

The decision process making it easy to decide. It starts with the analysis of the problem, predicting of what will happen. Then the results of each event are analyzed for the advantages and disadvantages. How different, then the final decision is made in the decision-making process by using the diagram to help for it to be simple and convenient. The Decision Tree will also make decisions more effective.

2.4 Related works

Chatchai Kaewta and Atchara Mahawirawat, (2016) have conducted a study on case diagnosed by using decision tree. The classification of guilt was described by a set of attributes into various measures appropriate with the cases. That was done by using rules, relationships, and factors affecting consideration. The punishment for the guilty has been defined. The information classification was done by comparing ID3 and C4.5 to create and present the model for supporting decisions to be used in the trial. However, there were limitations in the aspect of the considerations on cases because the classification is only done on the case wording or phrases and finding which provision or article it is contained in so there still is no correct diagnosis principle or method because it may change the fact and results in the case being misdiagnosed.

Wiboon Samranrum and Charoen Sunthrawanit, (2011) have conducted a study on the business process by analyzing brown paper in the clothing and apparel industry. It was divided into two parts in terms of design and production. The key controlling factor is the speed or time because the industry is highly competitive determined by times and seasons Any delay whether by design or production will result in the loss of sales or profitability, The work process is complex with the risk in the aspect of time is quite high. Thus business process improvement is recommended to tighten up the business processes and reduce process cycle times in order to meet the increasing demand. This can be done by analyzing the overview of the entire business process.

Mr. Pakorn Witchayanon, (2009)has conducted a study on exchange rate management approach that is appropriate for Thailand to explain that globalization has a tremendous impact on Thailand's economy. The impact is in many forms: the obvious is the development of product exportation and importation, investment funding from abroad, and transactions with foreign exchange rate. These things mean that currency exchange rate plays an increased significant role. The exchange rate is an economic engine that has much influence. Exchange rates do not

only affect transactions with foreign countries, but also both monetary policy and the domestic economy. This is because the exchange rate fluctuation can create huge problems and impact.

Refer to related works, the researchers have a theory and related research In order to guide the research. To makes valuable and reliability even further.

CHAPTER III
RESEARCH METHODOLOGY

The research on the development of priority management on International Financing through the use of decision tree has the purpose to manage priority of one financial institution by developing in such a way that match current situation. This is to reduce the time for processing, reduce the cost, reduce the damages caused by the currency fluctuation, and reduce the damages caused by transaction backlog in the system**)**. The processes are as follows:

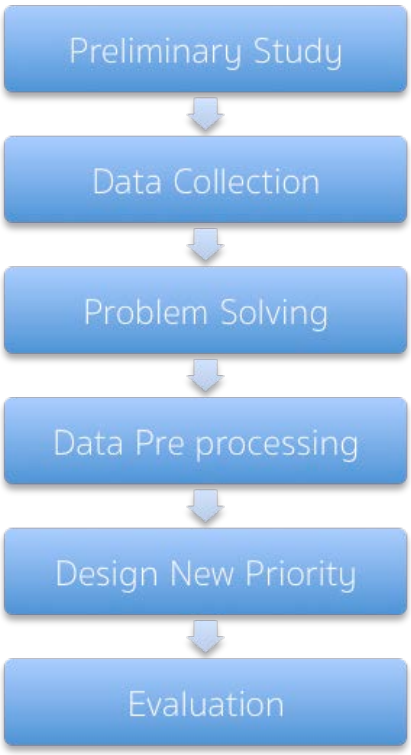

Figure 3.1 Research Methodology.

3.1 Processes and existing problems

In this chapter, the researcher has studied over all process of international financial transactions. Divided into two parts are Thailand and Hub are as following:

