

# **Chapter 4**

## **System Analysis**

### **4.1 Introduction**

The aim of system analysis is to find out the role of the proposed system and the identification of the requirements that it should meet. It is a systematic investigation of the proposed system to determine the functions of the system and how they relate to each other.

One method that is used to capture the requirements as mentioned in chapter three is the use of questionnaires which are analyzed in this chapter. The functional requirement of the proposed system is defined by using UML use case diagram. Each use case is defined and described, and finally a use case diagram is produced.

### **4.2 Analysis of Survey**

As was mentioned in Chapter 3, two sets of questionnaires were designed and distributed. The first is for companies who have an online purchasing system that

allows customers to purchase online, and the second set was designed for customers who use online purchasing systems.

#### **4.2.1 Companies' Survey Analysis**

The questionnaire was distributed to 22 companies and 18 completed and returned the questionnaire. Out of the 18 returned and completed questionnaire, 17 was analysed while one was discarded. The one that had to be discarded was because it was incompleted.

Tables 4.1 to 4.9 show the responses to the questions posed in the questionnaire.

**Table 4.1: Q1: Does your company have online purchasing system?**

<b>The Answers</b>	<b>Number</b>
Yes	17
No	0

**Table 4.2 : Q2. Does your company have stores to deliver online orders?**

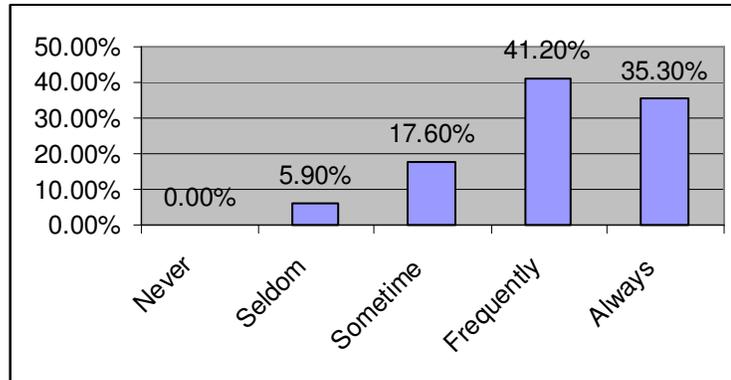
<b>The Answers</b>	<b>Number</b>
Yes	17
No	0

From table 4.1 and 4.2, it can be seen that the questionnaire that were analyzed and filled are from companies that work in the target research study, i.e the companies have an on-line purchasing system and own stores that deliver on-line orders.

Table 4.3 shows the result from question 3 to 12 in to questionnaire.

**Table 4.3 The answers to questions from 3-12**

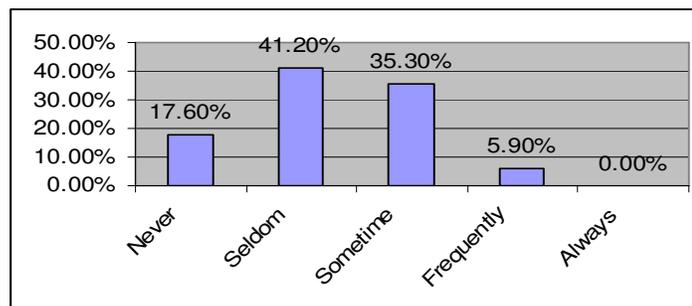
Q #	Questions	Percentage				
		Never	Seldom	Sometimes	Frequently	Always
3.	Does your company respond to specific questions from customers that are received through e-mail?	0	1	3	7	6
4.	Does your company have time-delay in delivering on-line orders?	3	7	6	1	0
5.	Has your company not completely deliver an order that is purchased online?	0	5	11	1	0
6.	Does your company apply the concept of decentralization in decision making that is related to its stores?	2	3	5	5	2
7.	Can a store manager generate reports that help in decision making that are related to his/her store?	1	3	8	3	2
8.	Can a Head office (headquarter) manager generate reports that are related to its stores)?	1	1	3	7	5
9.	Do you plan to improve your current system to help store manager in decision making?	0	1	8	5	3
10.	Does your online purchasing system deliver the online order from the nearest store to the customer	0	1	4	8	4
11.	Is the delivered online orders accomplished with minimum cost?	0	1	10	6	0
12.	Is your company satisfied with the cost of delivering an online order?	1	2	7	5	2



**Figure 4.1: Percentage of companies that respond to customer’s question received through e-mail?**

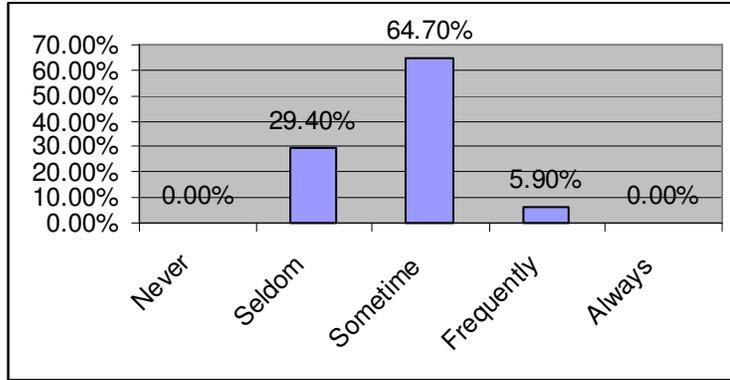
From table 4.3 it can be concluded that:-

- i. 5.9% of companies seldom respond to customers’ questions, 17.6% sometime respond to customers’ questions’, 41.2% frequently respond to customers’ questions, and 35.3% always respond to customers’ questions that were asked through e-mail, as can be seen in figure 4.1.



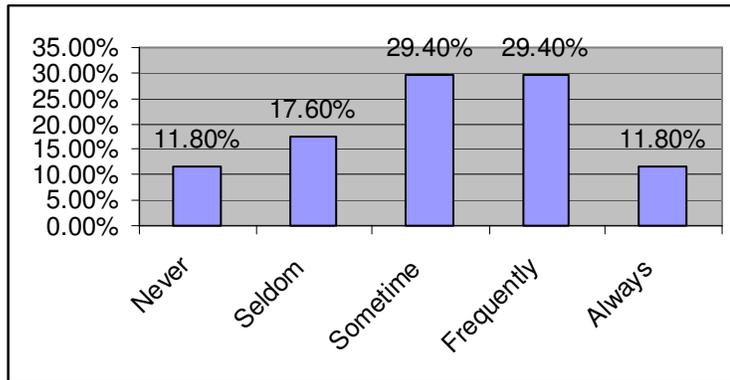
**Figure 4.2: Companies that have time-delay in delivering online orders.**

- ii. 82.4% of companies have a time-delay in delivering online customer orders as shown in figure 4.2. This means the system that is used in some companies is not efficient in managing the online orders.



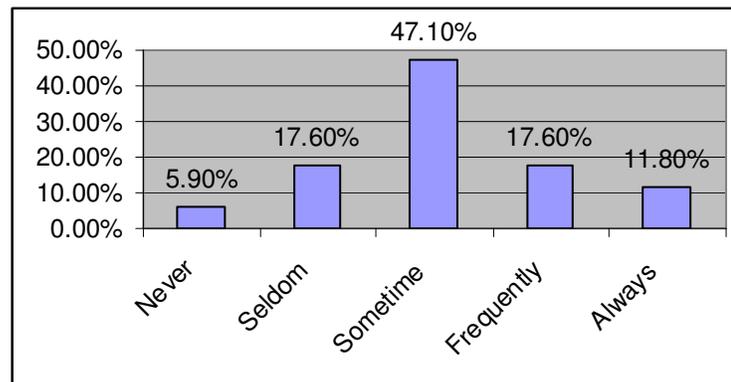
**Figure 4.3: Percentage of companies that does not completely deliver the order that is ordered online.**

- iii. 64.7% of companies sometime have problems in delivering orders, as can be seen in figure 4.3. This means that some companies have problem in managing the products in their store. There may also be some problems with the system in managing the orders.



