

Applying Electronic Commerce for a Proposed Virtual Organization

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Abstract
Virtual organization is similar to traditional organization in principles, but is different in the ways it operates. It requires small creation costs compared to the traditional and it uses electronic commerce as the market place and distribution channel for its products and services.The aim of this article is to applying electronic commerce for a proposed virtual organization. The tools used to build an effective web application for virtual organization to provide virtual environment to the customers to do the transaction activities online include PHP, MySQL and Apache. HTML is used for displaying forms and tables and JavaScript is used for verification in client side. Finally, connecting it to 2Checkout.com company as a third party to perform the financial transactions in a secure manner. The system has a protected database by encryption and password with simplified administration to manage all activities without the need for any experience in programming and designing. Using a trusted international electronic money transfer company can be an essential assuring step.
Keywords: Virtual Organization, Electronic Commerce, 2CO, Web application.

1. Introduction
Electronic Commerce (EC) in a broad sense is the use of computer networks to improve organizational performance by Increasing profitability, gaining market share, improving customer service and delivering products faster (Inma R., Antoni M. & Jordi V. 2008).

As applying EC to organization has numbers of advantages it also has limitations these include reliability, security issues and difficulties in policing the internet (Rana T. 2003).

The Virtual Organization (VO) is a process of finishing necessary work out of the company (Ivan T. 2003). It uses EC as the market place and distribution channel for their products and services; and it requires small creation costs compared to the traditional organization (Bogdan G. & Marian S. 2003)

2. Aim of the article
The aim of this article is to applying electronic commerce for a proposed virtual organization which would help to decrease the role that the intermediary personnel need to play, thus decreasing the cost of supplied services.

3. EC organizations
Physical organizations are referred to as brick-and-mortar organization (old-economy) that perform their primary business off-line, selling physical products by means of physical agents, whereas companies that are engaged only in EC are considered virtual or pure-play organizations. Click-and-mortar (or click-and-brick) organizations that conduct some EC activities, usually as an additional marketing channel. Many brick-and-mortar companies are changing to click-and-mortar (Efraim T., et al. 2010).

4. Basic functions of EC (Bogdan G. & Marian S. 2003)
Due to its concern with VO:
1- Electronic commerce is a distribution channel: when EC is seen as distribution channel, the emphasis lies on the medium. This means that products or services are distributed over a channel, which differs from the ordinary. Several products and services lend themselves to this:
- Products or services that are electronically transferable such as insurance policies and digital information goods such as news, articles, digital images or music, allow perfect copies to be created and distributed almost costless via the internet.
- Products or services that have a relatively low added value and whose quality does not have to be assessed visually or manually (books, CDs).
2- Electronic commerce is a market place: seeing EC as market place implies a totally different view of marketing, giving pride of place to informing and communicating between all parties, sellers, advisers and (future) buyers.

5. EC benefits and limitations to organizations
A. EC benefits to organizations (Efraim T., et al. 2010)
- Global reach: means locating customers and/or suppliers worldwide, at reasonable cost and fast.

- Cost reduction: lower cost of information processing, storage and distribution.
- Facilitate problem solving: solve complex problem that remained unsolved.
- Supply chain improvements: reduce delays, inventories and cost.
- Business always open: open 24 hour /7 days; no overtime or other costs.
- Customization/personalization: make services to consumers' wish, fast and at reasonable cost.
- Seller's specialization: seller can specialize in a narrow field such as dog toy. - Rapid time-to-market and increased speed: expedite processes; higher speed and productivity.
- Lower communication costs: the internet is cheaper than Value Added Network (VAN) private lines.
- Efficient procurement: saves time and reduces costs by enabling e- procurement.
- Improved customer service and relationship: direct interaction with customers and better Customer Relationship Management (CRM).
- Fewer permits and less tax: may need fewer permits and be able to avoid sales tax.
- Up-to-date company material: all distributed material is up-to-date.
- Lower cost of distributing product: delivery online can be percent cheaper.
- Provide competitive advantage: innovative business models.

B. EC limitations to organizations (Rana T. 2003).

1- Lack of sufficient system security, reliability and standards

2- Rapidly evolving and changing technology, so there is always a feeling of trying to catch up and not be left behind.

