

CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

The POS (Point of Sales) pilot project started from planning for system design and implementation, following the plan from identifying users' requirements, collecting data of the existing ECR (Electronic Cash Register) system, designing the proposed POS (Point of Sales) system, programming, testing, conversion, implementing the system, maintaining the system and finally evaluating the proposed system. During this pilot period, the case study gains many experiences and knowledge of using the POS system on store operations as follows :

- How to implement the new system.
- The major factors affecting the system implementation.
- The impacts of the system on retail store operations.
- Suitable conditions for implementing the system.

The objective of this chapter is to conclude these valuable experiences which will be references for the case study for future actions. Furthermore, at the last part of this chapter, there are some recommendations which are individual opinions of those involved in the pilot project.

The application of this POS pilot project was developed from the application package proposed by the vendor. However, the plan for system design and implementation was set up by the case study as follows :

- 1) *Identify the User's Requirements*
- 2) *Collect Data*
- 3) *System Design*
- 4) *Programming, Testing, and Conversion*
- 5) *System Implementation*
- 6) *System Maintenance*
- 7) *System Evaluation*

After one year of running the pilot project, it has been discovered that there are many factors which are significant in the system implementation as follows :

- 1) *Database*
- 2) *Software*
- 3) *Hardware*
- 4) *Procedure, Operation Environment, and Business Environment*
- 5) *Bar Code (Source Marking)*
- 6) *Economic Recession*
- 7) *Government Regulation*
- 8) *Employee Turnover Rate*

The impact of the above major factors to the system makes the result of implementation difficult to evaluate. Without these factors, the performance of the system may be higher, but they are real factors so the evaluation must be done under these conditions. Furthermore, some performances require a long period to improve. For this short testing period, those performances do not improve. However, one of the ways to improve the impact of the system can be achieved by reducing some unsuitable conditions and creating suitable conditions that will be presented in the last part of the chapter.

6.1 Results of System Implementation

The results of the Point of Sales (POS) system implementation are summarized as shown in figure 6.1.

Quality of Information	Service Level	Service Speed	Service Accuracy	Inventory Level	Store Image and Other Intangibles	Cost
Improved	Not Significant	Not Significant	Improved	Not Significant	Improved	
(The incorrect product information percentage is reduced from ten percent in August 1997 to one percent in April 1998.)	(The POS system implementation can not improve the service level of the convenience store of the case study in a short term.	(The use of the POS system for our current environment is not significant to improve the service speed of the case study.	(The percentage of mis-registration transaction is reduced from 2.33 % performed by the ECR system to 0.13 % performed by the POS system.	(The POS system implementation can not improve the inventory level of the convenience store for this short testing period.	(re-checkable slip, employees' job satisfaction, management of price changes, organizational flexibility, legal requirements	Hardware Cost = 1,330,000 Baht Annual Cost = 294,300 Baht

Figure 6.1 Summarized Results of the POS System Implementation

• Impacts of the System on Quality of Information

The implementation of the POS system which uses the itemized information to perform sales activity indicates the quality of information. The bar-code information, product price, product effective date, and etc. are used for every transaction every day. After implementing the POS system, the case study has found that there are many incorrect or inaccurate itemized information generated by two major sources : the internal and external sources.

The internal source includes human error, insufficient knowledge of the operators who maintain the database, and etc. The external source generates problems such as incomplete bar-code, negligence to inform the change of

information, and etc.. The case of incomplete bar-code information which makes the use of the POS system ineffective are listed as follows :

The potential problems of bar-code information

- 1) The bar-code of the same product is changed
 - 1.1) Repackaging
 - 1.2) Changing Product Shape
 - 1.3) Promotional Campaign
- 2) One product has many bar-codes.
 - 2.1) Bar-codes of individual item and of multi-packs.
 - 2.2) Various versions of the same products at the same time.
 - 2.3) Inner and outer labels
- 3) One bar-code is assigned to a different product.

