The Design and Implementation of Integrated E-Cart on E-Hyper Market

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Abstract- The idea in this paper is to design and build an E-Business Market that is very huge; the purpose is to enable customers to buy through the World Wide Web by applying the Browser-server architecture in Electronic Commerce. With the possibility of selling any type of goods, whether it's digital or physical, you would need to increase the proportion of sales to ensure customer convenience.

The hypermarket is trying as much as possible to make the process of purchasing goods very simple, therefore it is building and configuring a comprehensive electronic commercial site on the Internet. The new hypermarket provides novel services. It includes a number of commercial sites. The management of products that are offered by each site are done through the site owner. The site owner will manage the system and modify the products of his site through a set of tools provided by the main site. A new way is used to display the various products type which makes the navigation in the site and comparing its products with other related sites very easy.

The E-Hyper Market website provides a flexible method of payment that allows the customer to select a payment plan that suits him.

Also, unique search schema is offered. The searching process of the products according to certain conditions can be accomplished in a detailed search. This properties based search depends on determining the values and the ranges of the characteristics of the product, which provides accurate results.

We have used ASP.NET as a programming language to implement this project and the database program that is used to store the products data is MY SQL. Given the extra services mentioned above, our site will be more flexible and easier to use compared with other similar sites.

Keywords: Ecommerce, B2B, Electronic Markets, Flexible Payment.

Classification: GJCST Classification: K.4.4

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Strictly as per the compliance and regulations of:

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I. Introduction

Nowadays the wealth of information and means of modern technologies has become diverse and vast, thus, an individual has several options to face. A person may choose to watch TV channels, while another may prefer to read magazines and newspapers. The new millennium and the bulk of generations interact with each other using the World Wide Web (WWW) [1]. The WWW is increasingly important as a source of basic information and a place for trade [2] or so-called Electronic Commerce (EC).

EC in short, is the use of computer networks to improve organizational performance as well as increasing the profitability ratio. Moreover, it helps to get a share in the market and improve customer service by creating a Web page and supporting the investors' relations or communicating electronically with customers [3].

Overall, there are many excellent electronic commerce sites such as Amazon.com, ebay.com, disneystore.com, and others. Commerce is reasonable to the process of shopping on the web site. It is becoming a commonly used business pattern for households and implements web sites that provide functionality for performing commercial transactions over the web.

The customers can browse the catalogue and select products of interest. The selected items may then be collected into an electronic shopping cart. At checkout time, the items in the shopping cart will be presented as an order. Afterwards, more information will be required to complete the transaction. Usually, the customer will be asked to fill or select a billing address, a shipping address, a shipping option, and payment information such as credit card number. An e-mail notification is sent to the customer as soon as the order is placed.

Along with EC areas, the B2B (Business to Business) EC is being spotlighted as an interesting research area considering its size and the potential impact it has overall. Now various B2B systems are being used in seller-centric E-marketplaces, intermediary-centric E-marketplaces, and buyer-centric E-marketplaces etc. [4]

The Internet combines the entire purchasing process, from product exposure to product purchase, into one easily accessible medium. Although there are many ways in which the Internet differs from other advertising channels, three are consistently mentioned in the advertising literature Quinn [5] Berthon [6]. These components are interactivity, customer intimacy, and the ability to shop online. Many argue that these are the characteristics that are provoking interest among consumers, and will generate success for e-companies.

In this paper, we have created a hypermarket on the Internet that contains several commercial sites to sell

a wide range of goods to customers. We analyzed the treatment of three cases, the first case being multi-payment. The purchase process, as from the beginning of the late 70's, is an impressive number of innovative electronic payment systems that have been developed and tested commercially. However, the resulting variety and complexity of the systems has turned out to be one of the obstacles for the broad acceptance of electronic payment [7]. Second case is how to compare products with each other to save time and effort to the customer before the purchase process. The third case is the search process (Properties Based Search), rooted in the characteristics of the product to save time and effort for the customer.

II. PROBLEMS

Along with IT (Information Technology), the Internet high-speed development, electronic commerce has caused the current distribution realm to significantly transform, which can be smoothly developed [8]. We offer an electronic commerce site that we call HS (Home Site). The purpose of HS is to sell products and goods to the customers. This site displays the products from a large number of commercial sites that deal and have a contract with it (Site1, Site2…, and Site N).The customers can view and buy any product from different sites through this Site. The site owner of each site that has a contract with the main site (HS) can add, modify, and delete the products through the product management system.

