THE IMPACT OF INFORMATION SYSTEM ON THE OPERATIONAL COST REDUCTION: AN ANALYSIS AND IMPLEMENTATION IN A THAI SME

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THE IMPACT OF INFORMATION SYSTEM ON THE OPERATIONAL COST REDUCTION OF COMPANY: AN ANALYSIS AND IMPLEMENTATION IN A THAI SME

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ABSTRACT

This paper attempts to provide the simple way to help the firm with daily working operation from using the paper bases system to IT system in order to keep all the data. Inaccuracy data, unorganized data, and delay of work are the main problems, which usually found in the paper-based system. Hence, to introduce the IT system to the firm would be the best solution to solve all these current problems. As the results of this paper , the research team found that the working performance was increasing by data accuracy& consistency, time saving, and labor cost saving. However, the research team suggested to keep continues improving the performance of the firm by transfer the information to the wisdom.

KEY WORDS: Management/ Information systems/ Cost reduction/ Database/ Learning curve

20 pages

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CHAPTER I

INTRODUCTION

Rational & Importance of the subject

Since Mid-1990, the technology and IT innovation have become more important factor for business firm operation because the technology and IT innovation can provide a lot of advantage for the business firm (Laudon, K. C. & Laudon, J. P., 2006). Management information system or "MIS" is one of the technology and IT innovation that can help the business to increase their efficiency, performance and so on (McLeod, R. Jr. & Schell, G., 2001). Hence, the implementation of information system will help to firm to increase their competitiveness and challenge with other competitors in the difficult business environment (Laudon, K. C. & Laudon, J. P., 2006).

Problem Statement and Its Importance

According to the current situation of TCS Machine Trade Co. Ltd. a paper base systems is major problem that lead to any problems and created ineffectiveness in the company. At the moment, the document system in this company run on a paper-base system for all process including account, bills, administrative, payment, sales record and, so on. The company collected the data information in to paper-base which requiring time to record or transfer information which this problem can lead to a lot of problems. For example, the administrator has to take 15days to analyze the monthly income statement. It is nearly impossible for the company to transfer the information to knowledge because the limitation of time, and resource. Therefore, the implementation of software solution or information system could be good method for the company to increase its performance and the efficiency of the company.

Research Question

How technologies of information system improve the cost position of a firm?

Research Objectives

This paper aims to improve in term of the effectiveness of management information system, which can help the company to increase the performance and the productivity.

The objective for the research to solve ineffectively management, which bring poor performance of the company. The research aims to introduce the innovation and technology to improve the information system in the company. Moreover, the research seeks to educate the sustainability improvement for the firm.

Research Scope

The research aim to provide the example of the using management information system and provide the fully understand implementation process of management information system for a firm, which still using the paper base. The research focuses on the action plan that can actually increase the performance of the firm by applying the experiment approach of the IT information system that can be compare in term of tangible performance. This study may provide the example of the process which will help the company organizing easier than before.

The experiment period is divided into 3 phases, which could help the company adopt the new IT system quickly and effectively. The 3 phases of this experiment can be divided into1) Introduction, 2) Learning and developing, and 3) implement of the IT system.

Expected Benefit

1. Technology implementation can increase the performance of the firm
2. Using the information system to help decision making process inside the company
3. Implement the technology to save the time and reduce cost
4. Improve the firm's competitiveness

CHAPTER II

LITERATURE REVIEW & PROPOSED FRAMEWORKS

In this chapter we will discuss the existing literature in the area of information system and organization change. The mainly focus of the paper is about the management information system, so there are theories that involved in the research.

2.1 Theoretical Foundation

Information systems

An information system can be defined "technically as set of interrelated components that collect, process, store, and distribute information support decision making and control in an organization"(Laudon, K. C.& Laudon, J. P., 2006). Also, an information systems help the firm to increase competitiveness in the business environment today (Haag, S. & Cumming, M., 2006).