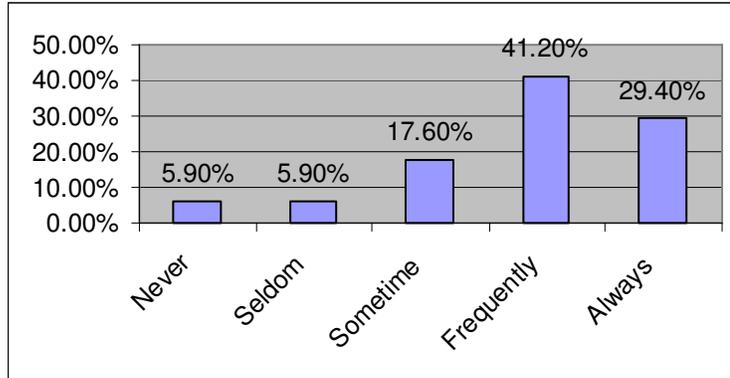
**Figure 4.4: Percentage of companies that apply the concept of decentralization in decision making in relation to their stores.**

- iv. 11.8% of companies are already applying the concept of decentralized in decision making, whereas some companies are trying to apply decentralization in decision making, as can be seen in figure 4.4. This means that there are some companies that still have hesitation in applying this concept, so they need a system to help them in applying it by giving the store managers the ability to make decision, and by allowing higher management to oversee and control them.



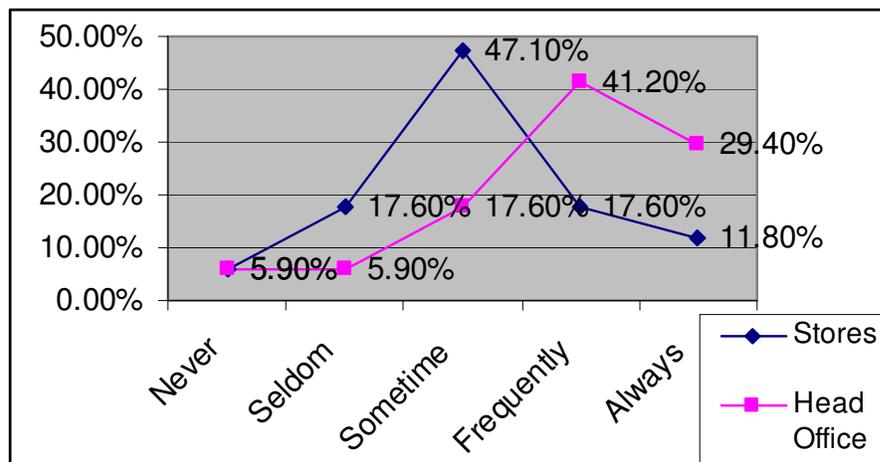
**Figure 4.5: Percentage of store managers who can generate reports.**

- v. As shown in figure 4.5, 47.10% of the companies have a system which sometimes generates reports that help managers in decision making. This means that sometime the manager can generate the proper reports that are needed for decision making.



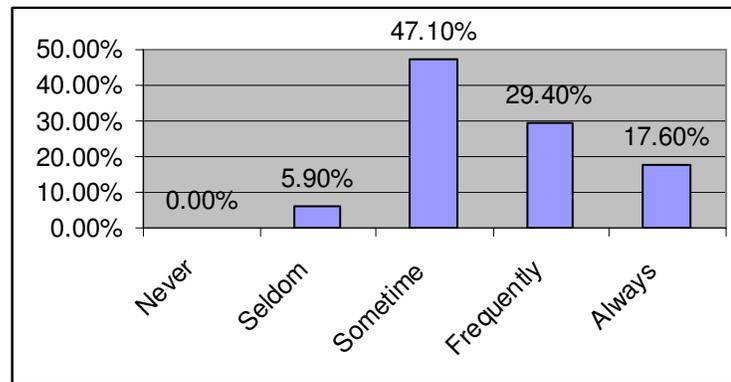
**Figure 4.6: Percentage of Head office managers who can generate reports.**

- vi. 41.2% of the HO managers frequently generate report for their stores, whereas only 29.4% always generate reports. This means that most of the current systems used in retail stores help the HO manager in decision making.



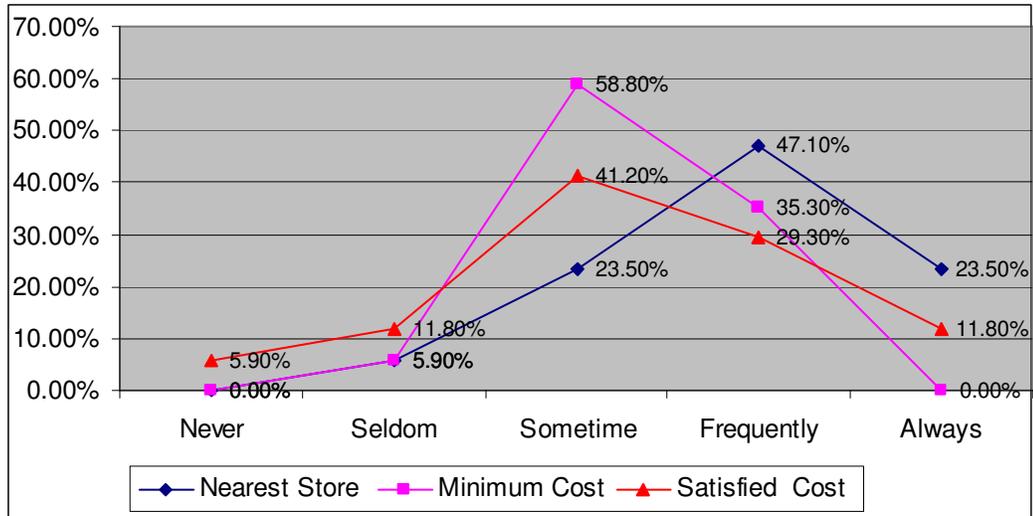
**Figure 4.7: Percentage of managers of stores and head offices that can generate reports.**

vii. As show in Figure 4.11, the percentage of both store and head office managers that can generating reports that can help them in decision making are 41.20% frequently and 29.4% always for head office manager, while 17.6% frequently and 11.8% always for stores managers. This means that the system used in most companies help the head office manager in generating report more than store managers.



**Figure 4.8: the percentage of companies that are planning to improve their current system.**

viii. As shown in Figure 4.8, most companies' surveyed plan to improve their current system, which implies that the current systems don't satisfy some of their business needs.