There is a payment system also in the HS as shown in the following figure. The customer deals with one site instead of visiting each site separately, which saves time and provides convenience for the customer.
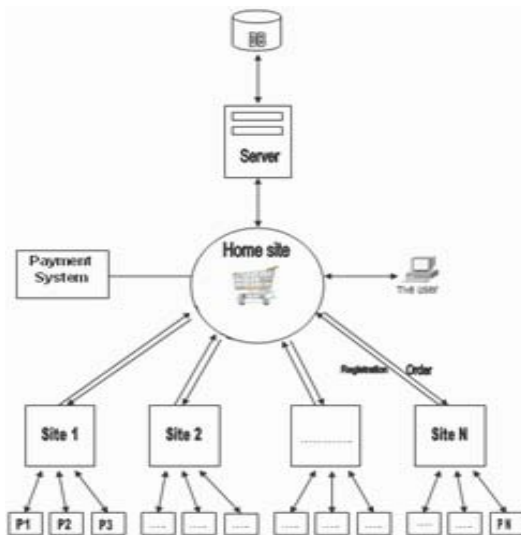

Figure1- The architecture of E-Hyper Market System

Based on the proposed design of the system, this site provides several additional services that allow the client to perform the purchase process with flexibility

and high efficiency. When a customer visits a site there will be three additional services available for him, these services help him to avoid the following situations:

1) *The payment method*

The on-line Electronic Payment System (EPS) uses transactions between three kinds of entities: A client (payers), electronic shops (payees) and the bank (Trusted Third Party) .The Architecture of system is shown in Figure (2) [9].
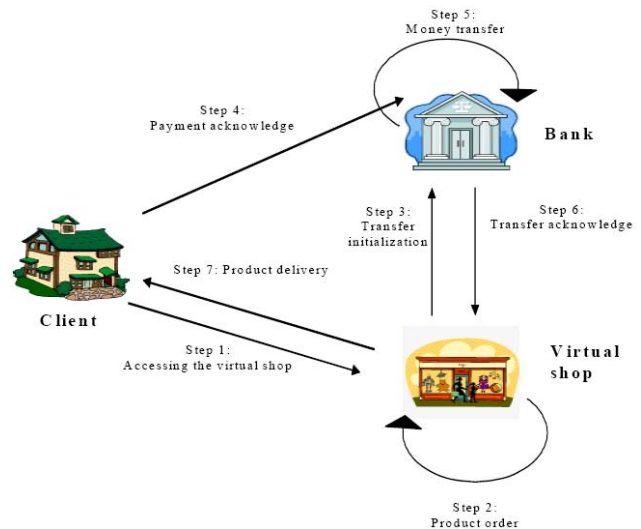

Figure2- The Architecture of on-line EPS

In general, EPS is classified into two categories, the systems with on-line verification and the systems with off-line verification [10]. The process of shopping in any E-commerce site on the Internet includes paying the total amount instead of payment plans. For example, when the customer chooses a product like a laptop by e-cart and when he reaches the payment stage, he must pay the total amount of the computer at once (Is it not true?) through one of the payment methods such as credit card, Internet Bank or other means of payment over the Internet.

Perhaps this customer does not have enough money now to buy this product in one of the payment methods. Therefore, he could not pay the full price at once, making him unable to buy this item. This will lead him to stop the purchasing process and thus, the commercial site along with the company/manufacturer that made this product will lose this trade process or maybe more. This customer can be a possible representative for one of the clients of that commercial site or to its customers!

2) *Compare Products*

Despite the vast amount of unstructured data on the web, 'Keyword-search' is often the only way to find

needed information [11]. In this case, there exists a large group of various products that result from searching for products on different sites. Some consumers may find it difficult to compare the features and specifications of the product from one site to another. In one of the stages of the purchasing process, the customer needs to determine the most suitable product for his/her needs. This is done by evaluating the different products through comparing the characteristics of the product that he/she wishes to buy as well as choosing the right price before buying this product.

However, the customer cannot compare this product with something similar to it in the same commercial site. Therefore, he may feel the need to visit other commercial sites. Each site is visited separately in order to compare with each other to help him make the final decision of the purchasing process or perhaps find the same product in another commercial site with best specifications; this will take more time on the customer's behalf by wasting his/her efforts, afterwards resulting in the customer registering with another commercial site.