Information systems are helping the firm to collecting the information about significant information people, places, and things within the firm or in the environment surrounding it (Laudon, K. C. & Laudon, J. P., 2006).

All types of businesses, both large and small, are using information systems, networks, and Internet technology to conduct more of their business electronically, achieving new levels of efficiency and competitiveness (Lucas, H. C. Jr., 1990). Information systems have both technical and behavioral perspectives and by surveying the changes they are bringing to organizations and management (Lucas, H. C. Jr., 1990).

Today it is widely recognized that information systems knowledge is essential for managers, because most organizations need information systems to

survive and prosper (Laudon, K. C. & Laudon, J. P., 2006). Information systems can help companies extend their reach to faraway locations, offer new products and services, reshape jobs and work flows, and perhaps profoundly change the way they conduct business.
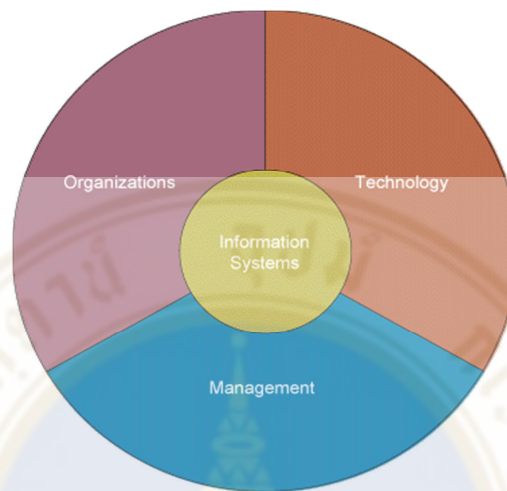
Figure 2.1 information systems are more than computers
Source http://dc394.4shared.com/doc/WFyYA1MQ/preview.html

This figure shows the important of the information system for the company. The broader organization, management, and information technology dimensions of systems and their power to provide solutions to challenges and problems in the business environment (Laudon, K. C. & Laudon, J. P., 2006).

Four powerful worldwide changes have altered the business environment (Laudon, K. C. & Laudon, J. P., 2006). The first change is the emergence and strengthening of the global economy. The second change is the transformation of industrial economies and societies into knowledge- and information-based service economies. The third is the transformation of the business enterprise. The fourth is the emergence of the digital firm (Laudon, K. C. & Laudon, J. P., 2006).

The Database

A database is an organized logical grouping of related files. The database help the firm to reduce data redundancy, data isolation, and data inconsistency and the data can be shared in the group of users of the data (Turban, E., Mclean, E. &

Wetherbe, J., 1999). Data warehousing is additional database (InmonW. H., 1992). It is a logical where the information collected. It gathered from other computers. It is use for create the business intelligence that supports business analysis activities and decision- making task (Haag, S. & Cumming, M., 2010).
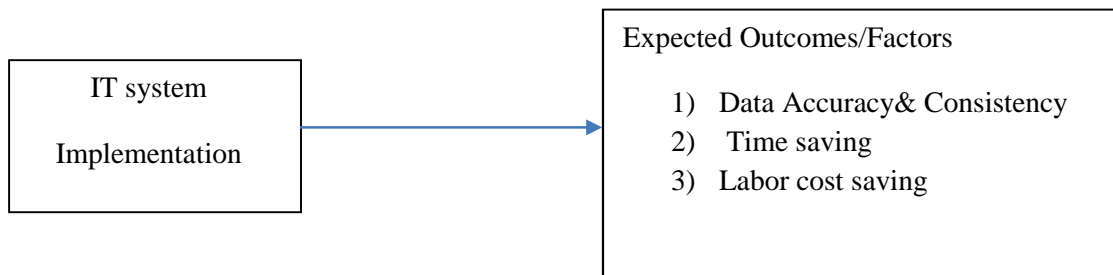
The Learning Curve

Learning curves, also called experience curves, it about curve that show a graphical representation of the rate at which you make progress learning new information (Petley, B. W., 1988).When people learn something new repetition is essential. Through repetition they become more efficient and more effective at any challenge (Petley, B. W., 1988).