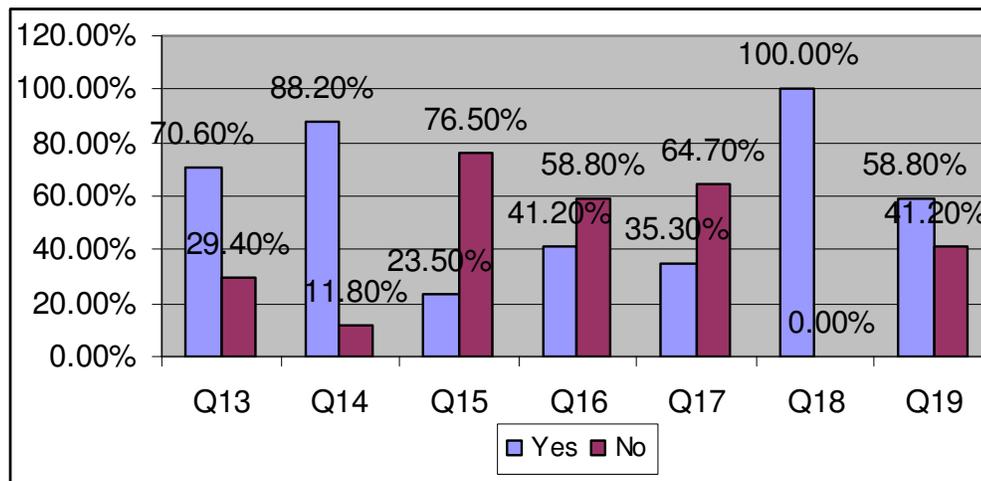
**Figure 4.9: Percentages of the way of deliver order and degree of satisfaction.**

- ix. 47.10% and 23.50% of companies frequently and always successfully deliver orders from the nearest store, while 35.30% of the companies frequently deliver orders at a minimum cost. From figure 4.9, it can be seen no company always deliver the orders at a minimum cost. In addition, 29.30% and 11.80% of companies are frequently and always satisfied with the cost of delivery. This means that the companies deliver the order from the nearest store, regardless of the cost of delivery and that companies are not satisfied with the cost of delivering customers' orders.

Tables 4.6 shows the results of the yes / no questions of the survey, i.e. questions 13-19, while figure 4.10 show the same result but in terms of percentages.

**Table 4 4: Answer for question from 13-19**

Q#	Questions	Percentage	
		Yes	No
13.	Would you like to increase the efficiency of your distributed orders?	12	5
14.	Does your online purchasing system depend on postcode to deliver orders that is ordered online?	15	2
15.	In case, the nearest store for customer hasn't an item in customer's order, does the system find another nearest store to deliver the item?	4	13
16.	Does one product have different re-order points in each company store?	7	10
17.	Does the system define different suppliers for the same product in different stores?	6	11
18.	Does the system define the shortage in inventory in the store?	17	0
19.	Can the head office (headquarter) staff know the shortage in inventory at stores through the system (without order from stores)?	10	7



**Figure 4. 10: Percentage of answers for Yes / No questions.**

The result from figure 4.10 shows that

⇒ 70.60% of companies would like to increase the efficiency of their distributed orders, which means that the managers need a new way to increase the efficiency of delivering the products.

⇒ 88.20% of companies depend on postal / zip code for online order. This means that the postal / zip code define a customer's area, and then the system identifies the nearest store to the customer.

⇒ Only 23.50% of companies have systems which find another "nearest" store to the customer in the case where the first selected store does not have a product in the customer's order. This means the most of the companies do not have this feature in their system.

⇒ 41.20% of companies have different re-order points for a product in each different store. This illustrate that the companies are trying to improve their inventory management.

⇒ 35.50% of companies have systems that define different suppliers for the same product but for different stores. This is to increase the efficiency of supplying products for the companies' stores.

⇒ 100% of the companies' system defines the shortage of inventory in each store.

⇒ 58.80% of companies' system the allow head office staff to know a shortage in inventory stores. So that appropriate action can taken.

**Table 4.5: Q20. How long does it take to deliver an on-line order to a customer?**

The answers	Percentage
Less than six hours	5.9%
From six – 12 hours	11.8%
From 12 – 24 hours	17.6%
Two days	52.9%
More than two days	11.8%

Table 4.7 shows that most companies need at least two days to deliver a customer's order. In reality, this time may be efficient for some product but may not be efficient in some cases.

**Table 4.6: Q21. Do the customers have the ability to fill the on-line order form correctly?**

The answers	Percentage
Less than 25%	11.8%
From 26% - 50%	35.3%
From 51% - 75%	29.4%
From 76% -90 %	17.6%
More than 90%	5.9%

The above table shows that the customers have some problem in filling the online order form. It may be because the customers are still having some problems with the concept of the online shop or the online store's system interface and purchasing process need to be improved.

**Table 4.7: Q22. In your opinion in term of percentage, is your online purchasing system easy to use and convenient for a customer to complete the purchasing process?**

The answers	Percentage
Less than 25%	0.0%
From 26% - 50%	5.9%
From 51% - 75%	35.3%
From 76% -90 %	52.9%
More than 90%	5.9%

Table 4.7 shows that only 52.9% of managers feel that their companies on-line system is convenient to the customers. While 35.3% of manager consider the system as is convenient. This means that the managers are thinking of improving their system to be more convenient to the customers.

**Table 4.8: Q23. Which address do the customers like to receive the order?  
(Can choose more than one answer)**

The answers	Percentage
Home	76.5%
Work place	52.9%
Family or friends home	29.4%
Others places	17.6%
I don't know	29.4%

As shown in Table 4.8, customers want the option of receiving to orders in different places each time they buy from an online shop.

**Table 4.9: Q24. What is your level of satisfaction about your online purchasing system?**

The answers	Percentage
Less than 25%	0.0%
From 26% - 50%	11.8%
From 51% - 75%	23.5%
From 76% -90 %	47.1%
More than 90%	17.6%

The above table shows that 47.1% of managers are 76%-90% satisfied with their current system, while 23.5% of managers are just 51%-75% satisfied with their

system. This means that most managers are looking for improvement in the system to achieve competitive advantage.

#### 4.2.2 Customers' Survey Analysis

The questionnaire was distributed to 240 customers, in which 217 answer was successfully collected. Out of 217 returned questionnaires, 22 had to be discarded because the respondents have never purchasing on-line.

The tables 4.10- 4.12 show the answers to general questions posed to the customers, such as their gender, age, marital status and etc.

**Table 4.10 :Q1. Your gender is**

The answers	Percentage
Male	54.9%
Female	45.1%

**Table 4.11: Q2. Your age is**

The answers	Percentage
Under 20	4.1%
From 20 – 29	65.6%
From 30 – 39	21.0%
From 40 – 49	8.2%
Over 50	1.0%

**Table 4.12 : Q3. Your current marital status is**

<b>The Answers</b>	<b>Percentage</b>
Single	22.6%
Married	67.7%
Divorced/Separated	8.7%
Widowed	1.0%
Other	0.0%

**Table 4.13: Q5. Please indicate your current household income per month?**

<b>The Answers</b>	<b>Percentage</b>
Under RM1,000	7.2%
RM 1,000 - RM 2,000	14.4%
RM 2,001 - RM 3,000	45.1%
RM 3,001 - RM 4,000	28.2%
Over RM 4,000	5.1%

From the four tables, it can be concluded that the respondent are male and female, between the age of 20-39, married and with an income of RM 2,001 to RM 2,999.

**Table 4.14: Q6 How many times have you purchased things by using the online purchasing system in a month?**

The Answers	Percentage
Didn't buy	0.0%
one time per month	68.2%
From 2 – 4 times	24.6%
From 5 – 7	5.6%
More than 7 times.	1.5%

As can be seen in table 4.14, 68.2% of customers purchase once per month from online shop, and 2.6% buy about 2-4 times per week. This means that the majority of customers buy at least once from online shop.

**Table 4.15: Q7, What percentage of your income are you using on online purchasing to buy goods or food?**

The Answers	Percentage
Less than 10%	90.8%
From 11% – 25%	8.7%
From 26% - 50%	0.5%
More than 51%	0.0%

The above table shows that the majority of customers only use less than 10% of their income on on-line purchasing.

**Table 4. 16: Q8, Where would you most like to receive the product which is bought through the Internet? (Can choose more than one answer)**

The Answers	Percentage
Home	69.2%
Work place	55.4%
Family home	14.4%
Friend's places	5.1%

Table 4.16 shows the location where customers would like to receive their online orders. The majority of customers would like to receive their online orders at home and/or at work. A small number of customers would like to receive the online orders at other address. This means that the customers are using more than one delivery address when shopping on-line.