3) *Process (Advanced Search)*

One of the main obstacles in e-commerce is that it is not easy for customers to search for relevant information about the products they want [12].When a customer searches for a specific product using traditional search the result contains a huge number of products, making it difficult for the customer to review and check each of the search results. Even the outcome of the advance search is vague and inaccurate. With using general search, the search is non-specific in terms of characteristics and qualities, and this causes the frustration, loss of time, and more effort for the customer.

III. METHODS

This section is the architectural design proposed for the databases using My SQL. The figure (3) below is architectural structure, which represents the logical schema.

Through the design, we will be dealing with all the cases that are mentioned above, which are supported with the database table and it include:

1) *The payment method*

There are various proposals for EPS the vast majority have been failed to achieve, rely on a large scale. Reasons for non-success of some of the proposals and others fail remains unclear [13]. After that product has been selected to be bought by the customer, the system of payment will automatically divide the total amount to be optional through the mechanism of a payment-plan. It contains several methods of payment such as (Credit Card, Internet Bank or on delivery ... etc.). If we take an example of payment process, which is in the form of three payment parts:

● The first part of payment can be by card credit for example, using 30% of the total amount.

● The second part of payment via the Internet Bank uses 40% of the total amount.

● The remaining part of the total amount can be paid via delivery.

The customer is also free to choose one method or more depending on his payment plan. The payment will vary in terms of percentage of each payment method depending on the customer's credit situation in each method. In this way, we achieve flexibility in terms of paying through the different payment methods. The following tables facilitate this flexible payment process:
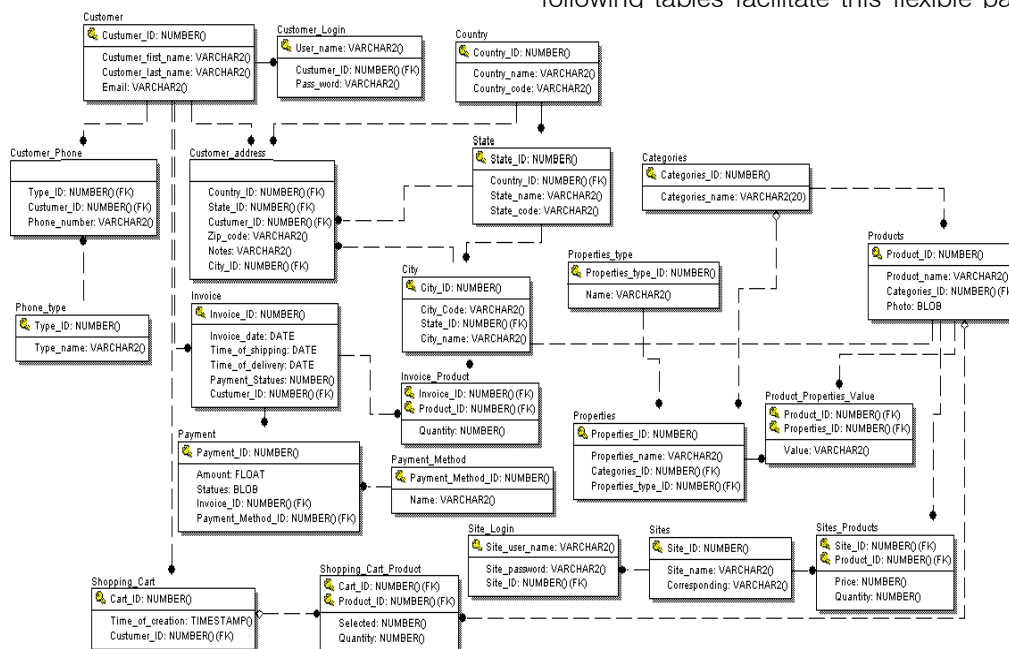

Figure 3.Logical Schema

Table1- Payment table schema

SNO	NAME	TYPE	DESCRIPTION
1	Payment_ID	Number	Primary key for Payment
2	Invoice_ID	Number	Foreign key from Invoice
3	Payment_Method_ID	Number	Foreign key from Payment Method
4	Amount	Number (float)	
5	Statues	Number	

Table2- Payment Method table schema

SNO	NAME	TYPE	DESCRIPTION
1	Payment Method ID	Number	Primary key for Payment Method
2	Name	Varchar	

2) Compare Products

Electronic commerce is the area that requires ontology mapping on product comparison over different product classification taxonomies of various shopping malls [14]. The customer will browse/search and select the products that he wants to compare. Then he may choose to compare selected products. The system will show the selected products side by side, so the customer can easily see the differences. These products can be from more than one commercial site and different manufacturers. In addition, the view contains information about whether this product is genuine or not.

