APPLICATION OF THE KANO MODEL TO SELECT LOGISTICS PARTNERIN THAILAND

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Abstract - This research presents guidelines for using computer program technology as a tool to help match the suitability between those who want to use the logistics service and the logistics and supply chain service provider in Thailand. The researchers use the Kano model to classify and find the customer satisfaction coefficient so that manufacturers or service providers can reach customers in a timely manner. Also, manufacturers can understand the needs of the market. This research aims to build a prototype computer program using Visual Basic software package and Microsoft SQL Server database. The target group of 400 people who want to use logistic services in Thailand is surveyed. Once the surveyed data has been entered into the created program, it has been classified according to Kato guidelines and has been analyzed. The result shows that the constructed tools can classify customer needs into various types according to the model guidelines. Manufacturers can develop services focusing on the types that make customers satisfied and meet the needs most. If the manufacturer is not able to develop all of the services according to the needs of the customers, the highest satisfaction coefficient should be considered the first.

Keywords - Kano Model, Logistics Partner, Logistics Provider, Satisfaction Coefficient

I. INTRODUCTION

This research focuses on developing a tool to help product manufacturers in Thailand who need to deliver products to customers nationwide and require services from logistic operators throughout the country. The tool helps the product manufacturer search for the logistics service provider that is suitable for their product or the logistics and supply chain service providers meet with customers or those who want to use their services.

The research develops guidelines for selecting service providers by applying the Kano model to measure the needs of customers or manufacturers in Thailand that want to use the services of logistics and supply chain operators in order to deliver products to their customers. The data in this study is the combination of primary and secondary data, with sample sizes determined by the Taro Yamane guideline of 95% confidence level, + 5% error, 100,000 population size, and 400 sample size.
This approach will help manufacturers in the role of customers who want to use logistics services find the logistics and supply chain providers in the role of manufacturers who can meet the requirements of customers. Meanwhile logistics and supply chain service providers can choose their customers or service users by considering the suitability in service quality, transport routes, distance, distribution centers, service rate, product sizes, product weights, product characteristics, chemical characteristics of the product, the ability to keep products during transportation, transport vehicle characteristics, delivery time including the satisfaction level that other users who have already used the service by determining the level of satisfaction coefficient.

II. RELATED THEORIES

A. Kano's Model

Kano's model was created by Dr. Nori Akano to study the relationship between customer satisfaction and product response services. It identifies the characteristics of the product or service that affect customer satisfaction. According to customer surveys, the satisfaction model of Kano model is divided into 3 types of satisfaction by Identifying product characteristics that affect customer satisfaction in different ways, as in Figure 1.

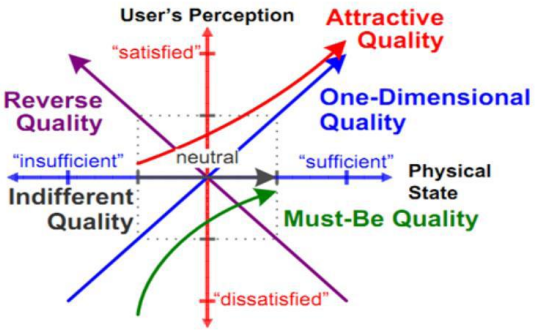

Figure 1 : Kano's model of customer satisfacation
Source: Richard and Glenn (2006)

3 Quality Features in a Kano's Model

1. Dissatisfiers, Must be Requirement

It is a basic feature that customers expect in advance that must be found in a service or product. Therefore they are not paying much attention to the feature. When the service does not have this feature, the customers will be immediately dissatisfied and make a complaint. But if the service or product has this feature, it does not increase customer satisfaction in any way.

2. One-dimension Requirement

The customer satisfaction level will vary with this feature. This feature is what customers want in the service or product and it makes customers more satisfied. The more it has, the more the customer satisfied such as faster delivery, easy to use service, various services and etc. that customers use in comparison to the services of competitors.

3. Delighters, Attractive Requirement

This feature is not what the customer expected from the beginning but it is the thing that affects the satisfaction of customers the most and is something that impresses customers. Any product or service that doesn't qualify for this will not affect customer satisfaction, such as freebies, accumulating points, giving special privileges. These types of services create satisfaction that the design team conceals to make the customers excited.