3- Under pressure to innovate and develop business models to exploit the new opportunities which sometimes leads to strategies detrimental to the organization. The ease with which business models can be copied and emulated over the internet increases that pressure and curtails longer-term competitive advantage.

4- Facing increased competition from both national and international competitors often leads to price wars and subsequent unsustainable losses for the organization.

6. The concept of VO

A standard dictionary defines virtual as being in essence or effect, not in fact; not actual but equivalent. In the organizational domain, this effect not fact can instantiate in an impression that there is what customarily is presumed to be an organization, while in fact there is no such a thing (Bob T. 2005).

Researchers are described VO by pointing out the following characteristics:

- VO is a dynamic network and the membership in VO can be dynamic. This is related to the fact that organizations or individuals can enter and leave the network at any time (Kristoffer J. 2004).
- Virtual organization extensions can be created on the back-end of the buyer organization (virtualized supply processes in a virtual corporation), front-end of the seller organization (virtual storefront) (Bob T. 2005).
- Virtual organizations take advantage of IT to facilitate several organizational design variables that often require electronic storage and sharing of information among firms (Jinyoul L., et al. 2007). IT allows the work to take place at any time of the day (24 from 24 hours), in any location and that connects people and information no matter of their location (Hortensia G. 2008).
- VO is more widely distributed geographically than the traditional organization. This geographical distribution adds certain challenges that traditional organization might not face (Bob T. 2005).

7. Issues and challenges faced by VO

Although VO has lots of benefits, it also has certain key issues such as:

a- Technical issues

- Capability of the communications network: as VO needs the support of internet to show its process, performance and existence, its efficiency and effectiveness would be affected by the potential constraints and problems on bandwidth especially during the transmission of data (Moshabaki A. & Alla T. 2010).
- Computer security: if any critical information of the organization is stolen, it might cause unwanted problems to the organization. Due to these problems, a level of security system is needed (Moshabaki A. & Alla T. 2010).
- Evolution of technology: technologies are developing and changing rapidly. This could affect the value of the VO as it is mainly based on the functions and characteristics of the hardware and software to perform the tasks (Nazim A., et al. 2010).

b. Communication issues

This is related to human factors. It would lead to inefficiency and ineffectiveness in the performance of virtual team if the received messages by other virtual team members are being misunderstood or vague (Nazim A., et al. 2010).

c. Managerial issues

Managers are able to monitor employees in the office of the traditional working while in a VO it is hard to monitor employees and their work progression, so it is necessary to define the job roles and responsibilities of

each individual more clearly to reduce work duplication and to ensure no key job requirement is missing (Gail T. & Monica T.2006).

8. VO interfaces

Virtual organizations are using interfaces not only to capture but also to build relationships with their desired markets. A clear understanding of how best to design effective interface is therefore vital. Most users choose online shopping because of its convenience. Therefore, it is important to have a good interface design to guarantee users are having a positive online shopping experience (Felix B., et al. 2009) (Noorfadzilah M., et al. 2010).

Several studies have proposed rules and guidelines for designing effective EC interface, some of these guidelines are:

Home page/page format: Since home page will be the landing page, it is crucial to design it nicely to attract users. There are some rules in designing home page:

- Make uses of fewer colors, do not uses italicize and underline font, and do not let too many adverts on your site (Noorfadzilah M., et al. 2010) (Natalie M. 2008). Besides, web page should be clean and not cluttered with text and graphics. The width of a page should be less than the width of the browser window to avoid horizontal scrolling (Xiaowen F. & Gavriel S. 2003).
- Navigation: a good navigation design will make it easy for the users to move through the site (Jason W. 2008).
- Product catalog: Products are presented as images with text descriptions, prices and product options. The website must never require users to register to see these products. Users must be allowed to get directly into the product catalog without performing extra steps (Noorfadzilah M., et al. 2010). The organization of the product is crucial because users look at the first two or three pages of a list of the products (Yenny P. 2011).
- Search function: the search function must be visible and easy to find. It will be better to give users more ways to navigate in the site (Yenny P. 2011).
- Shopping cart: It is defined as an order processing technology that allows customers to accumulate items they wish to buy while they continue to shop. The best location to place the shopping cart is at the right top area (Penelope M., et al. 2005).

