HAAGA-HELIA
University of Applied Sciences

Developing an online store for a startup apparel business

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Abstract

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A young entrepreneur is planning to open an online apparel store. In the Asian immigrants' community in Finland, ceremonial clothes are an important part of any celebration. However, there are no such clothes shops in Finland where to buy these clothes. The demand for these ceremonial clothes is increasing due to the increasing number of Asian immigrants and the growing interest of the local people in these garments. This thesis project covers the preliminary steps as for starting an online business dealing in ceremonial clothing.

The main objective of this thesis was to develop an brief business plan excluding the finanacial plan for this startup business and based on this business plan, to develop an online shop system. Due to the time constraint and the extensive size of the online shop application, releasing any prototype was not in the scope of this thesis.

The study defined the business environment, stakeholders and different business processes required for this clothing business. During the online store development, the study focused on defining the use cases, requirement specifications, interviewing customers, designing, and implementing some user stories. In addition, the general features of ASP.NET MVC Framework and Razor view engine and other technical issues were included in the technical background part.

The main outcome of this thesis was that the author got a good understanding about his startup clothing business and user requirement specifications and the development version of the online store. The thesis introduced a business plan and the requirement specifications and design documents, the implementation plan and the current version of the application to continue the development.

Those who want to open an online clothing business and also developers who want to develop an online store for a clothing business may find this thesis useful and practical reading.

Keywords
Business plan, Online clothing store, User requirements, ASP.NET MVC.

Terms and Abbreviations

Deshi Store	Name of the proposed apparel business.
Online Store	Web Shop or Online Shop
MVC	Model View Controller, a Software architectural pattern.
ASP.NET MVC	MVC based web application development framework.
Razor View engine	Different template markup syntax than ASPX markup sytax in ASP.NET. In Razor engine code blocks starts with '@'.

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1 Introduction

Ceremonial dress is an important part of celebration in every culture and society. Without having the ceremonial clothes the ceremony does not get its proper color. In Asia, the ceremonial clothes are different than the regular shirt, pants or suit. The number of immigrants from Asia and Africa living in Finland is increasing every day. While these immigrants are living far away from their home country, still they are celebrating their cultural ceremonies in this foreign country time to time. To make their ceremony more like their home country's environment, they are looking for ceremonial clothes in this foreign country. Even the native Finns are becoming interested to buy these kinds of clothes. So the demand for this kind of special clothes is growing. But there is no quality apparel shop to sell those kinds of clothes in Finland.

I want to take this business opportunity by opening an online shop where I can sell these kinds of ceremonial clothes. I have good connection to import those clothes from Bangladesh with cheaper price but to establish a physical shop in Finland would be a difficult task for me. That's why I have planned to start this business through an online store. The name of my online store is 'Deshi Store'.

1.1 Goals, scope and constraints

The project goal has been divided into two parts/milestones. Deshi Store is a start-up business, still in its planning stage. The first goal is to develop a brief business plan for Deshi Store. The second and main goal of this project is to develop an online shop application for Deshi Store based on the business plan and analyzing the target customer.

The online shop application for 'Deshi Store' will be developed by using ASP.NET MVC Framework. The application will have all the features for the customers and seller to do their all kinds of business activities.

The first part of the thesis, business plan, will cover the basic overview of the business, e.g., business processes, Products and stakeholders which are required for developing

the application. Financial accounting details and or any other complex issues regarding the business plan which are not required for developing the online application will not be covered in this thesis.

The second part of the thesis will cover system requirements documentation, design and implementation process of the application. The system requirements specifications will be formed based on the customers' and other stakeholders' interview and analyzing the existing online shop application. Based on the requirements documentation, the application will be designed and a prototype will be developed.

Due to the time constraint and the nature of the huge size of the web shop application, only couple of features will be implemented in the prototype during this project. Full implementation, testing and deployment are not included in this project.

2 Business Plan

'Deshi Store' is an upcoming Online Store to sell the ceremonial or cultural apparel, specially, targeting the Asian immigrants living in Finland. We are the first Asian ceremonial apparel shop in Finland to provide particularly the Asian ceremonial, traditional, and cultural apparels. We believe that our apparels will also draw attention to the non-Asians like, African and European customers. All kinds of business transaction or activities between customer and seller will be through the online store.

2.1 Company Location and Facilities

Deshi Store will be based on Helsinki, Finland. We will have one warehouse in Dhaka, capital of Bangladesh and one sales office in Helsinki, capital of Finland. As we will purchase the readymade apparels from the local wholesaler in Bangladesh, no production premise or production related machineries are required. The inventory manager in Bangladesh will buy the readymade garments and store it in the warehouse and upload the products info in the Deshi Store website. Primarily, there will be no physical location for sales or display in Finland. But there will be registered address for after sales related services or sometimes to help the customer for delivery service or payment related services.

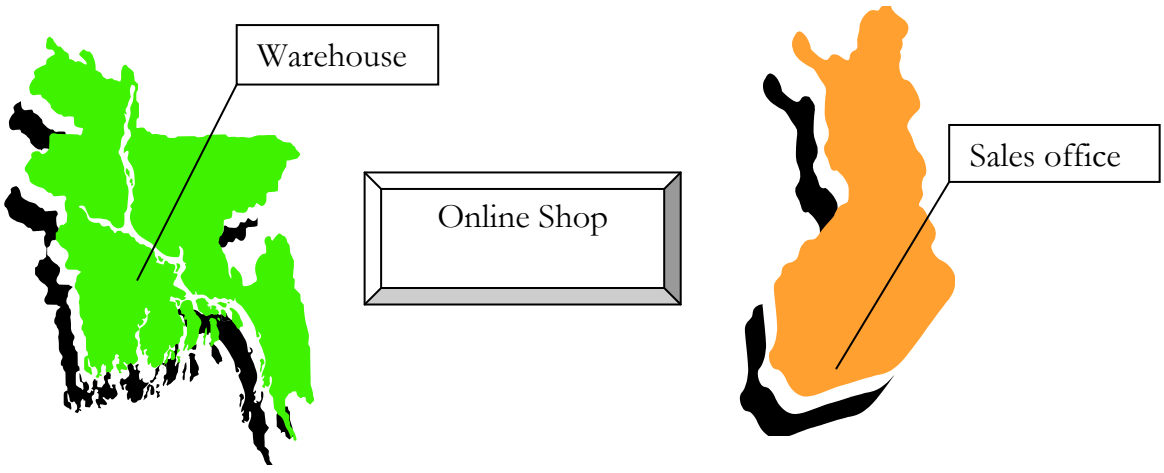

Figure 1. Location of sales office and warehouse

2.2 Products:

Deshi Store will sell nationally or culturally recognized ceremonial clothes. Our collection will range between Indian, Bangladeshi, Pakistani and also some middle-eastern ceremonial clothes. Most of these different countries clothes are manufactured in Bangladesh. So primarily we will collect these products from Bangladeshi whole seller. Some of the popular clothes' names are:

- Kurta (in Hindi)/ Punjabi (in Bengali)
- Fotua (in Bengali)/ Short Punjabi (in Hindi)
- Selware and Kameez
- Shari (women's clothes)
- Pagri/ Amama/ Turban

Figure 2. Kurta (Wikipedia)

2.3 Organization

Deshi Store has, currently, only two employees. One inventory manager in Bangladesh responsible for the updating the inventory and delivery and another employee is responsible for the sales, financial, and after sales services.

2.4 The Stakeholders:

Customers, Employees, and Suppliers are the primary stakeholders for Deshi Store business.

Customers

Asian immigrants in Finland, for example from Bangladesh, India, Pakistan, Indonesia, Malaysia, are the first target customers. Recent observation is that big number of immigrants in Finland is Somalians. They are becoming interested overwhelmingly by these Asian ceremonial clothes. And also native Finns are also interested to purchase these kinds of clothes as a hobby.

Employees

Currently, Deshi Store will have only two employees. Sales Manager is responsible for payment checking and after sales related services in Finland. Inventory manager will purchase the products from the local wholesalers and manufacturers in Bangladesh.

Suppliers

The local wholesalers and manufacturer in Bangladesh are the only suppliers, primarily. Based on the future requirements, Deshi Store may decide to purchase from other countries' supplier.

Only the customers and employees will be using the online shopping system, primarily, not any other stakeholders.

2.5 Sales process

Customers can visit our website and browse our clothes. Customer needs to register in the online shop system with very little information to get better browsing service. Customer is able to browse the products what he marked in Wish List during his last visit. And customer can place the order only through the online shop system.

2.6 Payment System

Primarily, it is not implemented in the online system to pay the bill through electronic bank cards but only using the bank transfer system to the Company's bank account. Deshi Store has account in most of the popular banks, so most of the transfer will be updated immediately. After transferring the money equal to the amount of invoice, a copy of transaction or transfer document need to be sent through the online system. The sales manager will be notified about the new order and payment immediately and he will check the order and invoice, and will create sales order and sends it to the inventory manager for delivery.

We have found that customers feel safer to pay by bank transfer than to pay by using their electronic bank card. Because when you pay the bill by using your electronic bank card you have to give your card information through internet. Customers feel that their bank card information might be stolen. But in the bank transfer method, customers don't need to give any credential information to any third party. As our target customers are from Finland, there will be no extra charge for bank transfer. But if you pay by electronic card or PayPal, there are some extra charges. So, in the beginning our plan is to make the payments only through bank transfer. Later, based on the customer needs and business we will implement other payments method also.

2.7 Delivery process

Within maximum 12 hours after receiving the payment from customer, the inventory manager processes the delivery and posts the products to the customer's postal address and updates the delivery status in online shop. Customer is able to check the update the delivery of his purchased items through our online system. There will be possibility to pick up products from Helsinki sales office which may make less delivery cost. If the customer has further query, he will contact with the sales manager through mail or phone by mentioning the order number, date or the customer ID.

2.8 Managing marketing and sales

We have very clear target customer- Asian communities. And our promotional plan will be based on any upcoming celebration of any community through the whole year. We will record all the customer data so that we can segment the customers and target them precisely with their expectation. And through the recorded customer information, we can also predict the customers' future expectation or needs. On our website there will be the advertisements for all the latest apparels, latest offers and discounts.