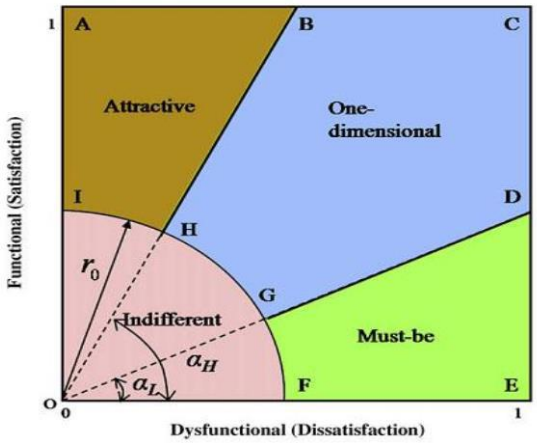

Figure 2 : A-Kano classify and Kano categories
Source: Qianli et al.(2008)

III. CALCULATION AND DESIGN

Satisfaction coefficient

The customer satisfaction coefficient represents the satisfaction that will come whether from receiving services that meet the needs of customers or protection from dissatisfaction. The different types of situations tend to have different needs and expectations, so it's not clear that some of the features of a product and management can be used with many products or services. Therefore, it's important to know the average impact of product or service features on customer satisfaction in every group. The customer satisfaction coefficient will be an indicator of how much the product or service will affect your satisfaction and dissatisfaction by calculating the average value of satisfaction as the equation (Matzler and Hinterhuber, 1988)

$$Customer\ Satisfaction\ (CS+) = \frac{(A+O)}{(A+O+M+I)} \quad (1)$$

$$Customer\ Disatisfaction\ (CS-) = \frac{(O+M)}{(A+O+M+I)x(-1)} \quad (2)$$

Customer Requirement		Dysfunctional (negative) question				
		1.like	2.must – be	3. neutral	4. live n	5. dislike
Function (Positive) question	1.like	Q	A	A	A	O
	2.must – be	R	I	I	I	M
	3.neutral	R	I	I	I	M
	4.live in	R	I	I	I	M
	5.dislike	R	R	R	R	Q

Figure 3 Kano's Analysis for logistics Service Provider

The analysis of answers to various quality levels by classifying the questions according to the Kano model into 6 types are as follows:

A is attractive. Users are satisfied if the service exists and dissatisfied when that service doesn't exist.

O is One-dimension which is the highest. That is, if there is this service, users will be very satisfied But if this service is not found, they will be very dissatisfied

E or M is Expected Features or Must-be. Users feel that there should be this service, but if it is not found, they will feel very dissatisfied.

I is Indifferent. Users will feel indifferent both with and without this service.

Q is a questionable result. Users have conflicting responses in answering questions which will not be considered in the Kano model

R is Reverse. Users have conflicting answers in answering questions that are opposite of your feelings.

IV. DATABASE SYSTEM DEVELOPMENT

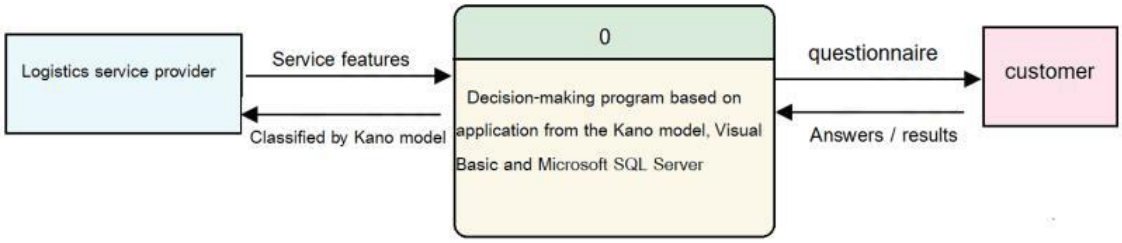

Figure 4 Database development process

Database System Development

The database development process consists of the following steps

1. Data Flow Diagram (DFD)

Data Flow Diagram is a tool for system analysts that helps to understand the work process of each entity. It displays the data transmission and reception and coordination between various operational activities. It shows the flow of INPUT and OUTPUT data between the system and the source including the destination of transmission depending on the system and coordination within the system. It also helps to know the information needed and defects in the system and to design the operation of the new system.

2. Components of Data Flow Diagram

The symbol used in DFD is a symbol developed by Gane and Sarson and DeMarco & Yourdon (Marakas 2001: 124). It is used to describe thework process in a diagram that is easy to understand.