However, in the beginning, when people have to learn the new things. They will make a progress very slow (Bills, A.G., 1934). Furthermore, if people keep training and repeating something interesting will happen. They brain start adjusting to the challenge and suddenly the progress becomes much more accelerated (Bills, A.G., 1934).

2.2 Proposed Framework

According to the above literature, we hypothesized that following factors may have an impact on firms' performance by make a use of management information system. To apply the information system to the firm, it is not simple to apply for the firm because the company management with the traditional style, so it is difficult for them to accept innovation and technology. However, the management already concerned and the project of change has been approved because the management believed that it would be worthwhile for the company. As mention above the research is focus on Transaction processing system which rerates to the day by day operation. The framework of implement the management information system will be list below;

| IT system Implementation | → | Expected Outcomes/Factors 1) Data Accuracy& Consistency 2) Time saving 3) Labor cost saving |

There are 3 main areas that this research going to focus on following below;

Firstly, the use of IT information systems would use the firm reduce the problems about the data collection of inventory management by reducing number of errors, loss of the documents, and unmatched meaning. As a predicted the implementation of IT information can help the firm increase Data Accuracy& Consistency

Secondly, after implemented the experiment by used of software tools to help the company working easier than the paper base used. The result that can be measurement is the time consume for each work. The time consuming is one of the most important reasons for implement the software tools. If the system can help employees to lower their task and saving time, it would be better for company to implement as a routine used.

Thirdly, the implementation of software tools would reduce the number of employees being use on the each work. The currently situation of the company, there are 3 employees working in the area of administrative and accounting. The cost would be reduces regarding with the number of employees on the task.

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research Setting

The industry which the research is mentions about is wholesale and retail industry. The attractive of the wholesale and retail industry are quite a number. The first reason why this industry is attractive because most of business firm nowadays is about trading even though some of non- trading companies still have to deal with trading company. It can say that the trading company is playing the big part of the business world. Hence, Good management of the trading company become necessary in the present in order to complete with the competitors and provide efficient to both suppliers and customers . The company that been selected is called "TCS Machine Trade" the detail in term of sample size, company characteristics, etc. will explain more in below section

There are a few reasons that this research has been conducted, on the basis of this firm. Firstly, the current problem of the company could be solving by the MIS theory. Secondly, the top management team of this firm is willing to provide the useful information for the research, and allow the researcher to implement information system inside the company, providing a good research setting to collect and interpret data.

3.2 Sample & Data Collection

In this study, the experiment approach is used to gather relevant data. A conduct of experiment approach by actually makes a use of software tools to transform the necessary information to the knowledge and wisdom information for the company. Also, the experiment approach can measurement in many ways but the limitation of time to conduct this research.

Company background

TCS Machine Trade is the importer and distributer of the small machinery such as motors, air compressors, water pumps, engineering tools and small construction machines. The office is located in China Town, Bangkok. TCS Machine Trade is a business to business (B2B). The main customers of the company are the retailers from both inside and outside Bangkok. There are 10 employees working for the company. The company uses the old traditional style of management which is quite usual for family business.

Implementation plan

The period of implementation the research experiment is 3 weeks. Hence, the period will divide to 3 phases which can help the company to change from the paper base system to the new IT information system. The 3 phases of experiment deposit the knowledge of IT usage to the firm step by step which can be lists blew;

Phase 1 Introduction of the new IT information system

In order to gain the good support from the top management of the company in the first week of implementation of the innovation information system, the experiment team has to talk with the top management team in the company and explain about how important of the IT information system is.

Also, the experiment team needs to create the best understanding to the real users which will work with the new IT information system as routine in the vicinity of future. In the first phase, there also provide the presentation of the new IT information system to the employees in the firm.