(Efraim T., et al. 2010) has derived additional set of guideline related to performance (speed) and website usability.

- Performance (Speed): the critical factor that is under the control of the web designer is the content and design of the page. The most widely recognized cause of long download times is a large graphic or a large number of small graphics on a single page. Create graphics at the lowest possible resolution so that the visitor can clearly see the picture, art, or icon so that the graphic file is only a few kilobytes in size.
- Website usability: in general, usability refers to how well users use a product or a website to achieve their goals. If a website is difficult to use, people leave. This results in negative financial performance.

9. Hypertext Preprocessing (PHP)

PHP is a server-side scripting language that lets user insert into his/her web pages instructions that the web server software (such as Apache, or IIS) will execute before it sends those pages to browsers that request them (Kevin Y. 2004).

There are several advantages of server-side scripting:

- No browser compatibility issues: PHP scripts are interpreted by the web server and nothing else (Xiaosheng Y. & Cai Y. 2010).
- Access to server-side resources (Kevin Y. 2004).
- Reduced load on the client (Xiaosheng Y. & Cai Y. 2010).

ASP.NET and PHP are the most popular of the website development (Xiaosheng Y. & Cai Y. 2010). According to BuiltWith statistics on 12- 11- 2014 there are **38,180,983 live** websites using ASP.NET, while there are **43,592,691** live websites using PHP (http://trends.builtwith.com/framework 2014).

10. MySQL

MySQL is a Relational Database Management System (RDBMS). It is the most popular open-source database in the world, that its software can be used and modified by anyone according to their needs (Larry U. 2008). It is used because customers need to be able to get information about a vendor's products and services, ask questions, select items they wish to purchase and submit payment information and vendors need to be able to track customer inquiries, preferences and process their orders (Morrison M., et al., 2002). There are several advantages of MySQL:

- It is fast and easy to use. To improve the performance, MySQL is multithreaded database engine (Kevin Y. 2004).
- Flexible: no matter what operating system is running, chances are MySQL has been covered (Jason W. 2008).

11. Electronic payment systems

An electronic payment is defined as payment services that utilize Information and Communication Technology (ICT), including cryptography and telecommunications networks Veronica S., et al. 2011).
Electronic payment system is conducted in different EC categories. Two main issues need to be considered under the topic of payment security: what is required in order to make EC payments safe and the methods that can be used to do it (Singh S., (2009).

12. System structure

A proposed web application of electronic commerce for virtual organization has the structure shown in Figure (1) and Figure (2).