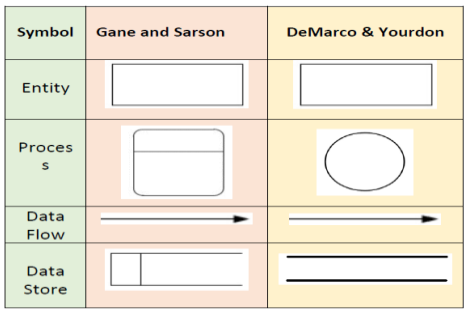

Figure 5 Data Flow Diagram Symbol (Marakas 2001:124)

3. Context Diagram

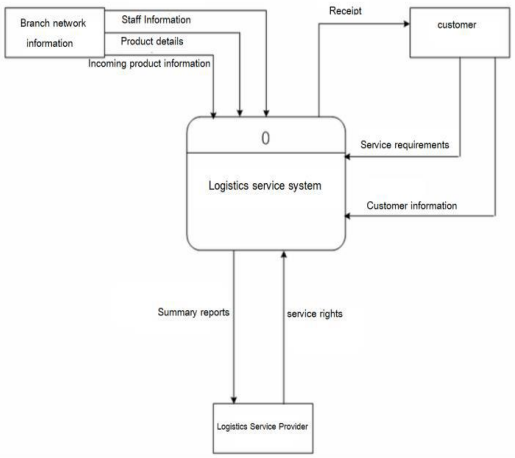

Figure 6 Context diagram of logistics service system

A. Visual Basic

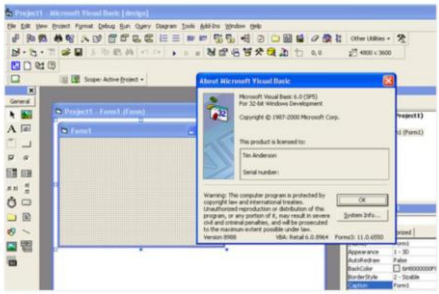

Figure 7 Visual Basic 6.0

V. VISUAL BASIC PROGRAM

In this research, the Visual Basic Program has been implemented because it can be used to create an application easily and quickly, called Rapid Application Development (RAD). Researchers do not need to write programs to control the hardware, commands to create a user interface. You don't have to write commands for the user interface to display or interact with the user through the screen and not need to write commands to manage the system within the windows system. Programming is only for problem management. Visual Basic Program is a language that is easy to learn which is similar to the normal language and there are tools to facilitate the programming. The tools are organized in the same working environment making it easy to use, from writing programs, testing, editing, creating installation kits as well as the requesting system. It also can add new tools and can remove unnecessary tools. In addition, there is an Activex Control tool, which is an important tool that helps reduce repetitive tasks in programming.

The program for creating an application can be used with personal databases, network databases, databases from Big Data and can be used via the Internet. There is Event-Driven programming used when new events occur and the developer has to create a program to handle those events.

VI. MICROSOFT SQL SERVER MANAGER

The study of the application of the Kano model to select logistics operators in Thailand shows that Relational Database Management System (RDBMS) is used. The concept is to present comprehensive relationships between data and control rules to prevent data redundancy using Structured Query Language (SQL), which is the standard language to interface with the database. The database types in SQL Server consist of 2 types which are:

1. System Database. It is the database that was created during the installation process. These databases are used to store Meta data in various parts such as account and password of staff, customer ID, vehicle, route, job-schedule, time, etc. In the system database, each part has different functions as follows:

1.1 Master. It is the most important database that stores important information of the system : Login Information, Error Message, Link Server, and information about other databases in SQL Sever. If the data in this master is damaged, SQL Sever will not work. Therefore, editing data in the database in the research, the Transact-SQL command is not used directly but the System Stored Procedure is used to avoid problems that may arise from editing data in the master database.

1.2 msdb. It is an important database, second to the master database, which holds information about Alert, Job Schedule, Events , Backup -Restore History and Log Shipping data. This msdb database is used by the SQL Server Agent service in an operation that requires SQL Server 2005 to automate. For using this database, it is similar to the master. In this research, the System Stored Procedure is used and it makes the system stable.

1.3 Distribution. It is a database used to store information about database replication, including Snapshot Job Data and Replication History Data.

1.4 Model. It is the database template for the new database created. When creating a new database, SQL Sever will copy it from the database. The new database will have the same data as the model database, and if you want every newly created database to have the required data and specifications, you can specify it in this model database.

1.5 Tempdb. It is a database that is rebuilt every time it is turned on or every time an SQL Server service is started. All data stored in the tempdb database will be deleted when the user shutdown server. In case that the transaction, the tempd database will be deleted as soon as the transaction ends. The tempdb database is used to store temp data, such as creating temp tables, Curors, and SLQ Sort Operation. The tempdb database has another special feature that is able to store Old Value until the transaction is completed. In case that an error occurs in a transaction, Commit will immediately cancel the rollback transaction.

2. User Database is a database created by the programmer for storing various required information. These databases are able to specify various features of the database, create Objects in the database as needed during the installation process and can be set to install the sample database for trial. The said database will have the following details:

2.1 Adventure Works. It is a suitable example database of Online Transaction Processing (OLTP). It is suitable for beginners.

2.2 Adventure Works DW. It is a sample database in SQL Serve for Online Transaction Processing (OLTP) or Data Warehouse. It contains data that is ready to use and try out for creating the Data Warehouse with the SQL Server Business Intelligence Development Studio.