**Table 4. 17: Q9. How many online shops have you used to buy product(s)?**

The Answers	Percentage
Less than 2 online shopping	58%
From 3 to 6 online shopping	40.5%
From 7 to 10 online shopping	1.0%
More than 10 online shopping	0.5%

Table 4.17 shows that 58% of customers buy from maximum 2 online shops, while 40.5% buy from 3 to 6 shops.

**Table 4.18: Q10. On the average, how long do you always spend on a site when you want to buy a product?**

The Answers	Percentage
Less than 5 minutes	12.8%
From 6 – 10 minutes	40.0%
From 10 – 15 minutes	12.8%
From 16 – 20 minutes	20.0%
More than 21 minutes	14.4%

The above table shows that 40 % of customers spend 6 -10 minutes to buy from online shop, 12.8% of customers spend 10-15 minutes, and 20% of customers spend 16 - 20 minutes to buy from online shop. This means that customers relatively spend a lot of time when they buy a product from online shops.

**Table 4.19: Q11, What is the percentage of your satisfaction when you shop online?**

The Answers	Percentage
Less than 25%	22.6%
From 26% - 50%	29.7%
From 51% - 75%	43.6%
From 76% -90 %	3.6%
More than 90%	0.5%

This table shows that 29.7% of customers fall into the 26% - 50% range in relation to satisfaction with online shop, while 43.6% have from 51% - 75% satisfaction with online shopping. This means that much can be done to improve customers' experience when they shop on-line.

**Table 4.20: Q12. How long does it take to fill up personal information when you want to buy a product online?**

The Answers	Percentage
Less than 2 minute	4.1%
From 2 – 4 minutes	14.9%
From 5 – 8 minutes	73.3%
From 8 – 10 minutes	7.7%

Table 4.20 shows that 73.3% of customers need from 5 - 8 minutes to fill in their personal information when they buy online.

**Table 4.21: Q13. Do you use user name and password on online shops?**

The Answers	Percentage
Yes	96.4%
No	3.6%

Table 4.21 shows that 96.4% of customers have on account in online shop.

**Table 4.22: Q14. If yes, how long does it take to checkout when you want to buy a product?**

The Answers	Percentage
Less than 1 minute	2.9%
From 2 – 4 minutes	35.4%
From 5 – 7 minutes	60.0%
From 8 – 10 minutes	1.7%

The above table shows that 35.4% of customers need 2 - 4 minutes to checkout when they want to buy, while 60% of customers need 5 - 7 minutes to checkout. This means that customers relatively need a long time to checkout their on-line orders.

**Table 4.23: Q15. Which method of payment do you use when you buy online? (Could choose more than one answer)**

The Answers	Percentage
Cash when you receive the order	8.7%
Transfer though bank	30.3%
Credit card	84.6%
Others type of card	1.0%

The above table shows that 84.3% of customers usually use credit card as a mode of payment when they buy online, while 30.3% use bank transfer as a form of

payment. This means that the customers prefer to have the freedom in choosing the way of payment with regards to online purchasing.

**Table 4.24: Q16. How long does it take for you to get the ordered product?**

The Answers	Percentage
Less than six hours	2.1%
From six – 12 hours	6.2%
From 12 hours - 24 hours	33.3%
Two days	40.5%
More than two days	17.9%

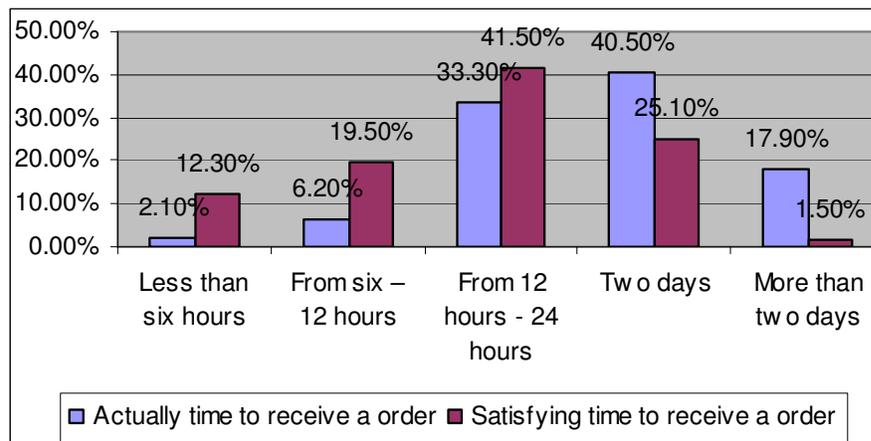
Table 4.23 shows that 33.3% of customers receive their order from seller within 12 - 24 hours, while 40.5% within two days, and 17.9% of customers received online order after more that two days.

**Table 4.25 : Q17. What duration of time would satisfy you to obtain the online ordered product?**

The Answers	Percentage
Less than six hours	12.3%
From six – 12 hours	19.5%
From 12 – 24 hours	41.5%
Two days	25.1%
More than two days	1.5%

Table 4.25 shows the duration of time that would satisfy a customer in obtaining an ordered product, whereby 19.5% of customers will be satisfied to receive online order within 6 - 12 hour, while 41.5% between 12–24 hour, and 25.1% will be satisfied within two days.

Figure 4.11 shows the comparison of the time that customers received their online orders versus the time that they would like to receive them. The first column shows the actually time and the second column shows the satisfied time.



**Figure 4.11: Percentage of the actual time of customers to get orders and satisfy orders.**

From the figure, it can be seen that most customers are unsatisfied with the time that it takes for them to receive their on-line orders. They want to get it as soon as possible.

**Table 4.26 :Responses to questions 18-25 shown in percentage. Of the questionnaires**

Q #	Questions	Percentage				
		Never	Seldom	Some times	Frequently	Always
18.	Are you using different types of credit card to buy from the same online shop?	8.7%	31.3%	41.0%	17.4%	1.5%
19.	Is it easy to purchase from an online shop?	1.5%	9.2%	23.1%	38.5%	27.7%
20.	I enter my personal information when I buy through online purchasing	2.6%	19.5%	45.1%	21.5%	11.3%
21.	While you are surfing an online shop, are you aware of what you are doing?	1.0%	3.1%	9.2%	57.9%	28.7%
22.	Do you feel comfortable (user friendly) with an online shop.	1.5%	2.6%	14.4%	62.1%	19.5%
23.	Do you send a note by email about your feelings and opinions about on line shop?	5.1%	23.1%	54.9%	12.3%	4.6%
24.	Do you feel confused while buying a product in an online shop?	1.5%	47.7%	34.4%	10.8%	5.6%
25.	Do the online shops that you always buy from have the ability to send the orders completely?	1.0%	4.1%	23.1%	53.8%	17.9%

**The result from table 4.26 is summarized as following:**

- ⇒ Most of the customers use different types of credit card to buy from the same online company.
- ⇒ 23.1% of customers sometime consider buying from an online shop easy, while 38.5 % frequently consider it easy.
- ⇒ Most of the customers fill some personal details when they buy from an online shop.
- ⇒ Most of the customers are aware of what they are doing while shopping on-line.
- ⇒ Most of the customers consider themselves frequently familiar with online shopping, while 18.5% aren't familiar
- ⇒ Most of the customers sometime send e-mail about their opinions on online shops.
- ⇒ 34%.4 of the customers feel confused while buying from an online shop.

⇒ 17.9% of the customers receive their online order completely, 53.8% frequently receive it completely, while 23.1% sometime receive it completely.