Because the home site contains several commercial sites there is no need to go out of it and look at other business sites, so the comparison process between the same products will be faster and easier to use so the client can save his time and efforts. The following tables facilitate this process:

Table3- Products table schema

SNO	NAME	TYPE	DESCRIPTION
1	Product_ID	Number(int)	Primary key for Products
2	Product_name	Varchar	
3	Category_ID	Number	Foreign key from Category
4	Photo	Blob	
5	Site_ID	Number	Foreign key from Sites

Table4- Product Properties Value table schema

SNO	NAME	TYPE	DESCRIPTION
1	Product_ID	Number(int)	Foreign key from Product
2	Properties_ID	Number(int)	Foreign key from Properties
3	Value	Varchar	

Table5- Properties table schema

SNO	NAME	TYPE	DESCRIPTION
1	Properties_ID	Number(int)	Primary key for Properties
2	Properties_name	Varchar	
3	Categories_ID	Number	Foreign key from Categories
4	Properties_type ID	Number	Foreign key from Properties_type

Table6- Properties_type table schema

SNO	NAME	TYPE	DESCRIPTION
1	Properties_Type_ID	Number	Primary key for Properties type
2	Name	Varchar	

Table7- Categories table schema

SNO	NAME	TYPE	DESCRIPTION
1	Categories_ID	Number	Primary key for Categories
2	Categories_name	Varchar	

3) *Process (Advanced Search)*

When pressing the button (Properties-based Search) the customer will enter the specific characteristics. He can search using a specific value for the property or a specific range (For example: colour of the product: black - price: 100-200 ... etc.).He can leave the other properties without conditions, when pressing the button (Search). The search results will be shown in an acceptable manner, correct, and 100% accurate. Here, the client will get exactly what he wants from using a precise search.

Here we mean that the search process is based on the characteristics of the product itself. Because there are different product categories, the characteristics will vary. Properties-based Search will be for different properties and characteristics and not for specific category. Nevertheless, according to the category of the product and not like other commercial sites, the search result will be precise in achieving the customer satisfaction along with excellent service of the Site.

IV.   PROJECT IMPLEMENTATION

C# language in Asp.net technology is used to construct and implement this project. C# language is feathered by Asp.net and gives the user the ability to design an Internet website.

As we can see in figure (4) which represents the main page of the E-Hyper Market, it contains a large number of goods and products. If the site owner is a member and is registered in this commercial site, he can be granted access by entering his name and password. Then, he will have the ability to delete, add, and modify the information of goods that belongs to his site. This information for example can be quantities, specifications, prices and other information.
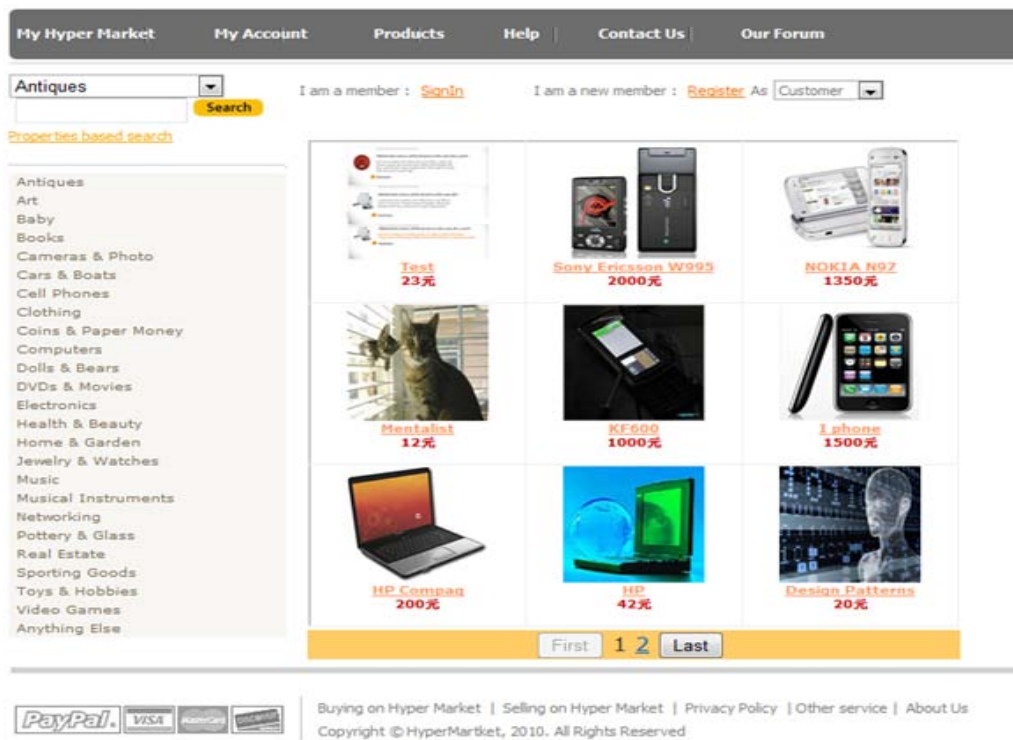