All the purchase and financial transaction will be documented not in online shop system. Online shop calculates and save all the sales and can displays it by dates and customers.

2.9 Sourcing and Warehousing

Deshi Store collects the clothes from the local wholesalers and manufacturer. If there is any special order from customer or new trends for the clothes, Deshi store orders for those clothes from local manufacturers.

Deshi Store has only one warehouse. Every time when there are some clothes in warehouse, those items should be in display on online shop. Online shop system should always records the update of the inventory status.

2.10 Financial Management

As this entrepreneurship is very small, by using the least resources making the highest profit would be the strategy in the beginning the business. Lack of time and security reasons, all the financial activities may not be implemented in the online system. Some transactions may be done manually. But with the growth of the business more investment and automatic information system will be added.

2.11 IT development program

The core of the business is the online shop system. Using the cutting edge technologies and giving the best online shopping experiences to the customer is our goal. So, updating the online system with the needs will be always in the focus of the strategy. With the time and requirement, system will be developed and new technology will be implemented.

During summer 2013, the first version of the online store will be deployed and open for the customers. The objective of the first release of the online shop is to analyze the customers' behavior to use the system and measuring the expectation and popularity of the business and to review the strategy based on collected feedback. If everything goes well, optimum features will be added to the online store for the customers.

3 Technical Knowledge

Microsoft ASP.NET MVC Framework will be used for developing this application. I have chosen ASP.NET MVC framework over ASP.NET Web Forms-based framework because in MVC it is easier to manage the application by dividing into Model, View and Controller, and I personally have great interest in this latest technology.

3.1 MVC Framework

ASP.NET MVC is a new architecture or framework than the traditional web forms based ASP.NET architecture. MVC stands for Model, View, and Controller. An ASP.NET MVC application is separated into three different parts- Model, View and Controller. Model contains the business logic, View contains UI logic and Controller contains input logic. And these parts are loosely coupled in the application what makes the developer to focus on implementing individual parts while not concentrating on other parts. Thus, ASP.NET MVC reduces the development complexity.

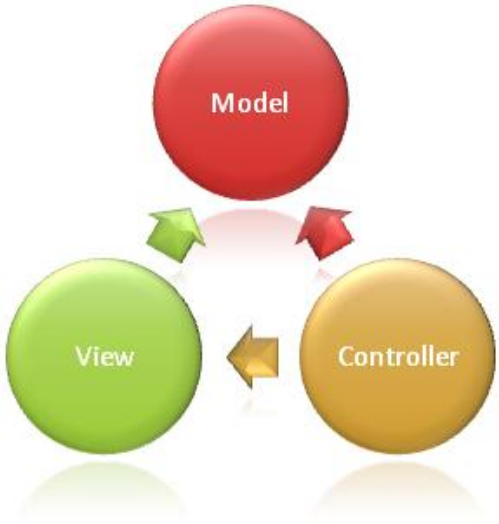

Figure 3. MVC framework Components (Microsoft 2013a.)

Model

Model is simply .cs file or class that describes the data sets of the object. It is used to retrieve and store model data to database. A model can be called by the controller or

view components. Controller calls the Model to prepare the data sets of the object for the browser request and Views also uses the Model to display the data.

View

View is a standard (X)HTML document which is called .cshtml file in Razor view engine and .ASPX file in ASPX view engine without having code behind file. View components are responsible for making the user's interface using model data. It can contain inline code/ scripts to create dynamic pages.

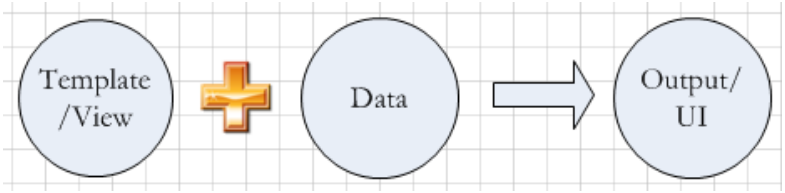

Figure 4. View components

Controller

Controller is %Controller.cs file with C# or VB.NET code. It is the main actor among the MVC components. When browser sends request, controller class receives the request and processes the request using model data and finally, select a view to present the result to the browser. (Dangar 2010; Microsoft 2013a.)

The following figure explains how the ASP.NET MVC application responds to a browser's request and the interactions happens between MVC components.

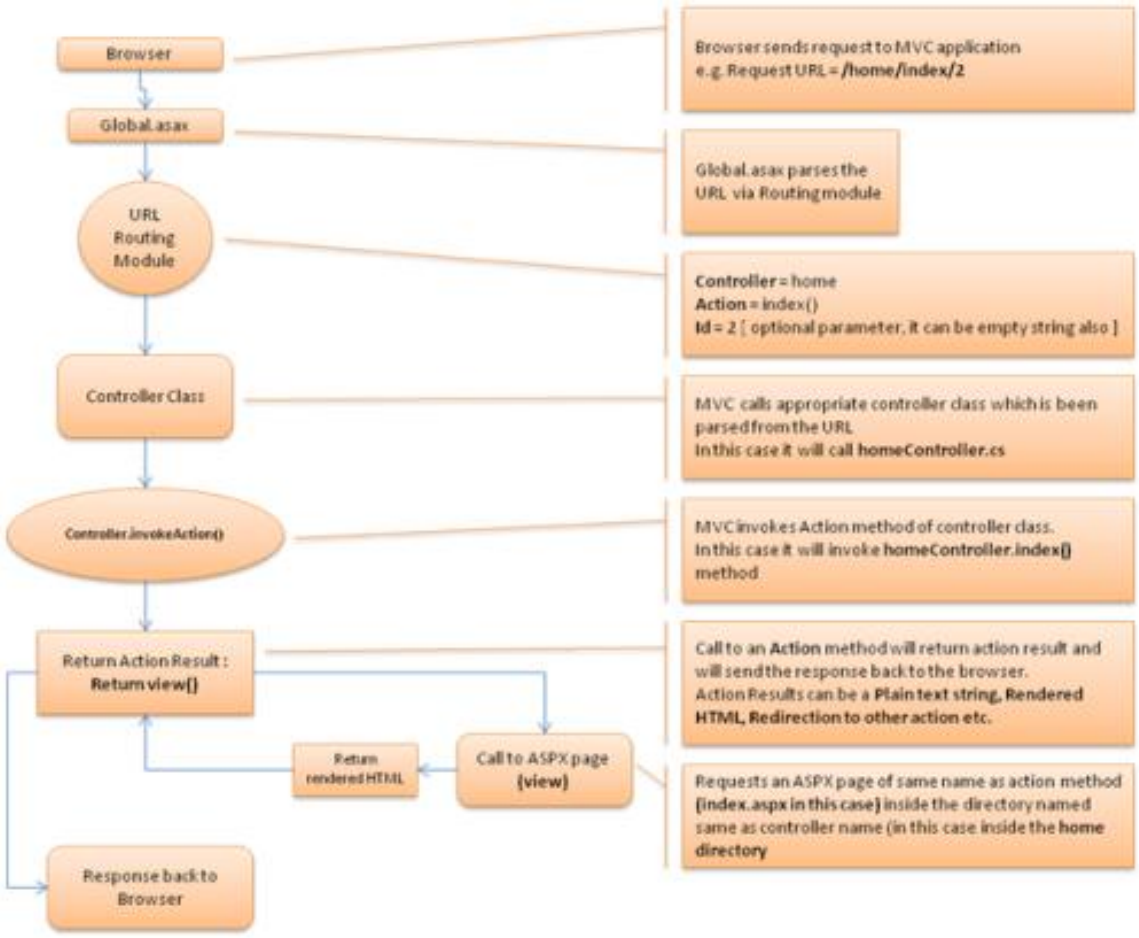

Figure 5. ASP.NET MVC execution lifecycle (Dangar 2010.)

3.2 Razor view engine and ASPX view engine

ASP.NET MVC Framework has two types of view engine- ASPX and Razor. 'Razor' is the latest view engine for ASP.NET MVC which has very smart parser unlike other view engines. It uses less numbers of characters syntaxes than ASPX to write the same block of code. Razor gives the ability to write cleaner and more expressive code than ASPX view engine, though you use the same languages.

ASPX view engine uses the .aspx file extension and Razor view engine uses the .cshtml file extension.

When we write a code block inside the HTML, in ASPX view engine we use '<%= %>' characters as start and closing tags, but in Razor view engine we can use only '@'

character in the beginning of the code block and even within the code block we can put HTML content and Razor view engine is intelligent enough to understand the HTML content and C# semantics. Here, below, are the examples. (Guthie 2010.)

```
<p>
    This example is using Razor view engine.

    @{var year = DateTime.Now.Year;}

    @if (DateTime.Now.Year == year)
    {
         <text> Current year is </text> @year;
    }

</p>
```

Figure 6. Razor view engine sample code

```
<p>
This example is using ASPX view engine.

<% var year = DateTime.Now.Year; %>

<% if (year == DateTime.Now.Year)
   { %>
        Current year is <%=year%>
        <%} %>
</p>
```

Figure 7. ASPX view engine sample code

3.3 Unit test with MVC application

Applications developed in MVC Framework gives the ability to create the unit tests. And, moreover these unit testing in MVC pattern does not depend on database, web server or external classes. In TDD (test driven development), tests are created before the actual implementation of the function so that the developers get proper understanding of the requirements. Application development in MVC framework can create unit tests for methods before writing the code for that method which helps the developer to write more effective and functional code. (Microsoft 2013b.)

4 Requirements and design.

I am the solely owner and developer of Deshi Store online shopping system. During this project, in the requirements analysis or design phase or later in the implementation phase I can make the decision of what requirements need to be changed or how it will be designed or what will be implemented.

Deshi Store is an online shopping system for selling ceremonial clothes. Customers will be able to browse and order the clothes from the online shop. Sales manager and Inventory manager will manage the product information and sales order through the online system.

During the requirements analysis and design, I have analyzed the application domain, requirements, entities and datasets required to develop this application. During the implementation phase, when I will face the challenges to develop the application and new requirements are discovered, then the documentation will be refined. So the analysis, design and implementation process will be iterated.

4.1 Users

Here, the users are those people who will actively use the system. Deshi Store online application will be used by Customers, Inventory manager, and Sales Manager.