#### **4.2.3 Conclusion of the survey / questionnaires**

From the survey that was conducted on both the customers and the companies that have on-line shops, it can be concluded that:-

- i. All companies surveyed have on-line shops, therefore there's a need for companies, especially one dealing with retail stores, to have their own on-line purchasing web-site.
- ii. Some companies manage to deliver their products ordered on-line completely, but with a time delay of less than 2 days. There other companies deliver not complete order.
- iii. Most companies practice the concept of decentralization in managing their retail stores. Whereby they want to improve a system to support store managers in make decision that related to them stores.
- iv. Most of HO managers generate ad-hoc reports.
- v. Most of companies plan to improve on their current system, whereby they want to improve on the efficiency in delivering the products.
- vi. Most companies use postal code / zip code in delivering the nearest store to the customer.

- vii. Only a small quantity of companies have the option of finding the next nearest store, if the first selected store does not carry an item in the order.
- viii. Not many companies allow for different suppliers to supply a product to different store location.
- ix. Majority of customers want an on-line system that is easy to use and efficient in handing their orders, i.e shorter delay in sending their products and ability to send all of the ordered products
- x. Most customers want the option of having different addresses to receive the on-line product, with different mode of payment.
- xi. Most of the companies not satisfied with the cost of delivery order.

### **4.3 System Requirement**

System requirement defines what the system is required to do and the circumstances under which it is required to operate (Kotonya et. al 1998). The system requirements for the proposed online decision support system for retail chain stores (ODSS-RCS) are categorized into functional and non-functional requirements. To define the system requirements for this system (ODSS-RCS), UML use case diagram is used.

### **4.3.1 Functional Requirement**

Functional requirement is defined as the “requirement that specifies a part of functionality required by the user” (Bennett et. al, 2002). Functional requirements capture the intended behavior of the system. This behavior is expressed as services, tasks, and functions that the system is required to perform (<http://www.bredemeyer.com>).

An e-commerce system brings together content and functionality on several levels. So in order to define and understand the overall functions of ODSS-RCS, the use case analysis is used to identify the different users (actors) of the system (i.e. customer, staff, store manager, HO Manager, and Administrator). The initial prototype include a skeletal implementation of the interfaces and functionality for each user (actor) role, (Nyberg, 2004). Following the construction of the prototype, a requirements review is conducted to determine whether the current understanding of the requirements is complete and correct.

#### **4.3.1.a System Requirement list**

The requirement list includes the system requirements and use case for these requirements. Table 4.27 shows which use case provides the functionality for a requirement. The last five requirements are non-functional requirements and so they do not have use cases that define their requirements.

There general requirements in the system are built into the ODSS-RCS. The system supports an organization that distributes orders to customers that are bought online. It is used that there are many main head offices (HO) for retail chain store and every one has many stores to distribute orders to customer; One HO has many stores and they are independent from other HO and it's stores, i.e. one HO and it's stores in Kuala Lumpur (HO in KL central, and stores for example in Bangsar, Ampang and in Bukit Bintang) and another HO and it's stores are in Ipoh, one in Melaka, etc.

The postal code of the place of delivery for an online customer order will determine the near subset of stores to the customer. Depending on the lower cost of delivery, the system finds which store should deliver an online order to the customer from the identified subset of stores. In addition, depending on the next lowest cost, the system will find another store close by to the customer if the selected store does not have a product in the customer's order.

The online decision support system manages the inventory for each store and decides which supplier will supply which product for its store. The same product can possibly be delivered to different stores from different suppliers.

Besides the general requirements a customer is also able to purchase in a convenient way. The system requests the customer to create an account. Once this is done, the customer can login into the system by using his /her user name and

password. After adding products to the shopping cart, and once the customer clicks to buy, a new page with two options will appear. The first option button asks the customer where he/she wants to receive the product (i.e. home or at work), while the second one deals with the mode of payment. When this is done, the customer clicks the submit button to submit his / her on-line order.

**Table 4.27: System Requirement List and Use Case.**

<b>NO</b>	<b>Requirement</b>	<b>Use case</b>	<b>Actor</b>
1	Add product to cart.	Add Item to Cart	customer
2	Surf the online shop	Browse the Site	customer
3	Review content of the cart.	Review Contents of Cart	customer
4	Remove, or add item to cart.	Update Cart	customer
5	Create a new account.	Create Customer account	customer
6.	Login to his / her account.	Login Customer	customer
7	Buy content of cart.	Checkout	customer
8	Change password.	Change Customer PW	customer

9	Change personal information.	Update Customer Information	customer
10	Update home address.	Update Customer Home Address	customer
11	Update work address.	Update Customer Work Address	
12	Update credit card information.	Update customer's credit card information	customer
13	Add a new address (other than home or office).	Fill New address	customer
14	Review history orders.	Check History Order	customer
15	Login to his /her account.	Login Staff	Staff
16	View Re-order point for each product in store.	View re-order Point	Staff
17	Define Re-order point for each product in store.	Define Re-order Point	Staff

18	View inventory status in a store.	View Inventory	Staff
19	Adjust inventory status in a store.	Adjust Inventory	Staff
20	View the state of the orders.	View Order Status	Staff
21	Update the state of orders.	Update Order Status	Staff
22	Add note to an order.	Add note	Staff
23	Change password.	Change password	Staff
24	Change personal information.	Update Personal information	Staff
25	Generate reports that help managers in decision making.	Generate report	Staff
26	View customers' orders that need to be delivered by the store at any time (can view all orders, by date, by order ID, customer ID).	View Customers' Orders	Staff
27	Print invoice for customer.	Print Customer's Invoice	Staff
28	Generate report of store needs from the inventory.	Print inventory needed	Manager

29	Generate report of inventory status in a store.	Print Inventory Status	Manager
30	Generate report of suppliers who provide specific product in specific stores.	Print Product's Supplier	Manager
31	Generate report to know actual stock with re-order point	Print Stock VS. Re-order Point	Manager
32	Generate report for know the performance of product in a store.	Print Sales Performance	Manager
33.	Log in to account	Login Administrator	Administrator
34.	Add product's category.	Add Category	Administrator
35.	Update product's category.	Update Category	Administrator
36	Delete product's category.	Delete Category	Administrator
37.	Add product to shop.	Add Product	Administrator
38.	View a product details.	Edit Product	Administrator
39	Update a product.	Update Product	Administrator
40.	Delete product from online shop.	Delete Product	Administrator
41	Add employee to store.	Add Employee	Administrator
42	Update employee in a store.	Update Employee	Administrator
43	Delete employee from store.	Delete	Administrator

		Employee	
44	Assign product to each store and which supplier will provide this product for this store.	Assign product to Store	Administrator
45	Delete a product from a store.	Delete Store's product	Administrator
46	Add new head office.	Add Head Office	Administrator
47	Add new store for a head office.	Add Store	Administrator
48	Add new postcode for a store.	Add Postcode	Administrator
49	Add another administrator.	Add Administrator	Administrator
50	Add new supplier.	Add Supplier	Administrator
51	Print list of suppliers.	Print Supplier List	Administrator
52	Edit supplier information.	Edit Supplier	Administrator
53.	Delete supplier.	Delete Supplier	Administrator
54	Change password for employee (if employee forgets it).	Change Employee Password	Administrator
55	The system will automatically determine the nearest store for customer based on lowest	Determine Nearest store	system

	cost of delivery. (System must find it in customer area).		
56	In case, the nearest store does not have a product in the customer's order, the system will automatically find the second nearest store that has the product(s) depending on the lowest cost.	Find Another Nearest Store	system
57	The system will send an e-mail automatically to a customer after purchasing.	Send e-mail Automatically	system
58	Each HO and its stores are independent in relation to the order.		
59	Set multiple user access level (administrator, customer, store manager, Head Office Manager, and staff).		
60	Session security.		
61	Encryption of information between client and server.		
62	Encryption of some information in the database.		