Figure4- The main page of E-Hyper Market

However, if he is not a member or he is not registered then he can register on this commercial site after getting the approval from the administration of this site.

For the customer, he can visit this site or register on it. In addition, he can visit one of the commercial sites which is affiliated to the E-Hyper Market through the link that appears under the name of each product that belongs to one of these companies.

After presenting the contents of the home page, now we will turn to the three cases mentioned above.

1) *The payment method*

Generally, EPS can be classified into four categories: Online Credit Card Payment System, Online Electronic Cash System, Electronic Cheque System and Smart Cards based Electronic Payment System [15].

After the customer chooses the product that he wishes to buy and reaches the payment phase, the customer has to establish his own payment plan. Figure (5) shows how to implement and choose the multiple means of payment (Credit Card, Internet Bank, on delivery…..etc.)
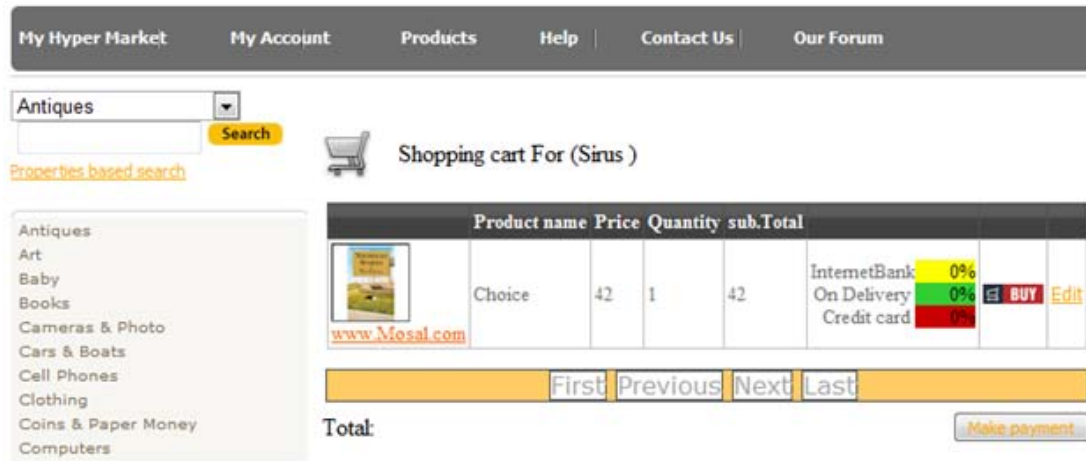
Figure5- Empty Payment-Plan

For example, if the customer decided to pay 25% of the total amount for the price of the product by credit card and 25% by Internet Bank and the remaining 50% through on delivery the payment plan will materialize in the following format figure (6).

Figure6- Payment-Plan example

Yellow Colour: Internet Bank: 10.5 $
Red Colour: Credit Card: 10.5 $
Green Colour: On Delivery: 21$
This payment plan would be changeable depending on the possibility and situation chosen by the customer.