4.1.1 Customer

The Customers, all around the world and mainly in Finland, are the main users of this application. In general, Customers will be able to browse and buy the products, to make the payments, to check their order status etc.

4.1.2 Sales Manager

The sales manager is responsible for checking the payments and other sales related services. After receiving the customer's order through the online system or phone, the sales manager will check the payment. If the payment is confirmed, the sales manager

will update the order status in the system and inform the inventory manager to deliver the product to the customer address.

4.1.3 Inventory Manager

Inventory Manager will use this application to manage the products information like uploading, updating the product details, images, color and prices. After receiving the delivery order from the Sales manager, he will send the products to the delivery address and will update the delivery information in the online system.

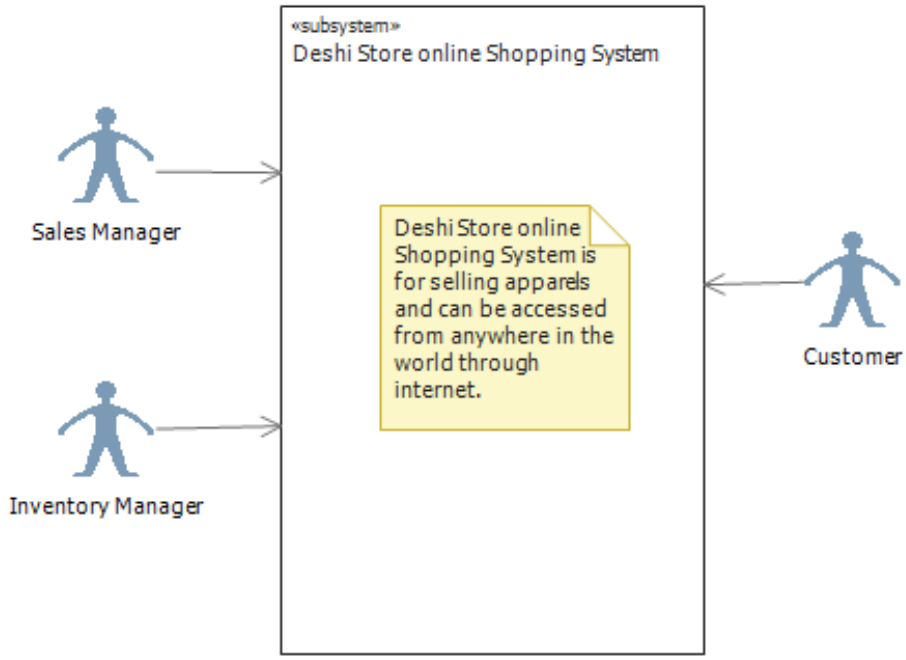

Figure 8. Users of the system

4.2 Main Business Use Cases

There are four main business use cases for Deshi Store Online store. They are following-

4.2.1 Manage product information

Inventory manager will manage the product information – uploading products details, pictures, prices and updating product information.

4.2.2 Shop for clothes

Customer will browse through the products and will see the product details, and make order for selected products.

4.2.3 Make Payments

Deshi store has only one method for payment is bank transfer. Because making the payments by bank transfer is cheaper and safer for our target customer in Finland. After checkout, customers will pay the bills by transferring the same amount money to the Deshi Store's bank account. And then, customer will send an electronic copy of the payment or notification of the payment to the sales manager through online system. Sales manager will confirm the successful payment.

4.2.4 Process orders

After getting the payment, sales manager will update the order status in the system and notify the Inventory Manager to deliver the product to customer's address. Inventory Manager will deliver the product from Bangladesh to customer address. Then Inventory Manager will update the delivery status in the online system, so the customer and sales manager can check the delivery and order status.

4.3 System Architecture

System Architecture presents the high-level overview of the expected system architecture showing the distribution of functions across system modules (Sommerville 2004, 139). Customer, Sales manager and Inventory manager will use Deshi Store online shopping application through internet browser and database server will be in the back end.

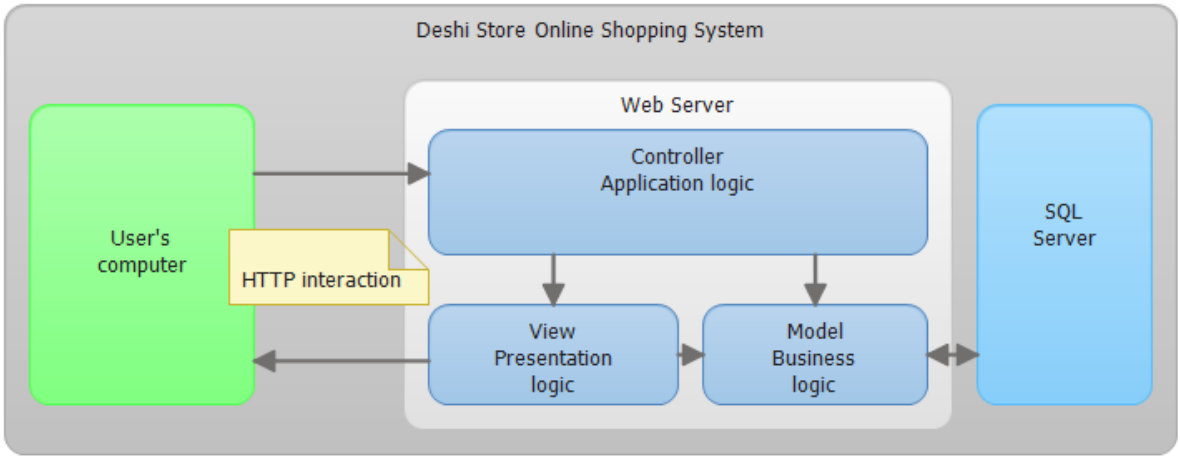

Figure 9. System architecture

4.4 Requirements elicitation

In Requirements elicitation process, software developer gathered the requirements by working with all kinds of stakeholders or end users who will interact with the system or will be affected by the system (Sommerville 2004, 146).

There are several ways to collect the system requirements. Some of them are:

- Interview
- Brainstorming
- Document analysis
- Reverse engineering
- Prototyping
- Observation

Each of them is effective in different circumstances. Sometimes multiple techniques are used to collect or discover the requirements. (BABOK 2009.)

In requirements elicitation of Deshi Store Online shopping application, I am the developer, owner and sales manager, one of the main users or actors of the system. So I can decide which requirements should be implemented and which not and how to implement. But I don't know very well about the customers' requirements. I need to understand the customers' requirements.

In my requirements elicitation process I have used combination of three techniques.

- Interview
- Observation
- Brainstorming

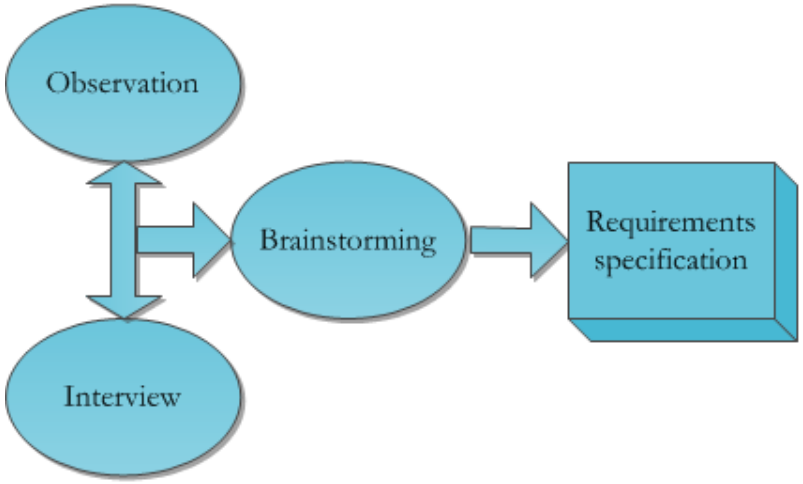

Figure 10. Requirements elicitation process

4.4.1 Observation

Typically, Observation means observing the end users at their real work environment. In this project, the Deshi Store online shopping application is not a running application but it is just an anticipated application and it has no real customer yet. So, I have observed two things. One is that the how the people use the existing online shopping systems when they buy something from online and second thing is that I myself has observed the existing online shopping application in the market. Several times I have bought products from online store and visited many online stores, specially, the online stores in Finland. When I have gathered my experiences and my observations of how

the people interact with the online shopping application, I have got really a very good collection of required functions for an online shopping system.

4.4.2 Interviews

According to Sommerville, Interview is a good technique to get an overall understanding of what stakeholders do, how they might interact with the system and what makes them feel good and bad. But it is not so good technique to elicit the organizational (Sommerville 2004, 146).

During the observation phase, I have understood what features are available in the existing online shopping system, what functions people generally use. But just by observation it is not possible to understand what is in the customers' mind, what they feel about buying from online store and also usability and non functional issues.

I designed a list of questions for potential customers to find out more about the non-functional and usability perspective of the application. The interview session was about 20 minutes. The questions were open ended. To the customers the Questions were,

- How often do you buy in online?
- Which are the sites you have bought from in online?
- What did you like in these shopping websites?
- What you did not like in these websites?
- How would you change these websites to feel better?
- What and how it concern you most about the products (e.g. color, real look of clothes, size,) when you buy in online?
- What and how it concerns you most about the online shopping application/ website (e.g. secure payment)?
- What and how it concerns you most about the total online shopping system (e.g. decision making to buy online, delivery date, return policy)
- Do you think people will make more shopping online?
- Anything else you want to comment about?

During the interview, I asked the questions to potential customers and we discussed about the issues and I wrote down the answers shortly. I asked the customers to visit their favorite online shopping site and how they use application. Though the estimated time was 20 minutes but most of the potential customers were happy to talk more than 20 minutes. Questions and answers from customers (attachment 1).

After the interview I listed down all the online shopping sites used by the interviewees. And I went through those sites to analyze the interviewees' expectation and available features in those shopping sites and I discovered several features that I can implement in my application. But most interesting thing is that during these interviews I discovered some interesting usability and business strategy issues which I did not realize during observation phase. Some of them I have pointed out here-

Usability perspective

- Should be multilingual, English must.
- Product specification needs to be exact as the real product is.
- A product detail is well organized and easy to read.
- HD video of the product is expected.
- Payment system is easy and simple.