Phase 2 Learning and developing the skills of information system

After the project had approved and gain the support from the top management of the firm. In this phase the experiment team tries to demonstration of the IT information system to the employees and could make the familiarity for employees to reduce the pressure.

Moreover, the research team also provides the training programs for the use of IT information system in order to make the better understanding in real use of the information system.

Phase 3 Implement of the IT information system

The implement phase is the final period of the experiment. The team implements the use of IT information system and measurement the outcome result by 3 factors which are Time saving, Labor cost saving, and Material cost saving.

CHAPTER IV
RESEARCH FINDINGS

4.1 Before implement the New IT Information system

According to the current situation of TCS Machine Trade Ltd, They still paper base using in all process including account, bills, administrative, payment, sales record and so on which leading to many problems in the company. For example, the time consuming for the company accountant to make annual income statement, it could take more than 20 days to provide the final report.

As the discussion above, the team divides the factors which mainly impact to the organization when implementing the new IT information system following the lists of factors below;

Table 4.1 The accuracy of management Inventory report

Issue	Times/month
The number of errors	20
The loss of the documents	10
The unmatched meaning	30

The table shows the number of issue which responding paper base using in management inventory. There are 3 main issues that often occurred in organization. Also, the frequency of occurred evaluate by monthly.

The number of error is the problem with usually occurred in the company because all of the recorded have written by hand writing, so there were a large number of errors occurred. For example, terrible hand writing of the administer lead to misunderstood of the number of the product.

Since, the company was using the paper base as a main to running the organization. It was hard to found the document when there are many transactions going on daily.

The unmatched meaning is the problem that easy to happen when the firm using the hand writing to recording all the report. The errors may occur easily when the record or the report is unmatched to the reality that means the firm cannot found it correctly to make the report.

Table 4.2 The time to respond

Issue	Days
Monthly report	10
Annually income statement	15
Inventory management report	3

This table is representing the time for employees to respond in each task. The implement tram pick up 3 examples of the important tasks that using the paper base including the monthly report, inventory management report and annually income statement.

The implement team makes some measurement before the company running the New IT information system. As result before apply the IT information system, the firm take 15 days in order to conclude all the information to provide the annually income statement and they take 10 days for monthly report which can say that consuming a lot of time. Also, its required the a lot of time and energy from employees which sometime it create the conflict between management and employees because the employees are too tired from writing the report, but it seen to be too slow for the report that management need to be use.

Table 4.3 The labor cost

Job description	The number of employees	Wages
Accountant	1	20,000
Administrator	2	14,000
Store worker	2	9,300

The labor cost is one of the major expenses in the firm. There are 10 employees in the organization. However, the positions which directly impact for implement the new IT information system would be including accountant, administrators, and store workers. The wages of the employees which relate with these job positions have been shown on this table. The accountant wage is 20,000 Baht. The Administrators wages are 14,000 Baht per person or 28,000 Baht as a total. The store workers' wages are 18,600 Baht as a total or 9,300 Baht per person.

4.2 After implement the New IT Information system

There was a training program for employees who will be the routine users of the IT information system. In order to minimize the cost the team project decide to provide the training by ourselves, so the cost occurred in training program come from wages 20,000 Baht. The training program period was a week which equal to 5,833 Baht. Therefore, the total cost of the project in the first year would be 58,951.80 Baht.

After 3 weeks of implementation, the implement team found that the performance have dropped below before the project has started because it is in the learning process(Petley, B. W., 1988), the employees are still adjusting themselves to fits in the new process and they are not familiars with the new IT information system. The disappointed result for some of indicators comparison between before starting the project and after the project has implemented. The team found out that some of performance indicators have dropped by using the 3 factors as above. However, some of the factors have a large increase the performance and more effectively which are outstanding the positively results that the firm has ever had.

Table 4.4 The accuracy of management Inventory report

Issue	Times/month
The number of errors	0
The loss of the documents	1
The unmatched meaning	0

The first performance indicator is the accuracy of management inventory report representing the great number of reducing of the number of problem that usually occurs in the firm. The positive number in term of reducing the number of errors, loss of the documents and unmatched meaning are nearly eliminated.