2) *Compare Products*

The study results show that people are inclined to use featured information paths when they are given the vertical disposition style and product information paths when they are given the horizontal disposition style [16].After the customer finishes his process research and selects a set of products to compare by displaying all the characteristics and qualities that have been selected, he then facilitates the comparison among them as in the following figure (7).
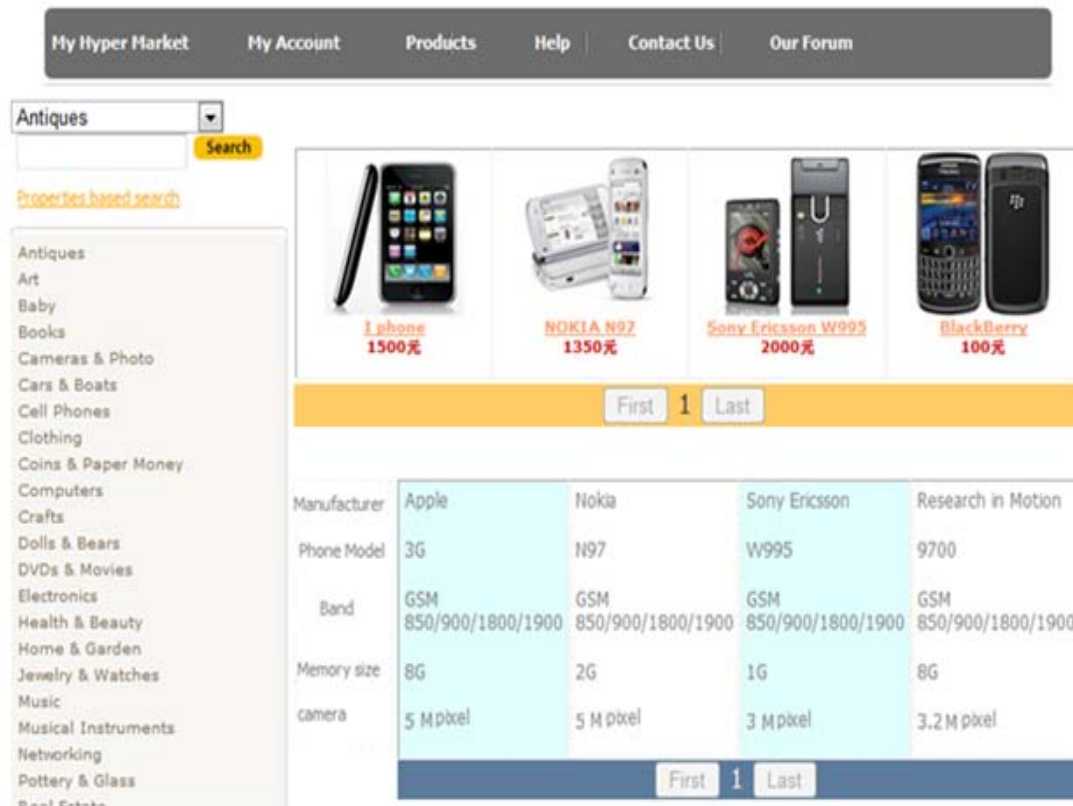
Figure7- Comparison between Products

3) *Properties-based Search*

The customer reviews the properties in detail by typing in the text box, or chooses values from a specialist for each property after selecting the category of the product. For example, searching for a book as shown in the following figure (8).

Figure8- Properties-based Search

Then click on the search button to obtain the search results as accurate as shown in the following figure (9).

Figure9- The result of Properties-based Search

V. Conclusions

The aim of this article is to design and build an E-Hyper Market on the Internet, which integrates a large number of commercial sites. The purpose is to attract and entice the largest number of customers as much as possible.

Moreover, facilitate the purchase process in order to increase of the percentage of sales (retail) for this commercial site, thereby increasing the profits of the companies and the factories that contribute to the success of the commercial site through the following:

1. Flexible payment process by dividing the total amount of the product that will be bought to a number of payments methods that fits each customer (Credit Card, Internet Bank, on delivery…etc.), given that E-payments help in avoiding long queues and other hassles and provide freedom for individuals to pay taxes, licenses and fees.
2. 2-Gain time and save effort for the customer and assisting him by facilitating the comparison between different products in terms of specifications and characteristics of the product that he wants to buy before beginning the purchase process.
3. 3-Properties-Based Search method was introduced. It searches accurately depending on the characteristics and specifications of the product according to the product category.

ASP.NET is used as a programming language to build this project, and MY-SQL is used as a database engine. With the extra services that this commercial site renders; it will be more flexible and easier to use when comparing with other similar sites.

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