Business Perspective

- People like to buy from online, when these products are not available in the physical market within the customers close proximity.
- The seller and product is more important than the look and feel of the web site.
- Customers prefer online shopping when they find the products with cheaper price and ability to choose from wide range of products and sellers.
- Seller need to be familiar and trustworthy to its targeted customer.
- Original product and product specification in the website should be exactly same.
- The offer and product in online should be special than what is in physical shop.
- Free shipping facility.

– Most common banks/ payment systems should be available to pay the bill.

In summary of the interview, I can say that I was really benefitted from this interview session. It gave me confidence about those functional requirements that I discovered in observation phase and understood them more clearly and the business insight that I got will help me to plan for the business also.

4.4.3 Brainstorming

Finally I collected all the requirements from the observation phase and Interviews. I compared the collected requirements with my expected application and how they can fit into the Deshi Store web shop, how these requirements can enhance the value of the Deshi Store web shop. In the next user requirements section, I have defined and written down the requirements.

4.5 Requirements specification

There are two most common techniques to specify or express the user requirements are 'User Story' and 'Use Case'.

'Use Case' modeling requires very details description of the interaction between system and actors, and picture of data processing and step by step interactions. Every Use case has triggers and goals and it illustrates all the possible scenarios or path from trigger to goal. It uses some unstructured text to fit into the required specification template. Use case also covers bigger scope than the user story does. (Rouse, 2007.)

In contrast, 'User Story' is very short descriptions of the functionalities and used in agile software development. User story is written from user's perspective. It is very useful for project planning to make faster decisions and easy to modify with the rapidly changing requirements. (Cohn, 2004.)

I have selected User Story method to describe the requirements. As I am the developer and owner of the application, it is not worth to spend time for making complex use case modeling for the requirements. The requirements:

As a Customer,

As a Customer, I want to browse the clothes.

As a Customer, I want to see clothe details.

As a Customer, I want to see the clothes with big view (zoom).

As a Customer, I want to watch the HD video of the clothes.

As a Customer, I want to add the clothes to the shopping cart.

As a Customer, I want to add the clothes to the wish list.

As a Customer, I want to create my User account.

As a Customer, I want to check out.

As a Customer, I want to see the total bill.

As a Customer, I want to pay the bill by online banking (bank transfer) system.

As a Customer, I want to send the bank payment receipt through system.

As a Customer, I want to get notification after sending payment receipt.

As a Customer, I want to get email notification after payment has been accepted.

As a Customer, I want to check order status.

As a Customer, I want to cancel order.

As a Customer, I want to see order history.

As a Customer, I want to make the payment.

As a Customer, I want to get confirmation letter of sales order to my email.

As a Customer, I want to check sales order status.

As a Customer, I want to see the other customers view/ comments on the products.

As Inventory manager,

As Inventory manager, I want to upload the pictures of the products.

As Inventory manager, I want to write price, description and other details for that product.

As Inventory manager, I want to be notified if the new sales order has been created.

As Inventory manager, I want to see when a new delivery order has been sent to me.

As Inventory manager, I want to update the delivery status of the order.

As a Sales Manager,

As a Sales Manager, I want to check if there is any customer's order.

As a Sales Manager, I want to check the Bank account against the payment information sent by customer.

As a Sales Manager, I want to update order status.

As a Sales Manager, I want to send delivery information to inventory manager.

4.6 Use case diagram

Instead of writing details of the Use cases, I have simply drawn the use case diagram to summarize the use cases and their relationship with the users.

Ovals are representing the use cases or actions done by the actors. Use case or action names are self-explanatory.

4.6.1 Customer as an actor

The actor 'Customer' is performing several actions in this diagram.

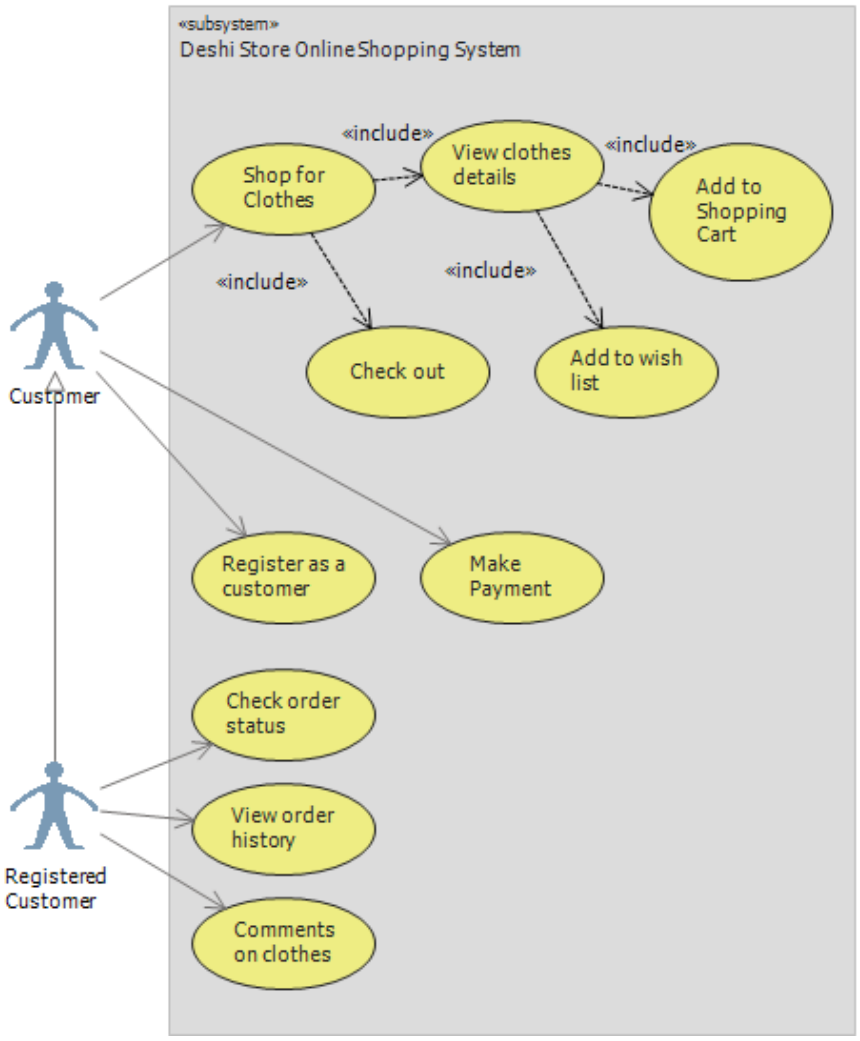

Figure 11. Use Case diagram (User: Customer)

4.6.2 Inventory manager as an actor

The actor 'Inventory manager' is performing several actions in this diagram.

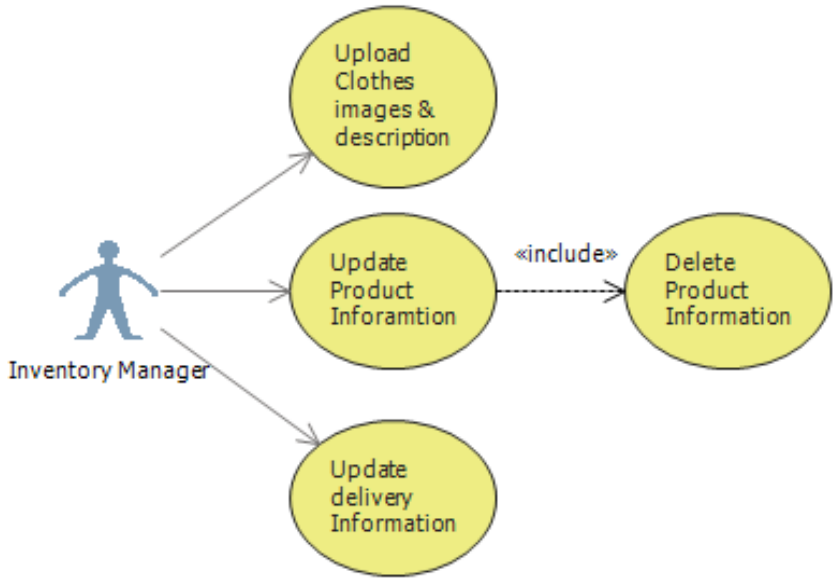

Figure 12. Use Case diagram (User: Inventory Manager)

4.6.3 Sales Manager as an actor

The actor 'Sales Manager' is performing several actions in this diagram.

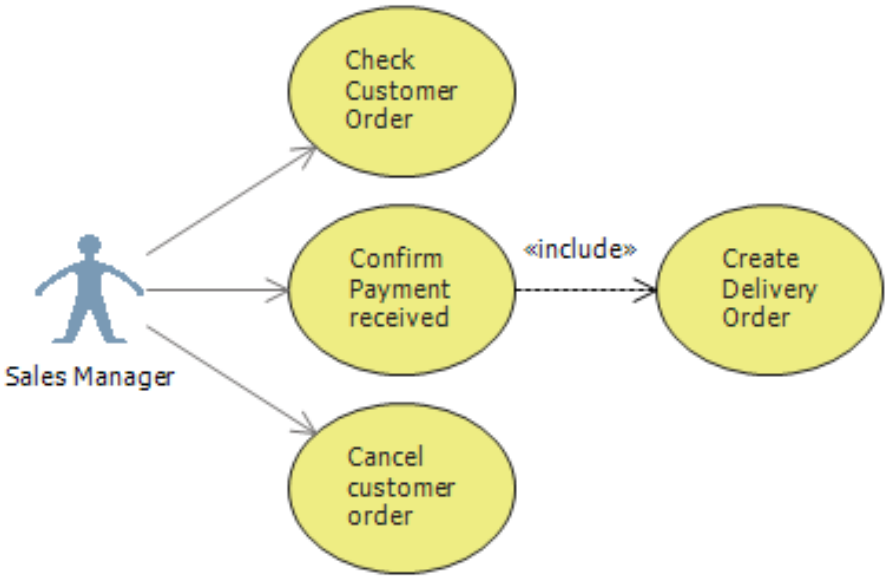

Figure 13. Use Case diagram (User: Sales Manager)

4.7 Conceptual level class diagram (Entity relationship diagram)

Here, the conceptual class diagram is not the final or static one; it will be iterated and refined during the development process when a new requirement is gathered or tuned