The problem which leads to inaccuracy in recording the information would be eliminated by implementation of the new IT information system. The benefit of correctable the information recorded would help the company to developing their knowledge, and information to responding the customers demand. Also, the firm can truly know the number of inventory inflow and outflow for the better accurate in term of accounting.

The lost in documents still got some problem about it. However, the implementation of the new IT information system reduces the large number of the loss of the document. The important of solving problem because the original bills for both inventory inflow and inventory outflow are proving the correctable of the number of stocks and the cost of goods sold of the product. The program required to put the issue number of the bills for both inflow and outflow, so it is easier to follow up the bills which have been lost. Also, the firm adjust the new way to keep the document by put in the folder following the date of received these documents. The new adjustment of the firm created to be support the information system program which working together very effective.

The problem of unmatched meaning has been eliminated because of the implementation of the IT information system because the information system program providing the name in each of product, so it is helping the recording process running effectively.

Table 4.5 The time to respond

Issue	Days	Days
	After	Expected
Monthly report	N/A	2
Annually income statement	N/A	3
Inventory management report	N/A	1

The Table shows that after applied the IT information systems the result have been N/A because it cannot be complete. The implement period is counting for 1 week. The employees are not familiar with the new IT system. Also, they are still lacking of the skills for using the program (Bills, A.G., 1934).

Moreover, all the information last year and this year has to be transfer from paper base into the computer program which requiring more time input information. The experiment cannot hold until work done. As a result, the implement team found that the performance have been dropped as stated in organizational change (Bills, A.G., 1934).However, with economy of learning, employees can gain experiences, skills to use this new information technology(Bills, A.G., 1934). Therefore, after 1 month of implementation the team expected the result to improve dramatically. Hence, the table shows the expect time to respond in each job task. The expected number can be predictable because the routine users of the program will be become more familiar with the system which all the information will be daily update into the program.

Table 4.6 The labor cost

Job description	The number of employees	Cost per working hour
Accountant	1	5,040
Administrator	2	7,008
Store workers	2	4,704

The table show a number of expected reducing the working hours which also reducing the major labor cost for the firm. The reducing in working hours does not mean to fire any employees but it mean employees have more time to work on others things. The normally which pay for accountant currently is 20,000 Baht which can count to 105 Baht per hour. For administrators wage are 14,000 Baht or 73 Baht per hour. The store workers earned 9,300 Baht or 49 Baht per hour. Hence, a total wage that firm has to pay their employees when they are using the paper base as the process is 66,600 Baht per month. However, after cut off the paper base by implement the IT information system. The team found out that the cost of labor has been reducing in the large number which reducing from 66,600 Baht to 16,752 Baht. The difference of the labor cost between paper base and IT information system is 49,848 Baht.

4.3 Financial for the project

Table 4.7 The cost of the project

Subject	Number	Total cost
Computer	3	24,420
Printer	1	4,990
Program	1	29,120
Depreciation	5 years	-5,411.40 per year
Training program	7 days	5,833
Total	First year of the project	58,951.80

The Table shows the cost of the project which included major for the project. The computers are the first primary needed for this research. The team chooses DellInspiron 660MT, Corei3, 3.0 GHz, Up to 8 GB, Window 7. It is cost 8,140 Baht. The total number of purchase 3 computers with the total cost 24,420 Baht. For the printer, the team selected Epson L210, all in one Inkjet. It can print, scan and copy which the team concerned that is worth for value of money. The team chooses to

purchase only one printer because they can share among officers. The cost of the print is 4,990 Baht.