VII. DATABASE MANAGEMENT IN THE APPLICATION

Database management in SQL Server includes creating a database, changing, deleting the database including defining features in various parts on the database which can be done in 2 ways

- Use the Transact-SQL statement
- Use the tool named SQL Server Management Studio.

SQL Server Management Studio is a tool that replaces the Enterprise Manager of SQL Server 2000. SQL Server Management Studio is a tool that combines the capabilities of Enterprise Manager with Query Analyzer enabling SQL Server Instance Management and Transact-SQL without having to open multiple programs. In managing various SQL Server Instance, Microsoft has SQL Server Management Studio tools to use to facilitate. However, in some situations that the SQL Server Management Studio cannot do as intended, using Transact-SLQ is inevitable. Therefore, Transact-SLQ is absolutely necessary for the work. Database Administrator (DBA) must learn and understand Transact-SQL in order to be able to use it in many situations.

This research uses SQL because it is similar to human language, making it easy to use and understand and the work process is not complicated. To get the data, you just type a simple command, just tell what data needed from which table, the data management system (DMBS) will search the information immediately. SQL can work with other programming languages, such as C, Pascal, COBOL, etc. Therefore, it can be embedded SQL in these languages to work together by using these languages only in the programming for complicated calculation and then using the SQL language to manage queries, edit data. You can also write interactive SQL statements one by one. SQL is a standard language that has a similar form in writing commands whether used on a microcomputer work station, mini or mainframe. It is an important engine of the relational database system where both hardware and software manufacturers, such as IBM HP Microsoft, are involved in product development to work more efficiently with SQL.

VIII. REFERENCES

The literature in this section is discussed using Kano's model to explore customer satisfaction in various ways with real products and services. Denise Ouellet, John P. Norback [1] studied on Sanitation Organization Committee Regarding the improvement of quality standards by stating that quality standards must be primarily considered by customers. The quality improvement must first identify the needs of the customers by looking at what makes customers satisfied or dissatisfied. Understanding customer expectations further improved product quality enabling service managers to choose quality standards that meet consumer needs. Elmar S., Franz B., Kurt M., Hans H. [2] has studied how to satisfy customers by using Kano’s Model as a model for studying customer behavior and preferences. Planning without taking into account both internal and external factors is considered to be extremely

dangerous to the organization. Therefore, in establishing a strategy for customer service, it is necessary to classify customers and clearly separate customer needs. Janne Huiskonen, Timo Pirttila [3] studies processes that will improve the strategic plan for transportation services for customers with the main assumption that different service characteristics are different and will affect the satisfaction or dissatisfaction with different customers. It is found that Kano's process provided accurate analysis. Johann Fuller, Kurt Matzler[4] discusses data integration in product development that is truly customer -centric by using Kano's Model to apply because customers can express their true needs for the product. The research inquired about customer needs via the Internet using the Kano Model to show that those customers were unable to tell their hidden needs because there was something that he did not expect in advance. Kurt M. and Hans, H. H. [5] studied why efforts to develop multiple products failed. The results showed that
the main cause was that the product did not meet the expectations of customers and high levels of customer satisfaction were not met. In addition, in the development of many projects, the development process did not have a suitable system and appropriate communication between related entities at an inappropriate time and wasted resources.

IX. RESULTS

The researcher has set out the practical steps of programming and process methods that help ensure that the logistics service provider is able to truly understand the needs of its customers. In addition, attention should be paid to effective communication processes, with a focus on customer satisfaction and dissatisfaction. Kano analysis processes are used to classify and analyze customer needs into different categories by considering the impact on customer satisfaction. This type of classification will be used for the product development of entrepreneurs. In the report of software trial, it consists of a separate report summary of needs classified according to questions, satisfaction coefficient, and dissatisfaction coefficient, average of each affecting factor and a report by product type that the logistic service provider received and delivered to customers divided into A, O, M, I.R and Q types

X. CONCLUSION

From this research, it can be concluded that Kano's model can create a ready-made program to survey the satisfaction of customers or users of this logistics system, can analyze customer satisfaction and classify customers in various ways, both as a form of service and rights that customers should receive. It also can sort customer satisfaction and dissatisfaction with the services provided by the logistics service provider. The service provider knows what the customer wants or what service is not available. This is considered one of the important objectives of an effective management system for service businesses today. It can bring a competitive advantage. However, planning without careful management can cause companies to use resources improperly, resulting in increased costs. Strategic planning for customer service is, therefore, necessary to provide an appropriate level of competition. Therefore, this research is one tool that helps the logistics service provider to easily separate and analyze the needs of each type of customer, save time and increase the ability to compete in the market.

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