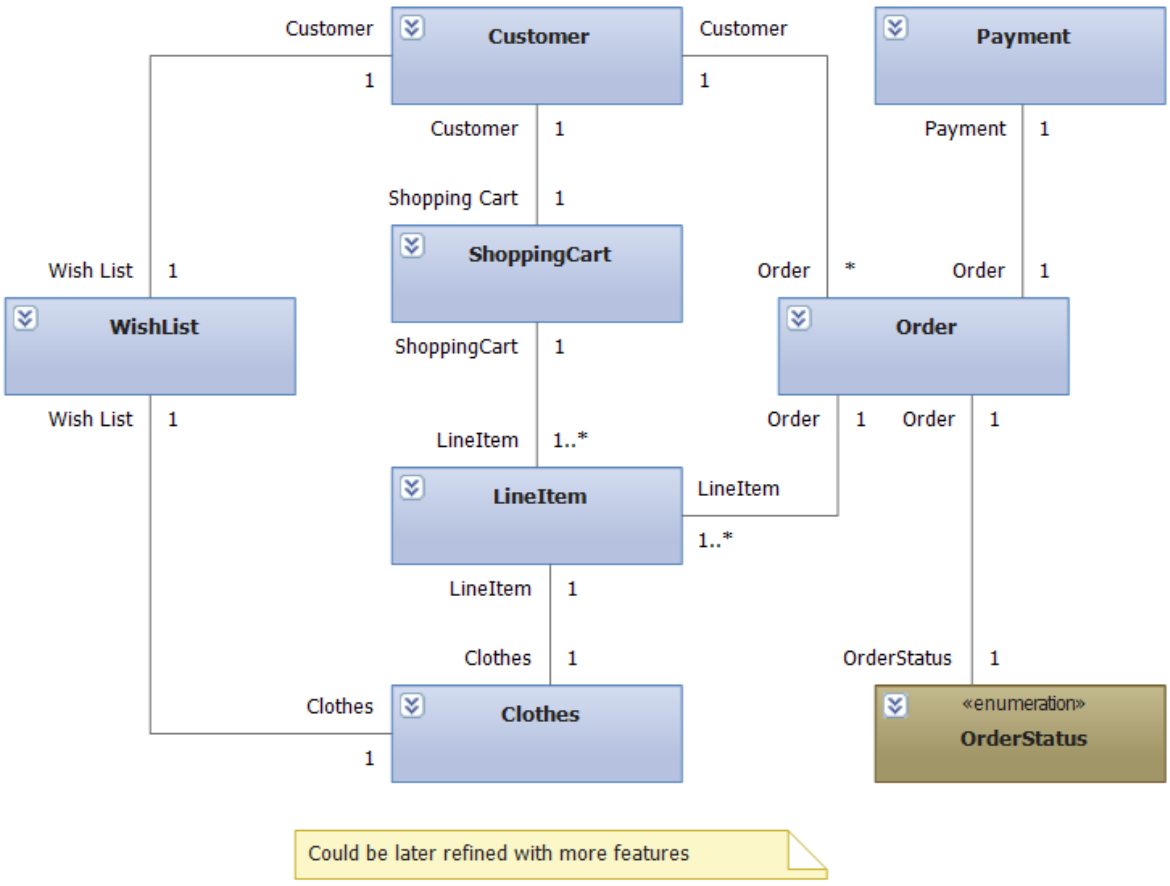

Figure 14. Class diagram (Conceptual level)

4.8 Class / Entity type descriptions

Entity name	Description	Synonyms/ Aliases	Occurrence	Medium/ Max Amount
Customer	Who buy the clothes	Shopper, buyer	Every month around 500 new customers	2000/ 20000
Clothes	Apparels, Products	Apparel, Product	Weekly around 150 items	2000/ 20000
Order	When customer place an order or the order placed by customer	Purchase order made by customer	Weekly 50	300/1000
LineItem	Unit of clothes and prices	Order Line Item	Weekly 50	300/1000
Payment	Paying the price of ordered clothes	Amount to be paid	Weekly 50	300/ 1000
WishList	Customer save the item for future browse	Favorite list	everyday around 100	
ShoppingCart	Selected product lists by the customer in order to purchase	Shopping bag	Weekly around 50	300/1000
InventoryManager	Who upload the product information	Stock/ store Manager	Only once 1	1/3
SalesManager	Who deals with the customer	Sales manager	Only once 1	1/5

4.9 Class/ Entity attributes details

Entity name	Attribute	Description	Data type	Required	Identity attribute	Special value domain
Customer	Id	Unique Identifier	String	Yes	Unique value	-
	firstName	First name	String	Yes	-	-
	lastName	Last name	String	Yes	-	-
	deliveryStreetAddress	Delivery street address	String	Yes	-	-
	deliveryPostcode	Delivery Postcode	String	Yes	-	-
	billingStreetAddress	Billing street address	String	Yes	-	-
	billingPostcode	Billing postcode	String	Yes	-	-
	phone	Phone number	String	Yes	-	-
	email	email address	String	Yes	-	-
Clothes	Id	Unique Identifier	String	Yes	Unique value	-
	name	Name of the Item	String	Yes	-	-
	gender	Gender	String	Yes	-	male, female, kids
	category	Categories	String	Yes	-	-
	color	color	String	Yes	-	-
	sizes	Size of the clothes	String	Yes	-	-

	description	Details of the clothes	String	Yes	-	-
	price					
Order	id	Unique Identifier	String	Yes	Unique value	-
	ordered	Customer order date	Date	Yes	-	-
	shipped	Delivery start date	Date	Yes	-	-
	delivered	Delivered date	Date	Yes	-	-
	shippingAddress	Shipping address	String	Yes	-	-
	orderStatus	Status of the Order	String	Yes	-	New, Hold, Shipped, Delivered, Closed
	totalPrice	Total price of the order	double	Yes	-	-
Payment	Id	Unique Identifier	String	Yes	Unique value	-
	paid	payed date	Date	Yes	-	-
	total	Total payment	double	Yes	-	-
	details	Information about the payment	String	Yes	-	-
shoppingCart	Id	Unique Identifier	String	Yes	Unique value	-
	date	Date created	Date	Yes	-	-

lineItem	Id	Unique Identifier	String	Yes	Unique value	-
	quantity	number of clothes	Integer	Yes	-	-
	price	Price	double	Yes	-	-
WishList	Id	Unique Identifier	String	Yes	Unique value	-
	date	Creation date	Date	Yes	-	-
inventoryManager	Id	Unique Identifier	String	Yes	Unique value	-
	firstName	First name	String	Yes	-	-
	lastName	Last name	String	Yes	-	
	streetAddress	Street address	String	Yes	-	
	postCode	Postal Code	String	Yes	-	
	phone	Phone number	String	Yes	-	
	email	Email address	String	Yes	-	
salesManager	Id	Unique Identifier	String	Yes	Unique value	-
	firstName	First name	String	Yes	-	
	lastName	Last name	String	Yes	-	
	street address	Street address	String	Yes	-	
	postcode	Postal Code	String	Yes	-	
	phone	Phone number	String	Yes	-	
	email	Email address	String	Yes	-	

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4.10 Activity diagram

By using activity diagram, I have displayed the anticipated business processes and flow of actions. Diagrams are self descriptive.

Shopping process starts from browsing the clothes item.

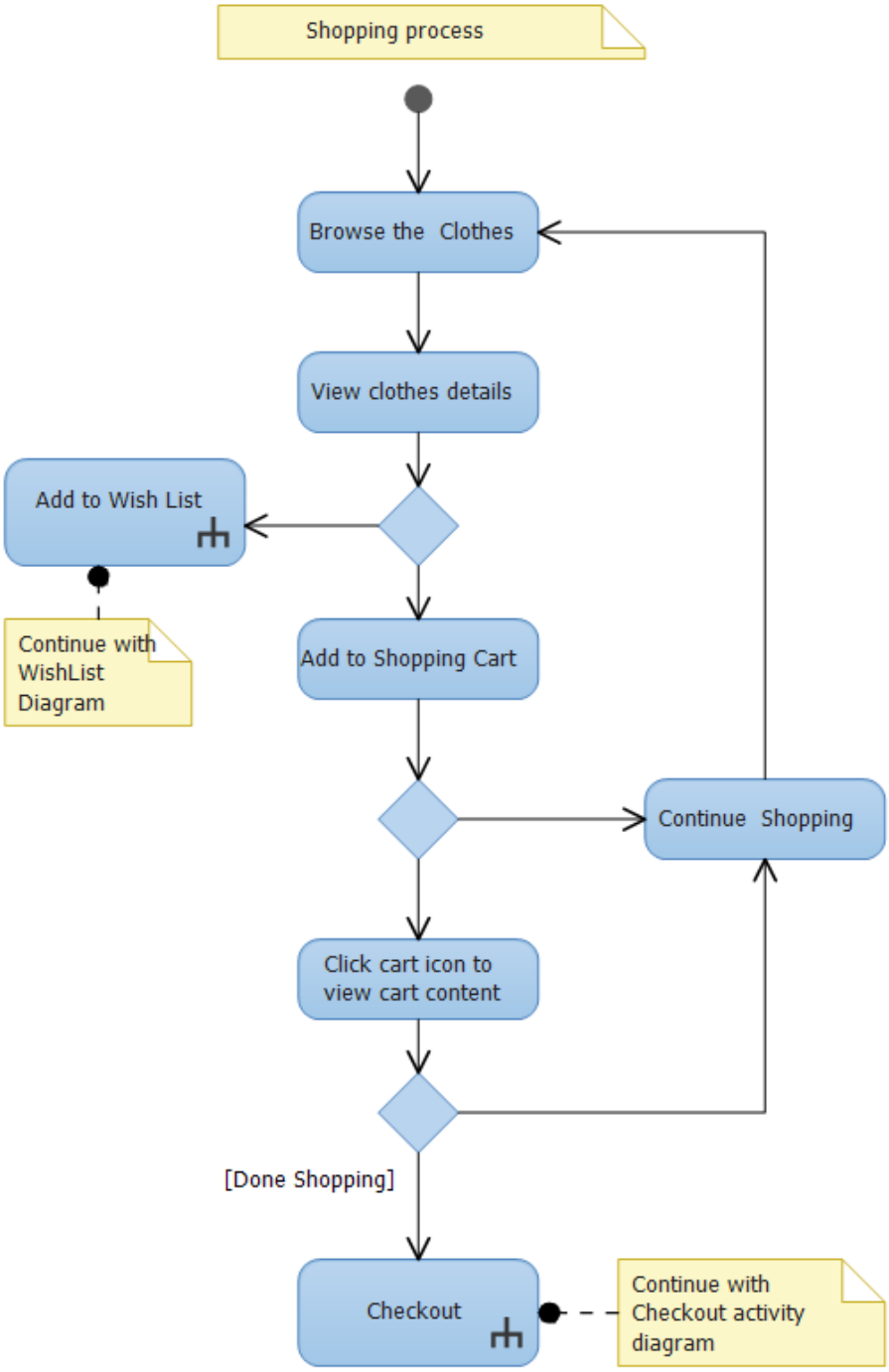

Figure 15. Activity diagram (shopping process)

This is how the checkout activities are planned for the Deshi Store system.