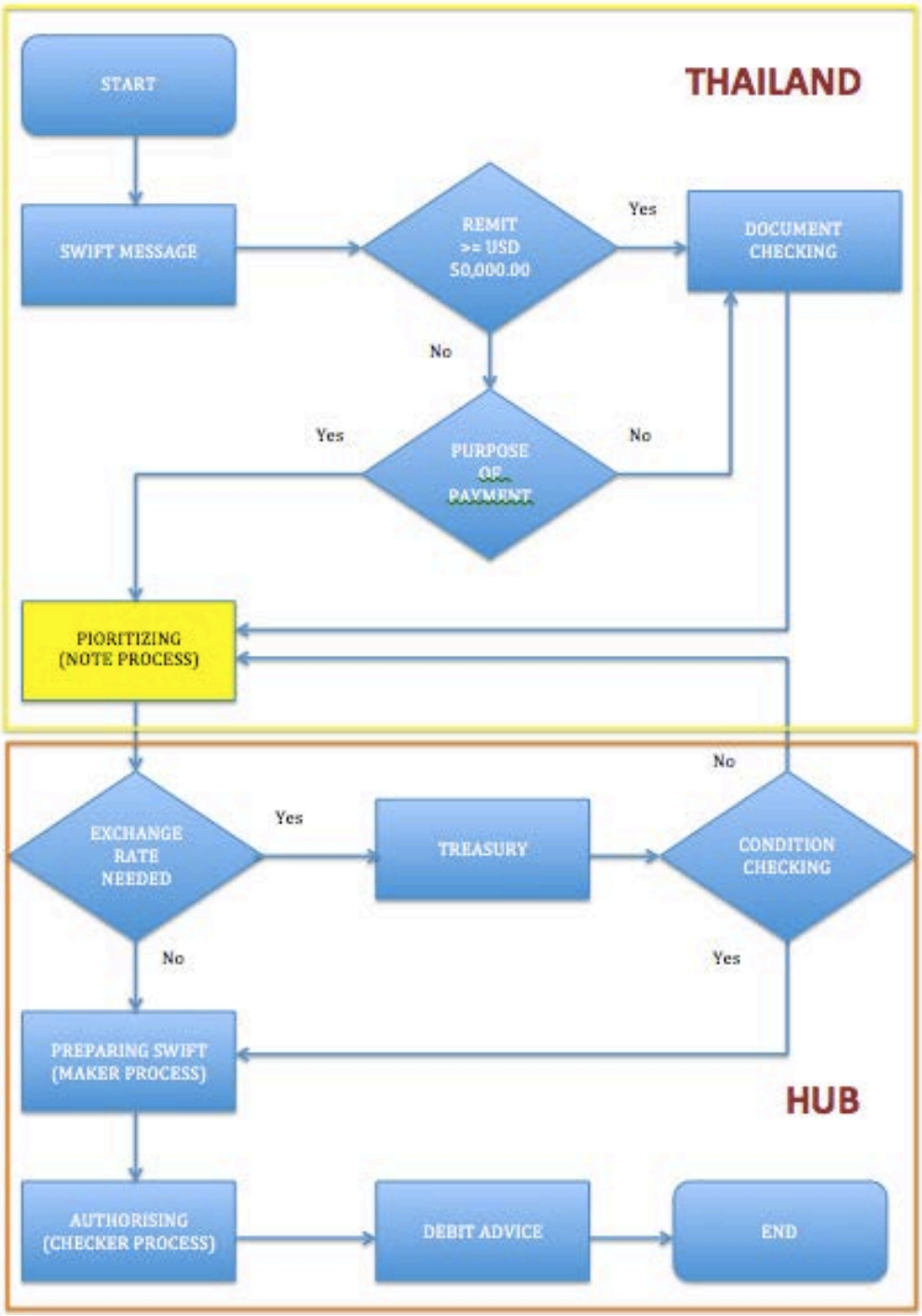

Figure 3.2 Over all of operations.

Currently, this financial institution has prioritized transactions into 5 groups, by chosing to study for Priority Urgent Domestic and Normal 50

Five categories defined by Priority are as follows:

Urgent : transactions that need to be performed urgently
Domestic : transactions that require currency exchange rate
Normal50 : transactions that can be performed right away
Normal 0 : initial transaction that just came into the system
Terminate : transactions that have been cancelled.

Transactions have been categorized as shown in the figure 3.3

Figure 3.3 Priority grouping.

From the process of prioritizing the transactions, it was found that priority domestic transactions obviously have problems. In the last 2 weeks of the months, there are a lot of transactions to perform and that lead to transaction backlog. The transactions cannot be performed in time due to the long time of processing for each transaction. Therefore, people at the destination cannot get money on time as well as be affected by the currency fluctuation that cannot be controlled.