During the POS system implementation, the case study found that there are around 200 items or ten percent of the items with incorrect itemized information generated from many incorrect data entry procedures and the misunderstanding of database maintenance or updates. The case study has been trying to correct this problem for ten months by setting correct procedures which began from setting a small working group for solving this problem, surveying the incorrect information, investigating the cause of the problem, correcting the incorrect information, and verifying the new coming information.

The result of database correction activity shows that the incorrect product information percentage is reduced from ten percent in August 1997 to one percent in April 1998.

- **Impacts of the System on Service Quality**

- 1) **Impacts of the System on Service Level**

Service level is one of the store performance which is expected to be improved by implementing the POS system then the itemized information will be used for product management process.

After implementing the proposed POS system to three pilot stores, the service level is measured in order to compare with the existing ECR system. The data are collected in three groups : medium moving, slow moving, and fast moving from each store. The evaluation is performed by comparing the service level of each group of data group by group and generates nine measurement results.

The results of the evaluation show that for nine groups, the service level of **four** groups are **improved**, **two** groups are **reduced**, and another **three** groups are **not significant** to be improved or reduced. By these results, it can be concluded that the proposed POS system implementation can not improve the service level of the convenience store of the case study in a short term.

There are some reasons behind this result. The first reason is the rather short testing period. The improvement of service level requires longer testing period. During this testing period, it may be the period for tuning the application to suit with the store environment together with the learning period of the operators.

The second factor is the high employee turnover situation. This situation impacts the system learning period due to the frequent changes which require new operators and a period of time to learn the use of application. Therefore, it

is difficult to have experienced operators who have the skills of product management at all times.

The third factor is the economic recession situation that makes the operators more difficult to forecast the demand. The customer behaviors are usually changed in this situation. These inconsistency situations make the operators hard to maintain the service level. Furthermore, under this situation, it generates a chain effect to the distribution centers and the suppliers. The goods shortage from the distribution centers and the suppliers also increases and generates the same negative effect to the stores.

The last factor is the quality of information. Poor quality of itemized information at the beginning of the project confuses the operators so the operators may be misled and feel unconfident about the itemized information. It makes the use of itemized information to perform product management ineffective.

2) Impacts of the System on Service Speed

The POS system implementation for this case study customizes the requirements and operation environments of the store so there are three operating procedures for handling three different kinds of products namely sales by scanning bar-code, sales by keying a one touch key, and sales by keying PMA (Product Movement Analysis) code. After implementing the pilot system, the data of operating time are collected and evaluated systematically by statistical techniques.

The result of the statistical testing shows that there is no evidence of the difference between the two population means of operating time while using the POS and the ECR systems. The statistical testing result concluded that the use

of the POS system for our current environment is not significant to improve the service speed of the case study.

The reasons behind this result, in my opinion and observation, are the unsuitable operation environments of the case study. Firstly, the proportion of products with bar-codes or source markings is not high enough. Secondly, the quality of the bar-code is not good enough for some products. Thirdly, the accuracy of the database is not high enough at the beginning of the project. Lastly, there is a lack of skilled operators due to employee turnover situation. These above obstacles are influential in reducing the advantages of the POS system using the scanner to improve speed performance. So the system performance due to service speed can not be fully achieved.

3) Impacts of the System on Service Accuracy :

The service accuracy is evaluated by comparing the percentage of mis-registration transactions of the two systems. The result showed that the service quality performed by the proposed POS system is better than the existing ECR system.

The factors resulting in this performance improvement are the quality of information, the operating procedure and the auxiliary function of the POS.

The quality of information is a critical factor that causes the success or failure of this project which uses the advantages of information technology to improve service accuracy. The concept is to accurate database for serving the customers together with reducing inaccurate service performance by human.

The ease of operating procedure is also an important factor that impacts service accuracy. Each key stroke when using ECR contains the probability of

failure or error due to human. So there is a probability of mis-registration of each transaction. The use of the POS system, on the other hand, reduces such kind of error by using a bar-code scanner. Even the service speed is not yet improved as shown in the service speed evaluation, the service accuracy is improved due to the easier operating procedures and shorter learning period of operators compared with the ECR system.