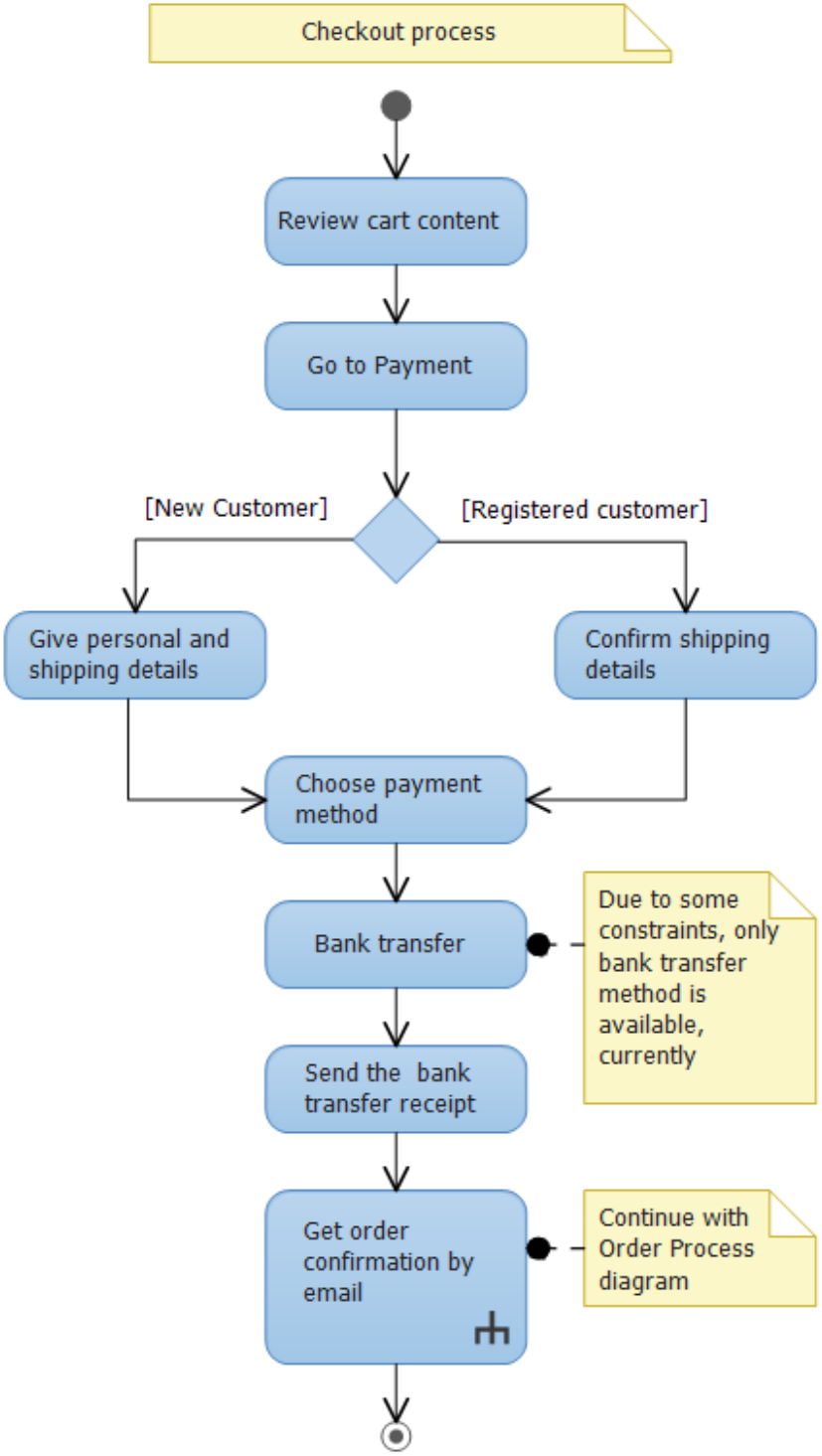

Figure 17. Activity diagram (checkout process)

After getting the order from customer, how the order process is planned is drawn below.

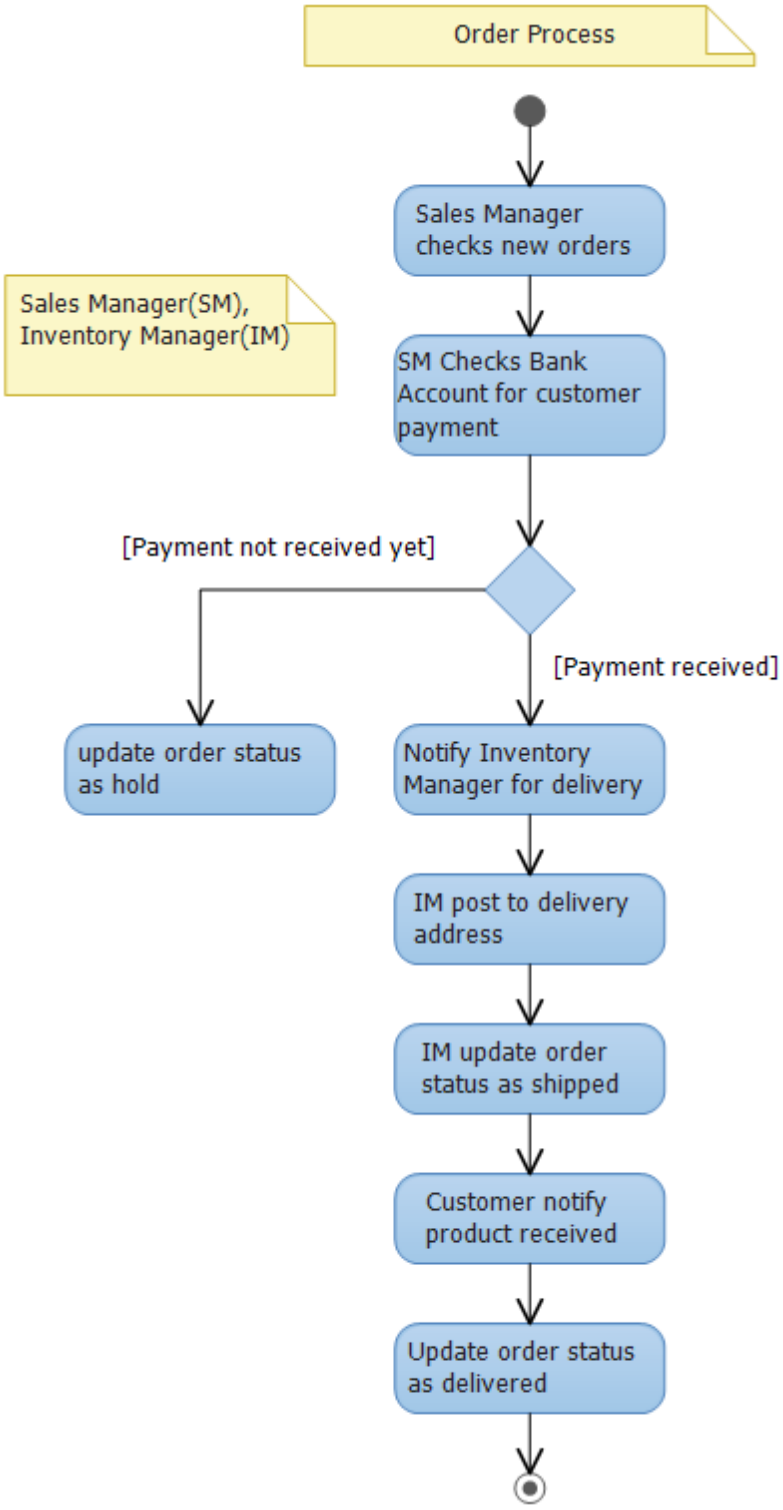

Figure 16. Activity diagram (order process)