The Cost of fixed asset must be charged to the income statement in a manner that best reflects the pattern of economic use of the asset. Most common methods of depreciation are Straight Line Method. The depreciation of this project will be including 3 computers and 1 printer following blow;

- An assets have a useful life of 5 years

- Cost of the asset is 29,410 Baht

- Residual Value or salvage 2,353 Baht

- Annual Depreciation cost will be (29,410 - 2,353) / 5years = 5,411.40 Baht

4.3.1 Net Present Value (NPV)

$$NPV = -C_0 + \sum_{i=1}^{T} \frac{C_i}{(1+r)^i}$$

NPV =? P or -Co = 58,951.80, C = 49,848, T = 3 years, R = 4%

$$NPV = -58,951.80 + \frac{49,848}{(1+0.04)^1} + \frac{49,848}{(1+0.04)^2} + \frac{49,848}{(1+0.04)^3}$$

4.3.2 Payback period

$$Payback\ Period = \frac{Initial\ Investment}{Cash\ Inflow\ per\ period}$$

Payback period in 1.18 year = 58,951.80/49,848

CHAPTER V
DISCUSSION & CONCLUSION

The Background and importance of this research is to prove the effective of implementation of the management information system which is become more important in the world of business today. This study seeks to provide the great example and comparison the difference between the paper base and the IT information system. Also, provide the results which tangible to measurement in term of number and value.

Summary of the research finding the possibility for the firm increase their performance, time saving and cost saving by implement the IT information system. Hence, the research provide the model of implementing the IT information system for the firm where still using the paper as a process.

5.1 Contribution of study

This project is proving the result by measurement in term of number which is tangible. Although the research cannot be archive the goal which set before implementing the IT information system but the positive results in many factors can prove a high chance of success in the near future. There are a lot of benefit which are intangible would be high possibility to discuss as a future research.

5.2 Managerial Implication & Suggestion

The suggestion from the team project, the firm should transfer all these information that they gained to be an knowledge and a wisdom because the knowledge and wisdom can be improve in the area of management inventory, accounting, sales, cash flow, and administrative. For example, after the company applies the IT

information system, they know that Product A has high volume of sale during raining season, so the firm is able to use this knowledge to decide the promotions and inventory management.

5.3 Limitation

The limitation of the research was the experiment research period which was too shot because the management and all the process in the organization had used the paper base for a long time when the research team has introduce the new IT information system to the firm, it is the new thing for them. The unfamiliarity have still unsolved because the implement period was only for 1 week. The short period was nearly impossible for the employees in the company to adopt the IT information system in used.

5.4 Future Research

The future research can be the measurement in term of intangible assets of the organization when they adopted the IT information system as their process. For example, after the company adopted the IT information system, all the bills that customers receive will print out from the printer. The study can be in the area satisfaction of the customers between the bills from hand writing and bills from the printer which is the better and the bills from the printing machine create any good image for the firm in customers' perspective.

REFERENCE

Bills, A.G. (1934). General experimental psychology. Longmans Psychology Series. (pp. 192-215). New York, NY: Longmans, Green and Co.

Haag, S. & Cumming, M. (2006). Information System Essentials. New York, NY McGraw Hill Irwin.

Haag, S. & Cumming, M. (2010). Management Information Systems for the Information Age. New York, NY McGraw Hill Irwin.

Laudon, K. C.& Laudon, J. P. (2006) Management Information Systems. New Jersey: Prentice Hall.

Lucas, H. C. Jr. (1990) The Analysis, Design, and Implementation of Information System. Watsonville. McGraw Hill

InmonW. H. (1992). Building the Data Warehouse. New York. John Wiley.

McLeod, R. Jr. & Schell, G. (2001) Management Information Systems. New Jersey: Prentice Hall.

Oz, E. (2009) Management Information Systems. Boston, Massachusetts: Course Technology, Cengage Learning.

Petley, B. W. (1988) Towards the Limits of Precision and Accuracy in Measurement. New York, NY: the American Institute of Physics

Turban, E., Mclean, E. & Wetherbe, J. (1999) Information Technology for Management: Making Connections for Strategic Advantage. New York, NY: John Wiley & Sons