#### **4.3.1.b Clarification of Use Case**

The system requirement list in Table 4.27 needs more clarification on what each use case represents. Use case clarification is done for each requirement in order to understand and build a clear picture of the system requirements. Appendix C has a table showing the use case description. It gives a more detailed explanation about each requirement. This style of clarification is adopted by (Bennett & all, 2002).

#### **4.3.1.c Use Case Descriptions**

Each use case description is a textual document, written to be understood by stakeholders. Descriptions of use case can be written in any of a dozen styles, some more appropriate than others. In this report, the style adopted is the one used by (Bennett et. al, 2002), as shown in Appendix D.

The purpose of writing these descriptions is to enable the stakeholders to understand the requirements and what each use case means, show how the actor will interact with the system, what is the input and output, and what each use case will do, in order to complete the process with success. This is the goal of the use case, and every use case has at least one goal that it is intended to achieve.

#### **4.3.1.d Use Cases Diagrams**

Use cases are descriptions of the functionality of a system from the user's perspective. Use case diagrams are used to show the functionality that the system will provide and to show which users will communicate with the system in some way to use that functionality. (Bennett et. al, 2002)

A use case diagram describes system functionality as a set of tasks that the system must carry out and actors who interact with the system to complete these tasks (<http://www.visualcase.com>). Use Case diagrams show the associated roles and accesses available to actors and other systems external to the system. They show how users can interact with the system while avoiding the complications of diagramming the internal workings of the system.

In building the proposed system, five actors have been identified, i.e. a customer, staff, store manager, administrator, and system. Actually, there is another actor is called HO Manager. The HO manager is the manager for the head office; he/she can manage, and generate reports for all stores that are under its head office in the same way store manager manages and generates reports about his/her store. Therefore, this actor has the same functionality as the Store Manager, but the HO Manager can select the name of store when he/she wants to do a function, or generate reports about a store that relates to his/her HO. Thus, there is no need to draw the same use case for HO manager.

The use cases that relate to customer is depicted in Figure 4.12. This figure shows what a customer can do and how he / she interacts with ODSS-RCS.

Figure 4.13 shows the functions that two actors i.e. the Store Manager and Staff can perform, F 4.14 show the function that can be performed by the store manager, while Figure 4.15 and 4.16 show the function that can be performed by the Administrator.