3.2 Data Collection

The researcher has studied on priority management of one financial institution total 6,520 transactions. The data related with the Priority management are:

Table 3.1 Transaction example.

ACCOUNT	NAME	DEBIT_CCY	CREDIT_CCY	AMOUNT	RATE TYPE
XXXX	XXXX	USD	USD	50,000.00	CCY
XXXX	XXXX	THB	USD	713,098.00	FW
XXXX	XXXX	THB	EUR	800.00	CT
XXXX	XXXX	USD	AUD	1,222,908.90	TODAY

3.3 Problem Solution

From the problems that occurred, the transaction backlog were found in the type of Priority Domestic and Normal 50 that refer to the transactions that require currency exchange rate and the transaction that can be performed right away respectively. If the transaction cannot be done on time, there will be the problems of currency fluctuation. Therefore, the transaction in which the customers have already reserved the currency exchange rate with the bank and with the amount less than 30,000.00 USD have been categorized in Priority Normal 50 that can be performed right away in order to reduce time of processing in Priority Domestic. Decision Tree was put into place to appropriately prioritizing the transactions.

3.4 Pre-process data

From the historical data of total 6,520 transactions, the researcher has categorized those data by considering

- Debit currency in equal to Credit currency
- Debit currency unequally to Credit currency and Fx rate equal to Forward (FW)
- Debit currency unequally to Credit currency and Fx rate equal to Today
- Debit currency unequally to Credit currency and Fx rate equal to Counter rate (CT)

Table 3.2 Transaction example.

ACCOUNT	NAME	DEBIT_CCY	CREDIT_CCY	AMOUNT	RATE TYPE
XXXX	XXXX	USD	USD	50,000.00	CCY
XXXX	XXXX	THB	USD	713,098.00	FW
XXXX	XXXX	THB	EUR	800.00	CT
XXXX	XXXX	USD	AUD	1,222,908.90	TODAY

3.5 Designing new priority

From the analysis, new rules to prioritized by using Decision Tree

3.6 Analysis

The researcher has compared between new and old way of prioritizing by using the same set of data

It was found that there was a change on Priority from Domestic into Normal 50. This resulted in the shorter time of processing, lesser numbers of processes and decreasing in number of transaction backlog in the system.

3.7 Research Schedule

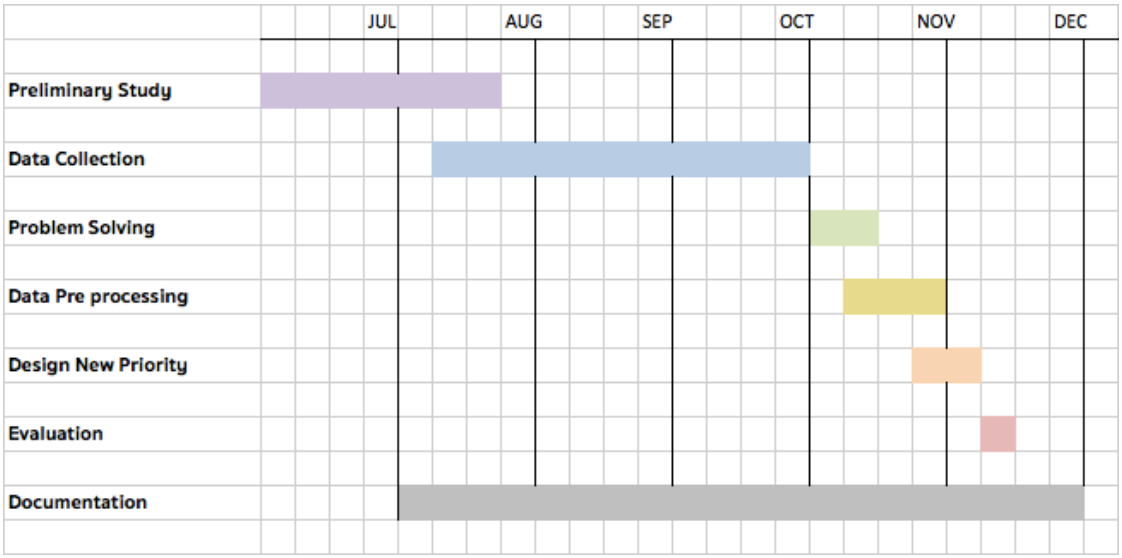

Figure 3.4 Research schedule.