The third factor which makes the service accuracy of the POS system better than the ECR system is the auxiliary functions of the POS system especially the “ Suspend ” and “ Resume ” functions. They are used for supporting the situation whenever the customers change their minds at the check out. It can reduce the number of bill correcting activities which are difficult and confusing for the operators in case of using the ECR system.

From the above factors, it can be concluded that the use of the POS system under suitable operation environments generates better service accuracy than using the ECR system. For this case study, the percentage of mis-registration transaction is reduced from 2.33 % performed by the ECR system to 0.13 % performed by the POS system.

• Impacts of the System on Inventory Level

Inventory management is important activity that requires itemized information to improve the inventory level. The inventory level of the stores shows the level of investment at each store. An effective inventory management is expected to maintain high service level with the minimal inventory level.

The data for evaluating inventory level are collected in three groups : medium moving, slow moving, and fast moving, each store. The evaluation is

performed by comparing the inventory level of each group of data group by group and generates nine measurement results.

The results of the evaluation show that for nine groups, inventory level of **three** groups are **improved** or their inventory levels are significant to be reduced, **two** groups are **poor** or their inventory level are significant to be increased, and another **four** groups are **neither significant** to be improved nor reduced.

By this evaluation results, it can be concluded that the proposed POS system implementation can not improve the inventory level of the convenience stores for this short testing period. However, considering the proportion of the number of stores which the inventory level are decreased or increased, I believe that it may be improved in the future if the case study can adjust or manage several factors that affect the inventory level. Most of the factors which impact the inventory level are common to the factors that impact the service level such as learning period, employee turnover situation, economic recession, and quality of information. These factors are not mentioned again. However, another factor that may have lesser impact to service level but more impact to inventory level is the ordering conditions such as pack size, minimum order quantity, delivery cycle, and shelf space.

The ordering task is the task that needs both skills and experiences of the operators. So with the case study's situation which has high employee turnover situation, the ordering task may not be performed effectively which causes overstock or goods shortages. New operators require a period of time to learn how to perform this task effectively.

- **Impacts of the System on Store Image and other Intangibles**

The intangible impacts which are difficult or impossible to quantify immediately may lead to quantifiable gains in the future. The first intangible impact is the *image* which is hard to quantify but may generate high impact to customers' satisfaction. The implementation of the POS system impacts the image of the case study by showing the service mind of the firm in providing better customer service by implementing a higher technology which requires more investment. This indicates that the case study always cares for the customer. Furthermore, the customers can recheck the corrections of the transaction easier than when using the ECR. The names of the purchased items are listed for every item while the ECR can only list the names of the groups of those items.

The next intangible impact which is usually a problem to the organization trying to implement a new computerized or automated technology or system is the understanding of the employees about the unemployment situation. However it is not a negative impact to this case study because the implementation of this system is not aimed to reduce the number of employees but to improve their efficiency. The system will help the staff to serve the customers easily and to prepare financial reports and other paperwork effectively. The store managers will have more information, more accurate information, and more timely information to manage their stores. This will enable the store managers to have more time to concentrate on improving customer service in order to increase sales rather than waste time in doing routine tasks or paperwork. Furthermore, this system is easier to use than the ECR system so the training period is shorter. This will increase *employees' job satisfaction* and enhance employees' goodwill. Also, it will reduce employees' fraud because every transaction can be tracked back easily.

The POS system implementation provides better *management of price changes* which the firm has quicker response to the market. It is easier and more economical when performing price changes process through the POS system compared with the ECR system.

The system also increases *organizational flexibility*. The firm can easily launch new customer service types utilizing the facilities of the POS system. These new service types include the acceptance of any payment types (credit cards, debit cards, smart cards, member cards, etc.), the selling of various tickets (movies, travels, concerts, sports, etc.), the selling by catalog media, and etc.. The POS has the capability to perform most kinds of service because it is programmable and easy to modify, and the application of scanning is very suitable for providing such services. This will make the firm more competitive than the competitors and very convenient for consumers.