This is how the items are added to the wish list

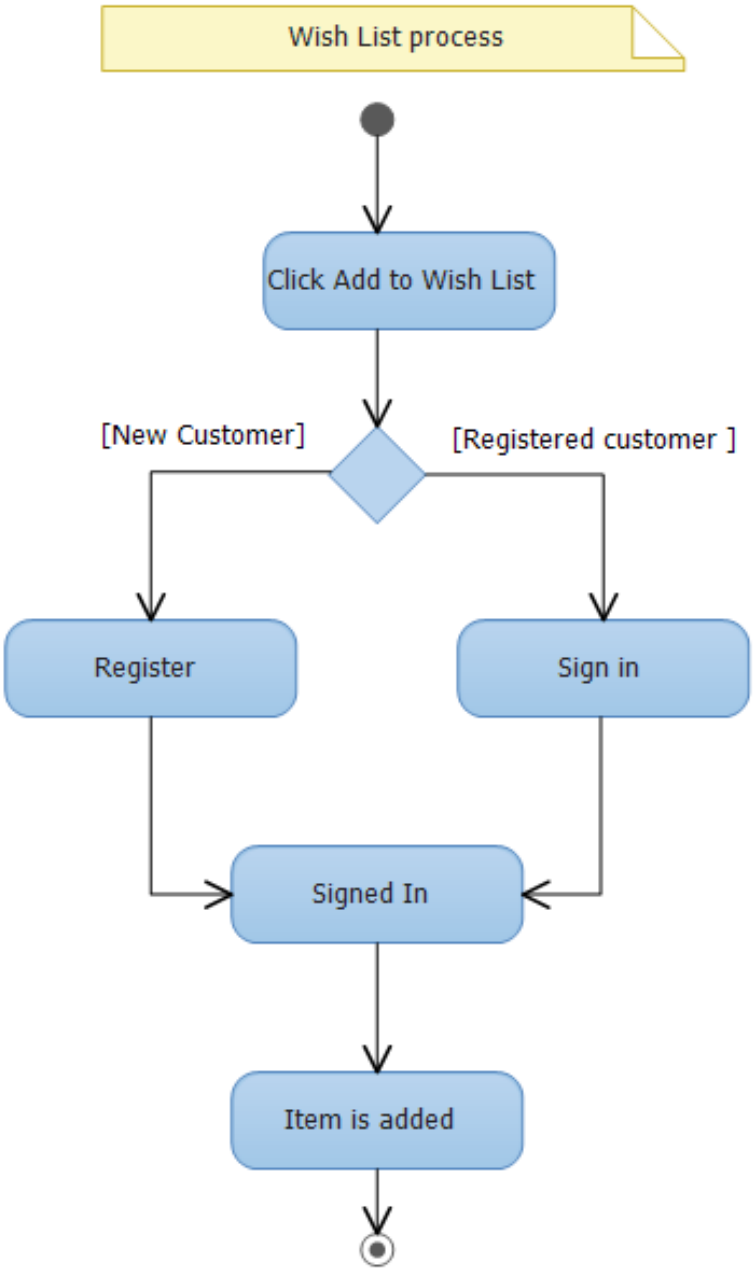

Figure 17. Activity diagram (WishList process)

4.11 Interfaces - Mock Ups

User Interface Mockups is a great way to design the software in the planning process. In Web Application development, developer designs the UI Mockups according the requirements of the customer to show the customer that how the developers have un-

derstood their requirements. It is simply the page layout of the application which helps developer to get the feedback from the customer about their expectation. Developer also gets a clear instruction how It helps the developer to test and evaluate the design and usability.

4.11.1 Main Page

This will be the Home page of Deshi Store.

Figure 18. Mockup (Home page)

4.11.2 Particular product page

After clicking on a particular product comes following page:

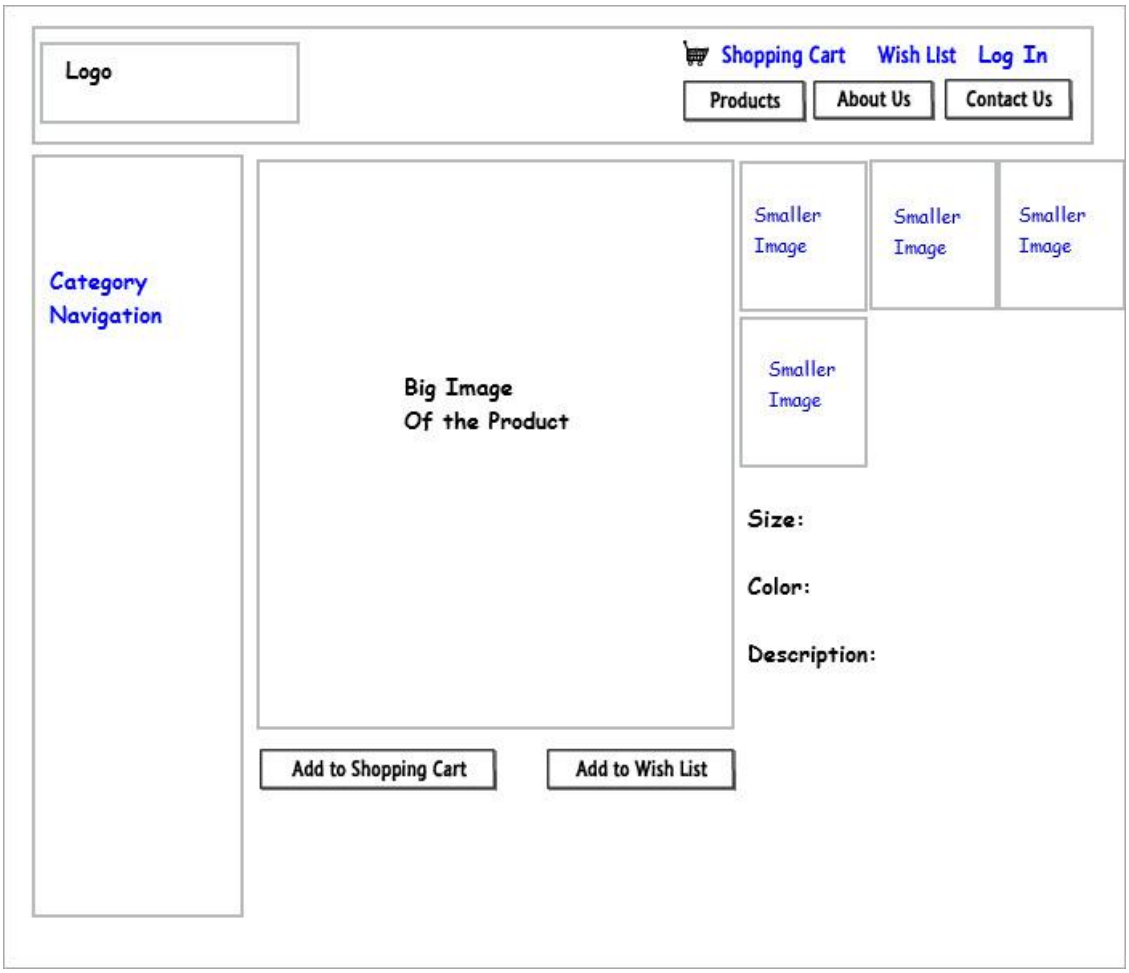

Figure 19. Mockup (product page)

4.11.3 Check out page

After pressing the Cart icon comes the following page

Figure 20. Mockup (Checkout page)

4.11.4 Uploading the product page

Inventory manager upload product from this page.

Figure 21. Mockup (product upload page)

4.12 Actors' Information access privileges

(KEY: C = Create, R = Read, U = Update, D = Delete)

Information-> Actors below	Product	Order	Order Status
Inventory Manager	CRUD	R	RU
Sales Manager	CRUD	RU	CRUD
Customer	R	CRUD	R

5 Implementation/ developing prototype

The Implementation follows the Scrum methodology. The product backlog is created based on the user stories. The development is divided into three sprints. In the first sprint database, common layout and products upload and browsing related stories will be implemented. The following sprints will follow the priority serial in the product backlog. During this thesis, only the first sprint will be implemented. As I am the owner and developer of the online store application, I can decide that which user story will be in which sprint based on the priority of the user stories.

After finishing the first sprint, product and customer table has been created, the common layout has been designed to have a common look through the application pages. And also two content views, one for upload products and display all products content view has been developed (attachment 2). During the first sprint implementation, main impediment was lack of fluent command on MVC framework. For this reason, some items from the first sprint have been moved to second sprint backlog (attachment 3).

6 Conclusion

The thesis is based on a business idea which is to sell the Asian ceremonial clothes to particular target customer segment in the Finnish market through online store. The name of this clothing shop is Deshi Store and I am the only owner of Deshi Store. The thesis started with the goal to develop a business plan for this business idea and to develop an online shop application to support this startup business. I am the only developer of this online shop application

Readers may find in some places not enough or clear details of the issue in my requirements documents and business plan. The reason is requirements analysis is an iterative process and I have been doing this analysis alone, sometimes I could not be enough careful to write everything down though the information is already processed in my mind. I am still learning this clothing business domain and user requirements of the online system for this business. With more research my understanding will become clearer and I will write more standardized requirements documentation.

The first effort in this thesis was to make a documentation of the business plan. I had the basic idea about how the business will run but the business was not in existing yet then, so there was a need of written document of business plan. So in this thesis project, I have defined the customers, products and organization. I have defined how the sales process, delivery process, sourcing will be done. I have analyzed which payment method will fit to my online store and I have found that the bank transfer method is the most suited method for my business. In the report I have explained why I have chosen bank transfer method over other typical online payment methods.

I am the owner and also developer of this application. I did not put much detail in the requirements and design documents. I have put more diagrams and drawings and less text or a detail of the requirements and design to use my time more effectively and to move forward faster. Because the application domain is known to me and requirements engineering is an iterative process and may be, I need to change the requirements based on my future realization.

First I have defined the users of the system and main business use cases. To find out the user requirements of the system, I have used combination of three requirements elicitation method- observation, interviews and brainstorming. I have observed the existing online shopping systems and the customers' behavior when they use the existing online shopping system. In the interview process, I have interviewed three potential customers. And finally after brainstorming, I have used user story technique to specify the user requirements. Based on the user requirements, I have designed entity relationship diagram, class attributes and activity diagram to get the clear picture of the future online store system. I have also designed the mockups of user interfaces.

ASP.NET MVC framework has been used for developing this application. There was not much progress in implementation during the first sprint, only the master layout page, home page partly and product upload feature was implemented, because I was quite beginner in MVC framework. Scrum development methodology has been used for development process. During this thesis first sprint has been implemented. All the sprint items in the first sprints were not implemented during the first sprint, undone sprint items have been moved to second sprint.

6.1 Further action

The next action is to continue the next two sprints to develop the application. If there are any changes in design or requirements are realized to make during the development, requirements and design documentation should be updated also. Hopefully, by the middle of July, 2013 first version of online system will be ready to use.

The plan is to release the first usable version of the online shop system in summer. Online shop system is the engine of the Deshi Store apparel business. If this Deshi Store online shop system can serve the customer to their expectation, the Deshi Store business will grow faster. After the first release, customers' feedback on products and online system will be collected with high priority. Based on those feedbacks, new design and features will be implemented in the system and also business strategy will be reviewed, if needed.

6.2 Personal development

This project was the most challenging project for me in last three years bachelor study. But I am quite happy after finishing the project. My plan was to write a brief business plan for the Deshi Store, I did that. My plan was to develop an online shop application for Deshi Store. I have successfully made the software requirements and design documentation, and now, the application is on the development process. Practically I have implemented all my skills that I have learned during my study period to make this project success. The most important experience I have got from this project is how to solve the problems independently.