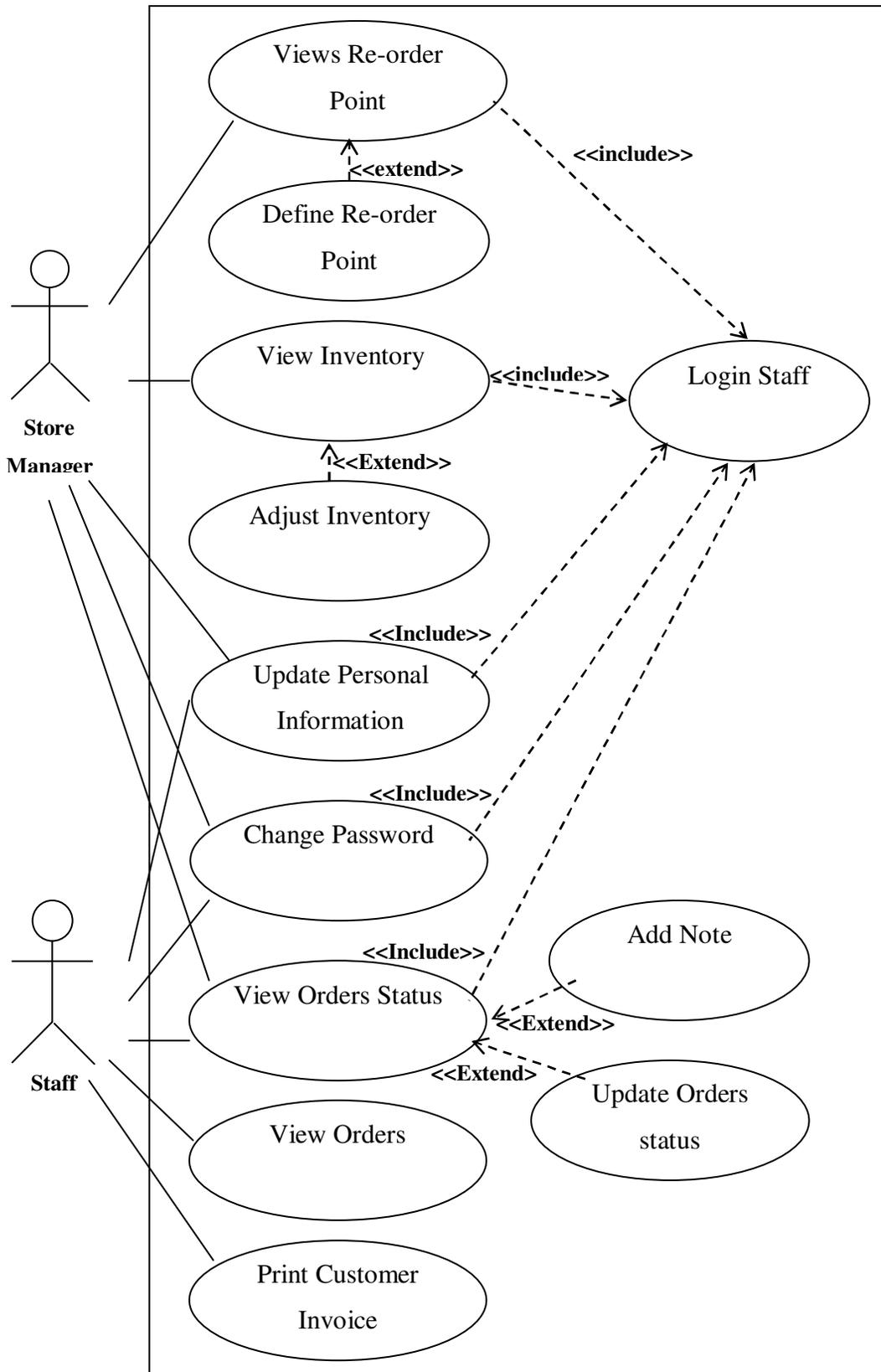
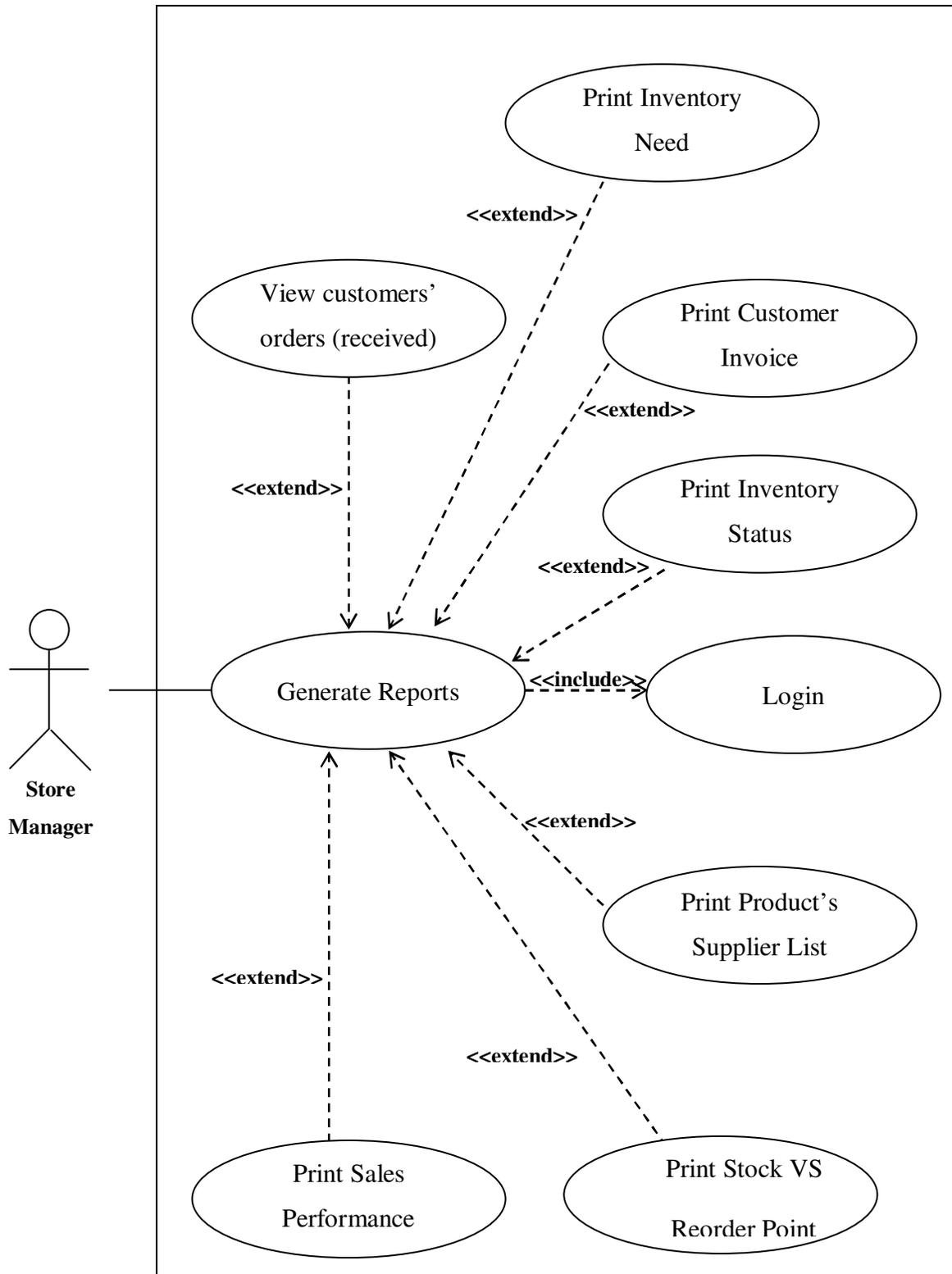
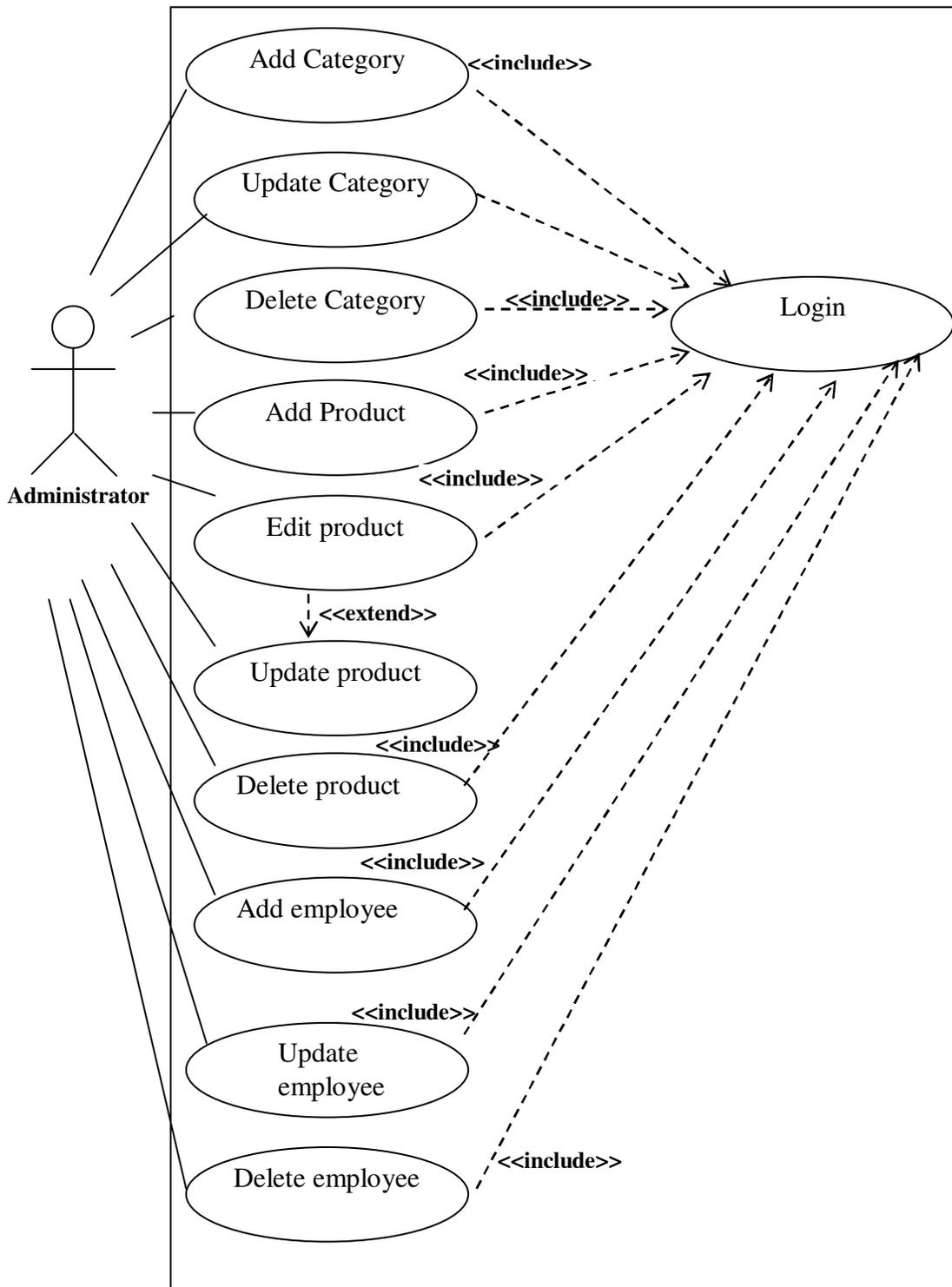