The ability to satisfy *fiscal requirements* is another intangible impact of the POS system implementation. The government or Revenue Department will be able to easily audit and track back the sales, inventory, and every financial activity of the stores and the firm. Through this, the image of the organization is also improved.

All of the major criteria which impact the system implementation as described can be classified into two groups depending on the performance period. The first group is the group of the criteria which is impacted in a short term. The second group is the group of the criteria which is impacted in a long term. For this case study, the short term group consists of service speed, service accuracy, quality of information, and some intangible criteria while the long term group consists of service level, inventory level, and the rest of intangible

criteria. The long term benefits for this case seem to have higher impacts to the retail store operations. So when analyzing the benefits and the costs of the system implementation, it is important to keep in mind that this kind of system may generate long term benefits. The analysis should be done based on long term investment basis. Thus, the financial analysis of this pilot project presents only the estimated cost of the system implementation as follows :

Total Hardware Cost	=	1,330,000	Baht
Total Annual Cost	=	294,300	Baht

Considering from the results and the major factors affecting the system implementation, the suitable implementation conditions are required to generate better implementation results. Those conditions are described as follows :

6.2 The suitable implementation conditions:

- **Commitments**

An important condition which is the first priority of key success of system implementation is commitment. The commitment for this system implementation can be classified as the management commitment and the employee commitment.

The management commitment to the system is important because it is the most powerful supporting and driving force. Without management commitment, the system implementation will lack cooperation, budget, and required resources. This commitment should be achieved at the beginning of the project throughout the life of the project.

Employee commitment is the next important condition. Even if the management has the authorization to command the employee, the work generated from commitment should have better results. So the system implementation should have the employees' commitment.

Although the new system implementation will generate benefits to everyone in the organization, the project owners who have the responsibility, accountability, and authority of the project must be responsible for generating commitment. It is the task of project team to inform, motivate, and convince both the management and the employees to commit to the system. Again, without these commitments, the project is difficult to succeed.

• **Financial Status**

It is obvious that the investment in technology and automation requires a large capital usually in a long term investment. It means that the benefits generated in a short term may be unable to cover the investment. Like the POS system implementation, the benefits which may cover the investment is expected to be generated in a long term. Examples of these long term benefits are increasing service level, reducing inventory level, and increasing sales.

The organization which intends to implement the POS system should have the strength in financial status. The pay back period may be three or five years which causes the disappearance of the weaker firm before gaining real benefits.

Furthermore, considering from the level of investment, the firm which has the more number of stores will get more advantages of the system. For example, the task which is performed at the headquarters will be shared for more stores which generate more benefits due to the economic of scale.

- **Database**

The use of the POS system is actually the use of information technology to improve business process performances. So the performance of the POS depends on the quality of its database. If the database is accurate, timely, and reliable, then the POS system will be able to generate effective analysis reports. Furthermore, the users can perform their tasks due to service, product management, inventory management, financial management, and etc. more effectively. So the POS system implementation will easily be successful if the firm has good quality database.

- **Employee turnover**

Employee turnover situation is one condition that impacts the system implementation. The difference between the POS system and the ECR system is that the POS can capture the itemized information and uses it to generate analysis reports. These reports require an experienced operator who has both the analysis skill and the understanding of the store's profile. This kind of operator requires a period of time to perform and will be available under the low employee turnover rate. So the suitable condition for implementing the POS system is during the low employee turnover situation.

6.3 The Potential Benefits of Using the Information from the POS system

The results of POS system implementation are concluded previously. However, there are some potential benefits of using the information from the POS system. It can be classified into two level as the potential benefits at store level and the potential benefits at headquarters level.

- **The Potential Benefits at Store Level**

The information from the POS system can be utilized for many stores' tasks. The itemized information can be used for ordering tasks that in long term it will improve service level and inventory level as discussed previously. The other potential benefits of using the information such as store management task and product management task.

The POS information can be used for store management task. The store manager will be able to know the distribution pattern of customer arriving. He will know whether there are a lot or a little number of customer. Then he can assign his staff for servicing the customer effectively. Furthermore the replenishment task also be done effectively.