I have realized how important a proper project plan is for the success of the project. If a project plan is well defined before beginning the project, the work during the project becomes smooth though there is sometimes the possibility of need to change the project plan during the project. I made my project plan before beginning the project, but during the project I had to change the time plan and I found some tasks very challenging in the project. But by following the thesis supervisor's advises, I was able to overcome those difficulties and rescheduled some tasks.

When, I was developing the business plan for Deshi Store, I have read many articles and writings on how to make a successful clothing business, how an online system can boost up the business to the pick. I have interviewed the users and analyzed the existing online shop application. Now I understand the user requirements better. I have got clearer idea how to implement a user friendly and quality online shop application.
These understandings will help me to make my clothing business successful.

During the university project, the teachers always give us assistance and some kind of framework for requirements analysis and designing. During this project, when I was analyzing user requirements alone, I found difficulties to elicit and express all the requirements required for the online store. May be, there are still some requirements not included in my requirements document what I will discover during the development process.

As a programmer, I have always interest in new technologies and that primarily motivated me to use MVC framework for Deshi Store online system. When I started to develop the online system, I was quite beginner in MVC framework. During the programming courses, I learnt web forms based application not the MVC based application. In the beginning it was taking too much time for me to understand this new pattern of MVC. But after the first sprint, I have become more fluent with MVC 3. Now, I have the skill on ASP.NET MVC framework.

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Attachments

Attachment 1. Interview with customers

Potential User: Customer 1		
Notice: I am planning to develop an online shopping application. I want to develop the application with such features so that you (customer) feel good when you buy from this online shop. So your opinion is very important for me to plan for a user friendly application.		
Name: Anonymous Age: 30 Profession: IT professional		
1	Question	How often do you buy in online?
	Answer	Seldom. Only when the seller is known/ well familiar.
2	Question	Which are the online shops that you have bought from?
	Answer	www.gigantti.fi www.groupon.fi
3	Question	What you did not like in these websites?
	Answer	Language problem, should be in English too,
4	Question	What did you like in these websites?
	Answer	The product information are very organized and easy to read.

5	Question	How would you change these websites to feel better?
	Answer	There is no big problem with that, ok.
6	Question	What concerns you regarding the item that you buy from online?
	Answer	The product was not exactly as it was mentioned in the website, though it was written on the website that actual product can be different than what is mentioned in the website.
7	Question	What and how it concerns you most about the online shopping application/ website (e.g. secure payment, navigation)?
	Answer	yes , secured, familiar company, simple for this website.
8	Question	What and how it concerns you most about the total online shopping system (e.g. decision making to buy online, delivery date, return policy)?
	Answer	some products are not available in physical shop, some are in another country, which are not available in local market. return policy within a month, good thing. Price is different in shop and in online.
9	Question	Do you think people will make more shopping online?
	Answer	Yes,

10	Question	Anything else you want to comment about?
	Answer	should be more facility, more details about the product. high resolution video of the product, free shipping facility. most common banks are used to pay the bill. Bad experience to buy from unknown seller, like groupon, they provide very low quality product. The seller and product is most important to you, not the look and feel.

Potential User: Customer 2		
Notice: I am planning to develop an online shopping application. I want to develop the application with such features so that you (customer) feel good when you buy from this online shop. So your opinion is very important for me to plan for a user friendly application.		
Name: Anonymous Age: 25 Profession: Student		
1	Question	How often do you buy in online?
	Answer	Sometimes
2	Question	Which are the online shops that you have bought from?
	Answer	www.kaplan.co.uk

		www.bpp.com
3	Question	What you did not like here in this websites?
	Answer	Nothing.
4	Question	What did you like in this websites?
	Answer	I got everything what I need.
5	Question	How would you change these websites to feel better?
	Answer	Satisfied, everything , well directed, navigation and organized
6	Question	What concerns you regarding the item that you buy from online?
	Answer	Quality expectation.
7	Question	What and how it concerns you most about the online shopping application/ website (e.g. secure payment, navigation)?
	Answer	Secure payment, Privacy , Are the information going to be public, or stealing by third party.
8	Question	What and how it concerns you most about the total online shopping system (e.g. decision making to buy online, delivery date, return policy)?

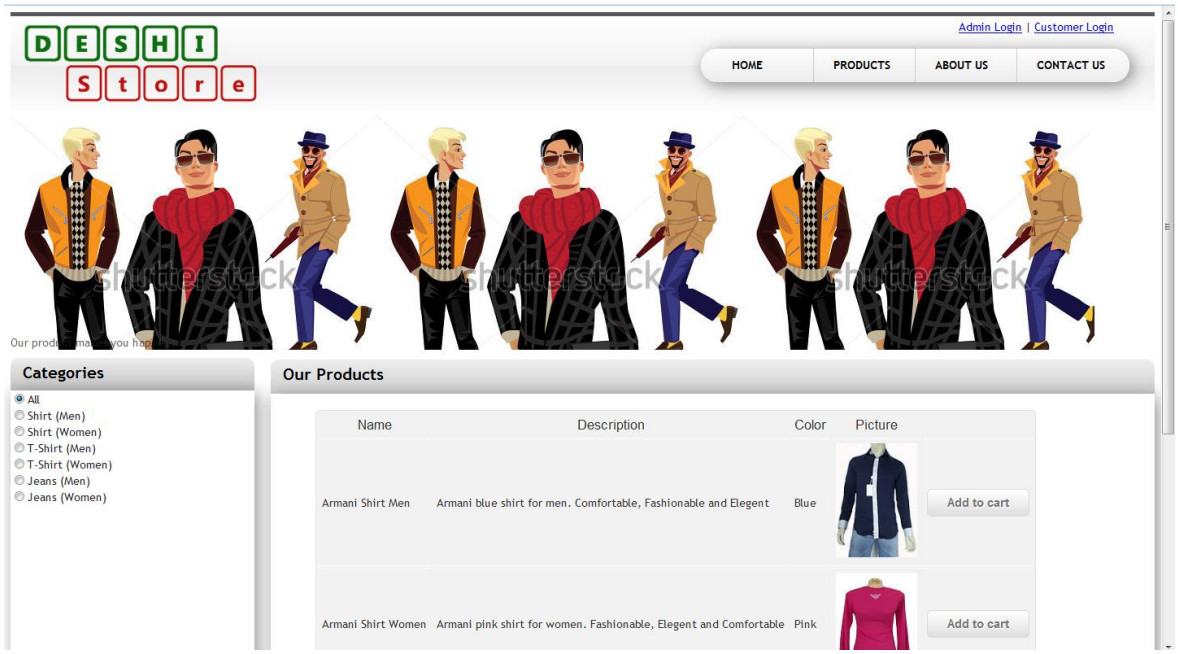
	Answer	The product which I cannot get in local market, I get easily from online.
9	Question	Do you think people will make more shopping online?
	Answer	Of course.
10	Question	Anything else you want to comment about?
	Answer	I like online shopping

Potential User: Customer 3		
Notice: I am planning to develop an online shopping application. I want to develop the application with such features so that you (customer) feel good when you buy from this online shop. So your opinion is very important for me to plan for a user friendly application.		
Name: Anonymous Age: 32 Profession: PhD researcher		
1	Question	How often do you buy in online?
	Answer	frequently, daily
2	Question	Which are the online shops that you have bought from?
	Answer	http://keltainenporssi.fi/, http://www.ebay.com/electronics, http://www.tori.fi/

3	Question	What you did not like here in this websites?
	Answer	ebay = Currency converter availability. product definition/specification is not enough clear to understand the product.
4	Question	What did you like in this websites?
	Answer	
5	Question	How would you change these websites to feel better?
	Answer	
6	Question	What concerns you regarding the item that you buy from online?
	Answer	size description, small = ?, color is not exact,
7	Question	What and how it concerns you most about the online shopping application/ website (e.g. secure payment, navigation)?
	Answer	
8	Question	What and how it concerns you most about the total online shopping system (e.g. decision making to buy online, delivery date, return policy)?
	Answer	*"delivery time is not fixed, tracking infor amtion free shipping, not applicable for finland, time wasting

9	Question	Do you think people will make more shopping online?
	Answer	grow must,
10	Question	Anything else you want to comment about?
	Answer	details of size in 3d, cartoon,

Attachment 2. Home page of the current system (prototype)



Attachment 3. Product Backlog

Product Backlog (Deshi Store online System)

Sort Product Backlog

Story ID	Story name	Status	Size	Sprint	Priority	Comments
10	As Inventory manager, I want to upload the pictures of the products.	Done	10	1	10	
1	As Inventory manager, I want to write price, description and other details for that produ	Done	10	1	10	
10	As a Customer, I want to browse the clothes.	Done	10	1	10	
11	As a Customer, I want to see clothe details.	Planned	10	1	10	
12	As a Customer, I want to see the clothes with big view (zoom).	Planned	10	1	20	
14	As a Customer, I want to add the clothes to the shopping cart.	Planned	10	1	10	
17	As a Customer, I want to check out.	Planned	10	1	10	
3	As Inventory manager, I want to be notified if the new sales order has been created.	Planned	10		30	
4	As Inventory manager, I want to see when a new delivery order has been sent to me.	Planned	10		30	
5	As Inventory manager, I want to update the delivery status of the order.	Planned	10		40	
6	As a Sales Manager, I want to check if there is any customer's order.	Planned	10		20	
7	As a Sales Manager, I want to check the Bank account against the payment information se	Planned	10		40	
8	As a Sales Manager, I want to update order status.	Planned	10		30	
9	As a Sales Manager, I want to send delivery information to inventory manager.	Planned	10		20	
13	As a Customer, I want to watch the HD video of the clothes.	Planned	10		50	
15	As a Customer, I want to add the clothes to the wish list.	Planned	10		40	
16	As a Customer, I want to create my User account.	Planned	10		20	
18	As a Customer, I want to see the total bill.	Planned	10		10	
19	As a Customer, I want to pay the bill by online banking (bank transfer) system.	Planned	10		10	
20	As a Customer, I want to send the bank payment receipt through system.	Planned	10		10	
21	As a Customer, I want to get notification after sending payment receipt	Planned	10		20	

Product Backlog | Impediment Backlog(JV) | Sp1 Backlog (example) | Sprint Backlog Template