CHAPTER IV
DATA ANALYSIS

This research is a study conducted on international money transactions priority. It was done by using list of past 6,520 international financial transactions to design the model to create priority rules in order to reduce, the transaction duration and costs including the damage caused by the transaction delay. The researcher would like to present the results of the data analysis as follows:

4.1 Data Pre-processing

From the comparison of past 6520 transactions to be prioritized, there were Urgent Domestic and Normal 50 respectively**.** The variables used are shown in Table 4.1.

Table 4.1 The data sets used for modeling.

TRANSACTION DETAIL	**DESCRIPTION**
DEBIT_VALUE	DATE OF DEBITED
CREDIT_VALUE	DATE OF TRANSFER
DEBIT_CURRENCY	CURRENCY OF DEBITED
DEBIT_AMOUNT	AMOUNT OF DEBITED
CREDIT_CURRENCY	CURRENCY OF TRANSFER
CREDIT_AMOUNT	CURRENCY OF TRANSFER

4.1.1 Priority Urgent

Considered from the transaction date equaling the funds transfer date and currency transferred being CNY (Renmibi), MYR (Malaysia ringgit), AUD (Australia dollar), SGD (Singapore dollar), HKD (Hong Kong dollar).

Table 4.2 Variables used for Priority Urgent.

DEBIT VALUE	CREDIT VALUE	DEBIT CURRENCY	DEBIT AMOUNT	CREDIT CURRENCY	CREDIT AMOUNT	EXCHANGE RATE
290516	290516	CNY	6,589.23	CNY	6,589.23	CCY
290516	290516	SGD	123,554.43	SGD	123,554.43	CCY
290516	290516	AUD	893,000.77	AUD	893,000.77	CCY
290516	290516	SGD	456.09	SGD	456.09	CCY

4.1.2 Priority Domestic:

Considered from the currency not equaling the currency transferred with exchange rate.

Table 4.3 Variables used for Priority Domestic.

DEBIT VALUE	CREDIT VALUE	DEBIT CURRENCY	DEBIT AMOUNT	CREDIT CURRENCY	CREDIT AMOUNT	EXCHANGE RATE
150516	150516	THB	105,076.76	CHF	2,937.00	FW
150516	150516	THB	2,538.33	EUR	65.76	TODAY
150516	150516	THB	8,628.05	USD	243.35	CT

4.1.3 Priority Normal50:

Considered from the currency equaling the currency transferred without exchange rate.

Table 4.4 Variables used for Priority Normal50.

DEBIT VALUE	CREDIT VALUE	DEBIT CURRENCY	DEBIT AMOUNT	CREDIT CURRENCY	CREDIT AMOUNT	EXCHANGE RATE
240916	240916	USD	33,343.90	USD	33,343.90	CCY
240916	240916	EUR	4,590.00	EUR	4,590.00	CCY
240916	240916	USD	665,332.00	USD	665,332.00	CCY
240916	240916	GBP	145,770.78	GBP	145,770.78	CCY

4.2 New Prioritizing Rules

From the information set used in the Decision Tree by J48 for the Model to create new rules for Priority totaling 2 models: Country-Based Prioritizing Model and Region-Based Prioritizing Model. When the data set is used in the first model, it yielded a large tree so the data was group and used in the process to end up with model 2 with the different decision Root node to get the results.

4.2.1 Country-Based Prioritizing Model

When the data set is used in the process, the accuracy was at 99.816%, which ended up with a huge Tree so it was summarized in the form of a table as follows:

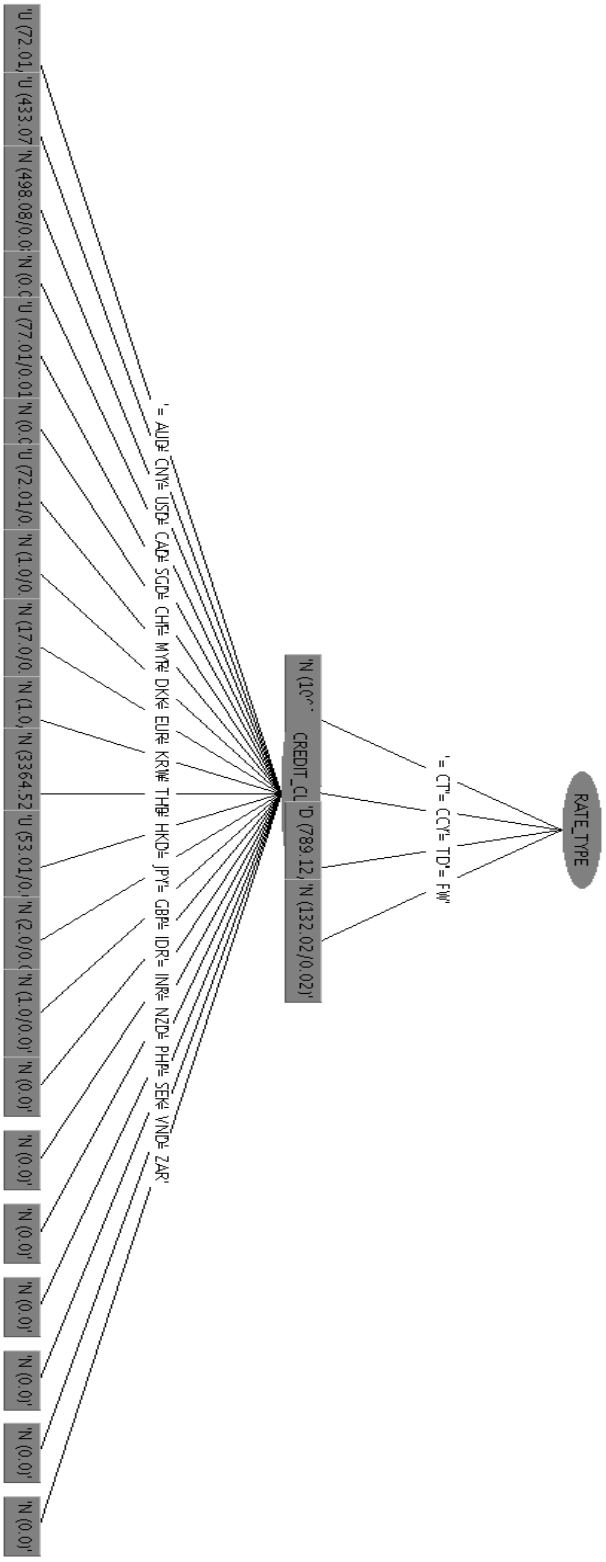

Figure 4.1 Country-Based Prioritizing Model Tree from program.

The rules can be summarized as follows.

Table 4.5 Country-Based Prioritizing Model summarized rules.

RATE TYPE	CREDIT CURRENCY	PRIORITY
CT	ALL	NORMAL50
CCY	OTHER CURRENCY	
	AUD	URGENT
	CNY	
	HKD	
	MYR	
	SGD	
FW	AUD	
	CNY	
	HKD	
	MYR	
	SGD	
	OTHER CURRENCY	DOMESTIC
TD	ALL	

- If Rate Type is CT and Credit Currency, All will be Priority Normal 50
- If Rate Type is CCY and Credit Currency, Other Currency will be Priority Normal 50
- If Rate Type is CCY and Credit Currency equal AUD, CNY, HKD, MYR, SGD, it will be Priority Urgent
- If Rate Type is F W and Credit Currency equal AUD, CNY, HKD, MYR, SGD จะเป็น Priority Urgent

- If Rate Type is FW and Credit Currency equal Other Currency will be Priority Normal 50
- If Rate Type is TD and Credit Currency, ALL will be Priority Domestic

4.2.2 Region-Based Prioritizing Model

In model 2, the currency grouping was done by dividing each country's zone. There can be two groups: Asia Zone: CNY (Renmibi), MYR (Malaysia ringgit), AUD (Australia dollar), SGD (Singapore dollar), HKD (Hong Kong dollar) and Other Zone: other currencies. When the data set is used, the accuracy is at 100% as shown in Figure 4.4.