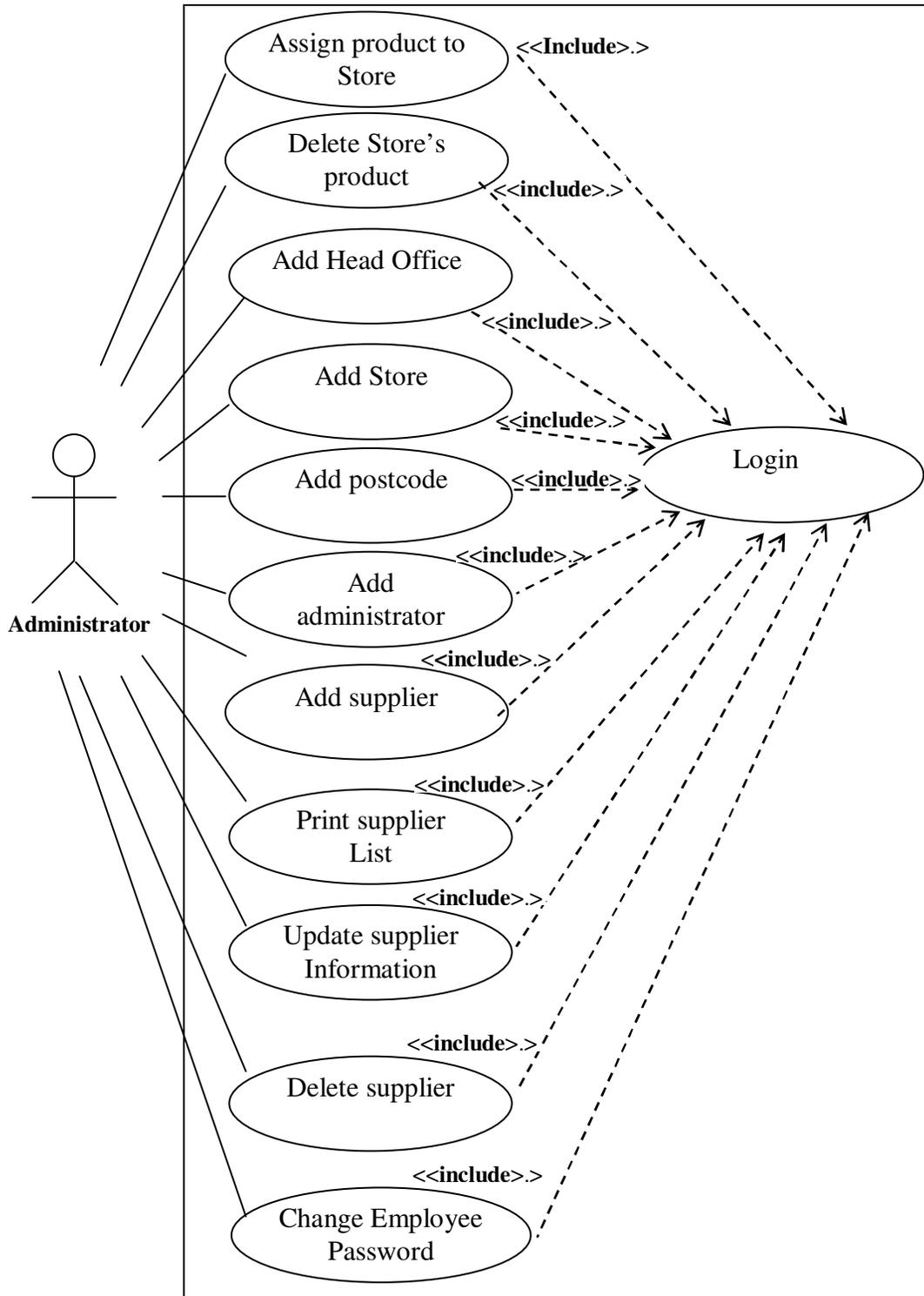
Figure 4.13: Store Manager and Staff Use Case Diagram



**Figure 4.14: Store Manager Use Case Diagram**



**Figure 4.15: Store Manager Use Case Diagram**



**Figure 4.16: Store Manager Use Case Diagram**

### 4.3.2 Nonfunctional Requirement

Non-functional requirement refer to a requirement that relates to system features such as performance, user friendly, and etc.

In the case of ODSS-RCS, the non-functional requirements identified are:-

- Each HO and its store has independence in relation to the order.
  
- Multiple user access level (administrator, customer, store manager, Head Office Manager and staff).
  
- **Security issues,**

Because the system is an online system, there are some security requirements that are implemented in the system in order to be more secure, such as.

#### 1. **Session.**

- i. A specific visit to the system should end when the user has taken no further action after a given period of time.
- ii. If a user copies the Address bar when he/she logs-in into his/her account then paste it in other page, it doesn't open.

#### 2. **Encryption:**

- i. Encrypt all transfer data between client and server.
- ii. Encrypt all passwords, credit card number and any important data in database.

- **User-friendly**
  - i. Easy-to-use
  - ii. Simple interface.
  
- **Reliability**
  - i. Automatic e-mail sent to customer

## **4.4 Summary**

This chapter discusses the analysis of the surveys given to customers and related companies as a type of potential users, after which the functional and non-functional requirements were listed. UML use case diagram was used to define the requirements and the interaction with the actor.

<b>Chapter 4: System Analysis</b>	
4.1 Introduction	68
4.2 Analysis of Survey	68
4.2.1 Companies' Survey Analysis	69
4.2.2 Customers' Survey Analysis	82
4.2.3 Conclusion of the survey / questionnaires	93
4.3 System Requirement	94
4.3.1 Functional Requirement	95
4.3.2 Nonfunctional Requirement	111
4.4 Summary	112

Figure 4.1: Percentage of companies that respond to customer’s question received through e-mail?.....	71
<b>Figure 4.2: Companies that have time-delay in delivering online orders. ....</b>	<b>71</b>
Figure 4.3: Percentage of companies that does not completely deliver the order that is ordered online.....	72
Figure 4.4: Percentage of companies that apply the concept of decentralization in decision making in relation to their stores. ....	72
Figure 4.5: Percentage of store managers who can generate reports.....	73
Figure 4.6: Percentage of Head office managers who can generate reports. ....	74
Figure 4.7: Percentage of managers of stores and head offices that can generate reports. ....	74
Figure 4.8: the percentage of companies that are planning to improve their current system.....	75
Figure 4.9: Percentages of the way of deliver order and degree of satisfaction.....	76
Figure 4. 10: Percentage of answers for Yes / No questions.....	77
Figure 4.11: Percentage of the actual time of customers to get orders and satisfy orders. ....	90
Figure 4.12: Customer use case diagram .....	106
Figure 4.13: Store Manager and Staff Use Case Diagram.....	107
Figure 4.14: Store Manager Use Case Diagram.....	108
Figure 4.15: Store Manager Use Case Diagram.....	109
Figure 4.16: Store Manager Use Case Diagram.....	110

Table 4.1: Q1: Does your company have online purchasing system?.....	69
Table 4.2 : Q2. Does your company have stores to deliver online orders?.....	69
Table 4.3 The answers to questions from 3-12.....	70
Table 4 4: Answer for question from 13-19 .....	77
Table 4.5: Q20. How long does it take to deliver an on-line order to a customer?.....	79
Table 4.6: Q21. Do the customers have the ability to fill the on-line order form correctly?.....	79
Table 4.7: Q22. In your opinion in term of percentage, is your online purchasing system easy to use and convenient for a customer to complete the purchasing process? .....	80
Table 4.8: Q23. Which address do the customers like to receive the order? (Can choose more than one answer) .....	81
Table 4.9: Q24. What is your level of satisfaction about your online purchasing system?.....	81
Table 4.10 :Q1. Your gender is .....	82
Table 4.11: Q2. Your age is .....	82
Table 4.12 : Q3. Your current marital status is .....	83
Table 4.13: Q5. Please indicate your current household income per month?.....	83

Table 4.14: Q6 How many times have you purchased things by using the online purchasing system in a month?.....	84
Table 4.15: Q7, What percentage of your income are you using on online purchasing to buy goods or food? .....	84
Table 4. 16: Q8, Where would you most like to receive the product which is bought through the Internet? (Can choose more than one answer).....	85
Table 4. 17: Q9. How many online shops have you used to buy product(s)?.....	85
Table 4.18: Q10. On the average, how long do you always spend on a site when you want to buy a product?.....	86
Table 4.19: Q11, What is the percentage of your satisfaction when you shop online?.	86
Table 4.20: Q12. How long does it take to fill up personal information when you want to buy a product online?.....	87
Table 4.21: Q13. Do you use user name and password on online shops? .....	87
Table 4.22: Q14. If yes, how long does it take to checkout when you want to buy a product?.....	88
Table 4.23: Q15. Which method of payment do you use when you buy online? (Could choose more than one answer) .....	88
Table 4.24: Q16. How long does it take for you to get the ordered product?.....	89
Table 4.25 : Q17. What duration of time would satisfy you to obtain the online ordered product?.....	89
Table 4.26 :Responses to questions 18-25 shown in percentage. Of the questionnaires .....	91
Table 4.27: System Requirement List and Use Case.....	97