The product management in the store can also be improved by using the information from the POS system. The manager will be able to know who are the target group of his store, what merchandises they want, and when they want. So he can provide the right product for the right customer at the right time.

- **The Potential Benefits at Headquarters Level**

Whether the POS system is implemented company-wide, the information from this system will generate a huge benefits for headquarters. For example, the data entry tasks of Accounting Department will be reduced. The information can be transmitted from every store to the database of accounting without re-key task.

Purchasing Department also need the itemized information from the stores. This kind of information strengthen the bargaining power of the company. If the purchasers know the movement of the merchandises, then they

will exactly know what merchandises will generate the benefit at which level. So they can bargain the supplier with the precise information.

Marketing Department will able to utilize the information from the POS system. They will know sales trend of the merchandises, so they can manage it effectively. Furthermore they can select the right product for the target group.

In conclusion, the information from the POS system can be used as a strategic management tool for many departments. The management can obtain a clearer picture in a shorter time allowing for faster responses to changing market conditions. This will make the company go to the right direction faster than the competitors.

6.4 Recommendations

There are some recommendations for improving the performance of the POS system collected from the three years experience in the case study. During these three years, the writer has a good chance to be a project engineer for the first year, a staff for total systemization consultation project which was consulted by the Japanese consultant team for the next year, and a person responsible for the POS pilot project for the last year. If the firm requires to implement the POS system throughout the organization, the following recommendations should be achieved.

The first recommendation is about the quality of the case study's database. The database of the case study has been established for a decade so it is difficult to redesign the structure of the database. The suggestion will ignore the case of utilizing the EDI (Electronic Data Interchange) system that is not fully effective in Thailand yet. The quality of database should be improved by

establishing suitable database maintenance procedures. It should begin from the data entry procedure.

The existing **data entry procedure** at the headquarters is done by manual key-in of every field of data. In order to have accurate database and suitable with the use of the POS system, the database especially the bar-code number should be entered by using an electronic scanner scanning the physical bar-code printed at the package of the sample product. The advantages of this procedure are :

- To increase data accuracy by reducing human errors due to keying-in a lot of digits of bar-code numbers.
- To have the database which is able to scan at the store because the data is entered by the same hardware specification.
- To verify the quality of bar-code printing before launching new products at the store.

Furthermore, at the store level, the merchandises should be received by using the same scanner. This procedure will prevent the receipt of the disqualified bar-code merchandises.

By this data entry and merchandises receiving procedures, the case study will ensure that the bar-code information will not be inaccurate due to the data entry process. Furthermore, the quality of bar-code printing will be good enough to prevent the case of unable to scan at the store.

The next thing the case study should improve is the proportion of products with bar-codes at the store. This proportion should be increased because it directly concerns the performance of the POS system. For products without bar-codes, due to the restriction in printing on their packages such as

size or shape of a product, the incapability of the small vendor, some fresh food items, etc., the firm should establish the procedure for managing this problem such as generating a bar-code book, applied in-house bar-code at some centers, force the vendors to generate their bar-code systems, etc..

The high **employee turnover** rate should also be reduced. The strategies for solving such kind of problem include providing more incentive, improving job's satisfaction, and etc.. However the incentive program may be ineffective, so one way to solve this problem is to increase the number of good franchisees. From my both direct and indirect experiences, franchisees have more ownership than the hired store managers. Furthermore, good franchisees tend to manage the employees more effectively than the hired store managers. Since the franchisees are the store owners, they can create more effective incentive programs than the store managers who may not have the authority to provide incentive programs.

Furthermore, if the POS generates analysis reports, there is a high possibility that the franchisees will use these reports more effectively because :

- The franchisees are the owner who have more ownership than the hired store managers.
- The franchisees usually have higher educational background that may be required for analysis tasks.
- The franchisees usually know the store profiles better than the hired store managers.

In conclusion, the increasing number of good franchisees may reduce employee turnover rate and increase the use of analysis reports provided by the POS system.