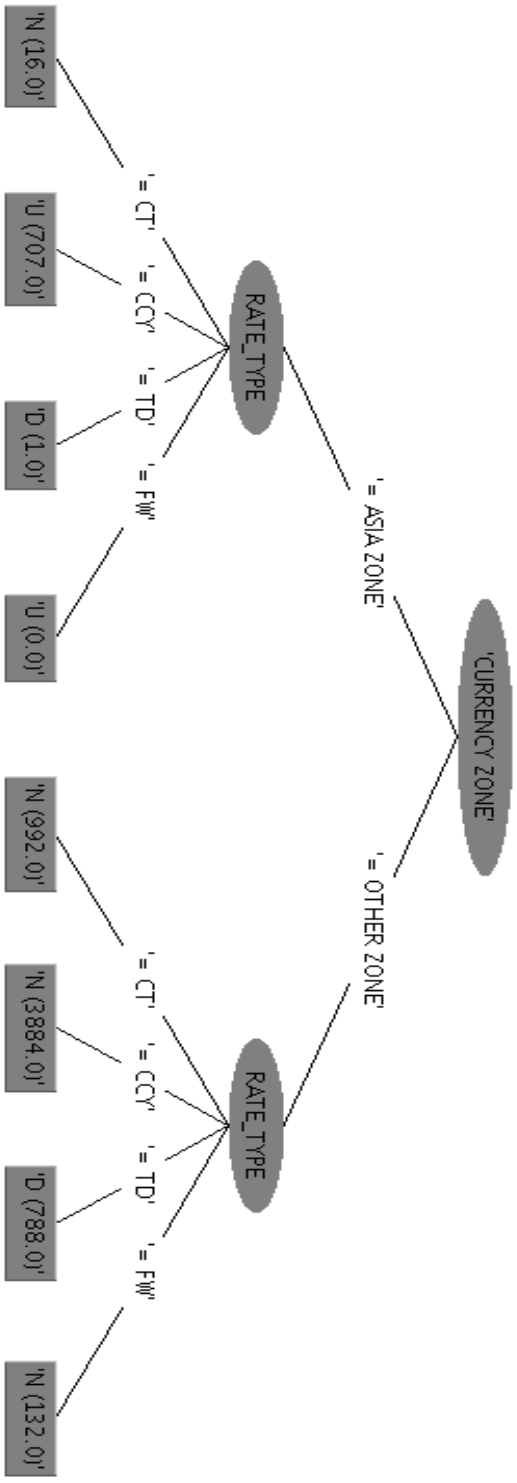

Figure 4.2 Region-Based Prioritizing Model Tree from program.

Table 4.6 Region -Based Prioritizing Model summarized rules.

CURRENCY ZONE	RATE TYPE	AMOUNT	PRIORITY
ASIA ZONE	CCY	ALL	URGENT
	FW		
	TD	ALL	DOMESTIC
	CT	ALL	NORMAL50
OTHER ZONE	TD	ALL	DOMESTIC
	CCY	ALL	NORMAL50
	CT		
	FW	< USD 500,000.00	
		> = USD 500,000.00	URGENT

- If Currency Zone is Asia Zone and Rate type is CCY, it will be Priority Urgent.
- If Currency Zone is Asia Zone and type is FW, it will be Priority Urgent.
- If Currency Zone is Asia Zone and Rate type is TD, it will be Priority Domestic.
- If Currency Zone is Asia Zone and Rate type is CT, it will be Priority Normal50.
- If Currency Zone is Other Zone and Rate type is TD, it will be Priority Domestic.
- If Currency Zone is Other Zone and Rate type is CCY, it will be Priority Normal50.

- If Currency Zone is Other Zone and type is FW, it will be Priority Normal50.
- If Currency Zone is Other Zone and type is CT, it will be Priority Normal50

4.3 Model Comparison

From the comparison between the original priority model to new model with the data on 6520 transaction from the same period, the total number of transactions per minute are as shown in the table.

URGENT : the average duration per 1 transaction is no longer than 20 minutes.

DOMESTIC : the average duration per 1 transaction is no longer than 90 minutes.

NORMAL50 : the average duration per 1 transaction is no longer than 30 minutes.

Table 4.7 Transaction duration comparison.

PRIORITY	TRANSACTION		PROCESSING TIME (MINUTES)	
	OLD	NEW	OLD	NEW
URGENT	718	718	14,360	14,360
DOMESTIC	1,918	778	172,620	70,020
NORMAL50	3,884	5,024	116,520	150,720
TOTAL	6,520	6,520	303,500	235,100

The table shows that the new prioritizing method can shorten the time better than the original. However in practice, the researcher found that the fund amount is another important variable in the transaction so the Model was revised in the next section.

4.4 Adjusted Prioritizing Model

When the new Model was considered, it was found that it was a key factor in the transaction. The research has adapted the Region-Based Prioritizing Model by increasing the transaction fund amount as a variable. With the following consideration: the other zone currency with exchange rates was FW and the transaction amount is the equivalent of or more than USD 500,000.00 would be Priority Urgent as shown in the Table.

Table 4.8 Adjusted Region-Based Prioritizing Model

CURRENCY ZONE	RATE TYPE	AMOUNT	PRIORITY
ASIA ZONE	CCY	ALL	URGENT
	FW		
	TD	ALL	DOMESTIC
	CT	ALL	NORMAL50
OTHER ZONE	TD	ALL	DOMESTIC
	CCY	ALL	NORMAL50
	CT		
	FW	< USD 500,000.00	
		> = USD 500,000.00	URGENT

Table 4.9 Transaction duration comparison.

PRIORITY	NUMBER OF TRANSACTIONS			PROCESSING TIME (MINUTES)		
	OLD	NEW	ADJUSTED	OLD	NEW	ADJUSTED
URGENT	718	718	816	14,360	14,360	16,320
DOMESTIC	1,918	778	778	172,620	70,020	70,020
NORMAL50	3,884	5,024	4,926	116,520	150,720	147,780
TOTAL	6,520	6,520	6,520	303,500	235,100	234,120

4.5 Discussion

From adopting a series of past 6520 transactions entries in the Decision Tree by J48 is a model used to establish the rule of the two models include Country-Based Prioritizing Model and Region-Based Prioritizing Model, the accuracy was 99.816% and 100%, respectively. From the two models, it was found that the fund amount is a significant variation in the transaction in practice. The researchers took model 2, the Region-Based Prioritizing Model to increase the transaction fund amount. The results were compared in the aspect of the transaction duration of the traditional Prioritizing model took a total of 303,500 minutes and new grading Priority took a total of 235,100 minutes and Priority after the Model was adjusted, it took a total of 234,120 of minutes. Therefore, it was found that the new Priority and Priority after the Model was adjust can shorten transaction duration to be better than the traditional at 68400 min and 69380 min respectively. Therefore, it was concluded that the best model is the New Region-Based Prioritizing Model.

In practice, there would be other relevant factors to be considered: the cost of each transaction and time wasted including staff OT, which in the future should be studied further and taken into consideration in conjunction with the transaction.

CHAPTER V
CONCLUSION

5.1 Conclusions

From the study conducted on Prioritizing international financial transactions of a bank, problems were found in the system due to the delay of the transactions implementation related to the exchange rate that were uncontrollable and the transaction duration was relatively high that resulted in damage. The researcher has studied and grouped Priority transaction using the J48 Decision Tree to group the transactions by using list of past 6,520 transactions. This resulted in 2 models to create rules: the Country-Based Prioritizing Model with the rules based on type of exchange rate and currency, which ended up with a large Tree. Thus the grouping of currency was done by divided it into zones from the period of each country, the second model was the Region-Based Prioritizing Model with the rules based on the currency and exchange rate. The 2 models accuracies were different at 99.816% and 100% respectively but the results were the same in practice. The researcher found that the fund amount of the transaction is a variable in the transaction, thereby the Region-Based Prioritizing Model was adjusted by increasing the amount of transaction rules in the New Region-Based Prioritizing Model with new Priority grouping and grading. After the Model was adjusted, it was found that the duration of the transaction was reduced by 68,400 minutes and 69,380 minutes, respectively, the decrease was 22.54% and 22.86% of the total respectively, the research found that the adjusted New Region-based Prioritizing Model shorten the transaction duration to be better than traditional and new prioritizing method period. The transaction duration was reduced. It also reduces costs and damages that may occur.

5.2 Limitations and suggestions

This research had a limit on the duration of the transaction because there are other factors and elements that such as the foreign exchange restrictions that required the relevant departments to proceed. Therefore, there should be studies conducted on the part of the departments or agency to reduce the duration of the transaction, delays and the damage that may occur.

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