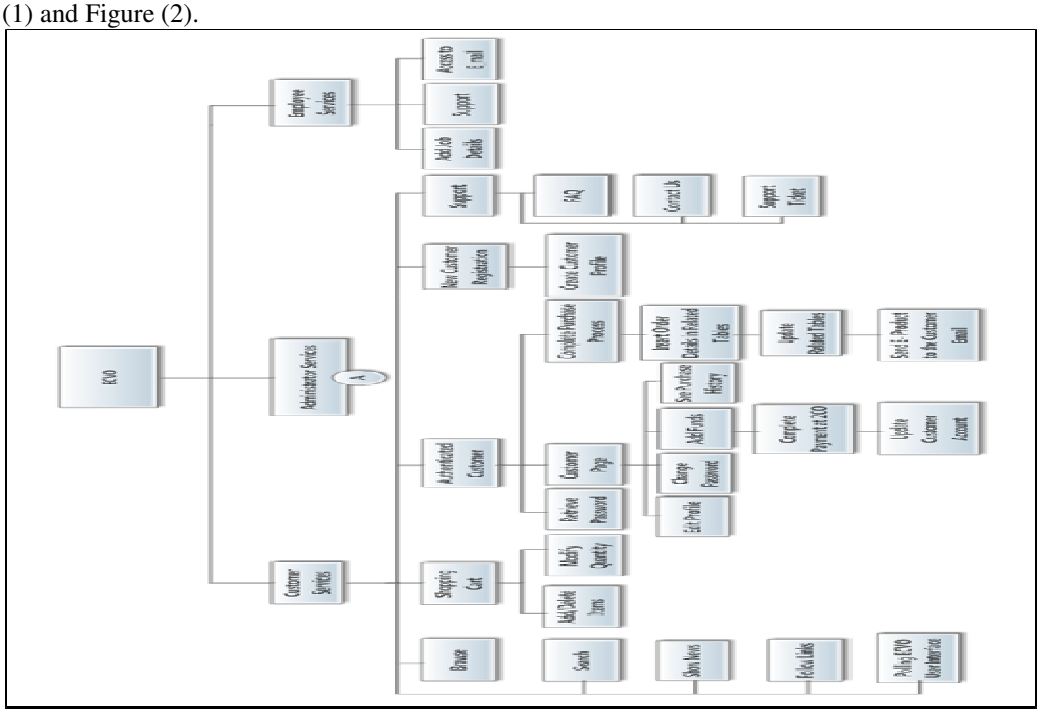

Figure 1. System structure.

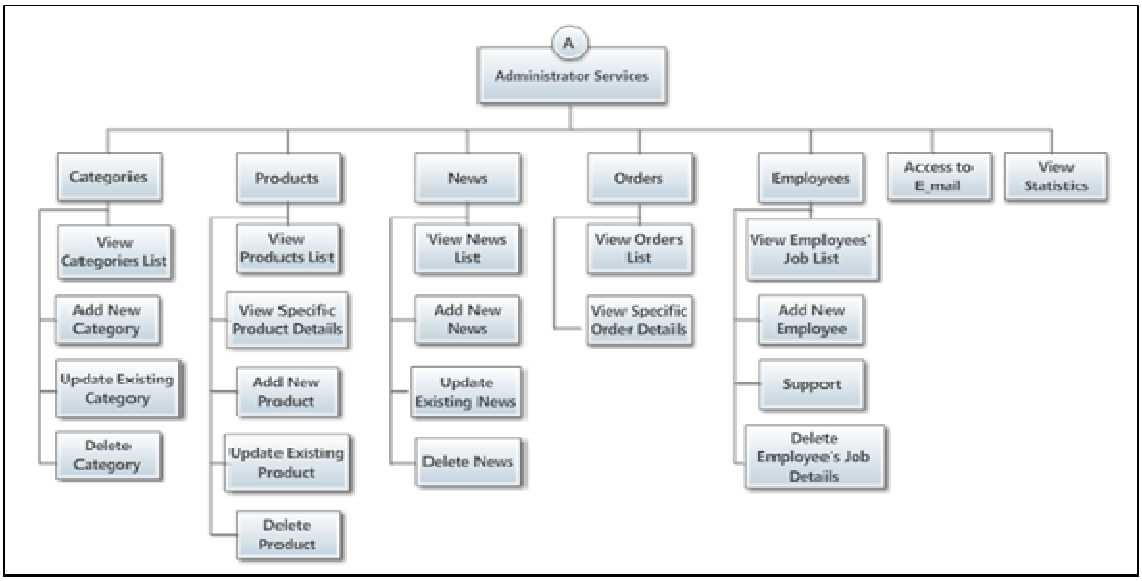

Figure 2. Administrator services.

Figure 3. User's main page.

Guest: default role which represent every non-authorize user. This role allows the user to browse the full offer of the web application site, access to the shopping cart, uses the products finder and gets support. It also allows registering in the system and polling the users' interface. Figure (3) shows user's main page.

Customer: has the same functionality as a guest but extended to possibility to buy products, retrieve password, access to his/her special page to browse history of his/her shopping, modify profile, change password and add funds in his/her account. This is important because he/she allowed purchasing items only when he/she has enough money in his/her account. Add funds page is shown in Figure (4). When the authenticated customer chooses how many amount of money from the options available in this page, then he/she will be redirected to 2 Checkout (2CO) company as shown in Figure (5) to add the money in a secure manner. Every customer has to register to the system to have access to these functions. Customer in any moment can log out from his/her page.

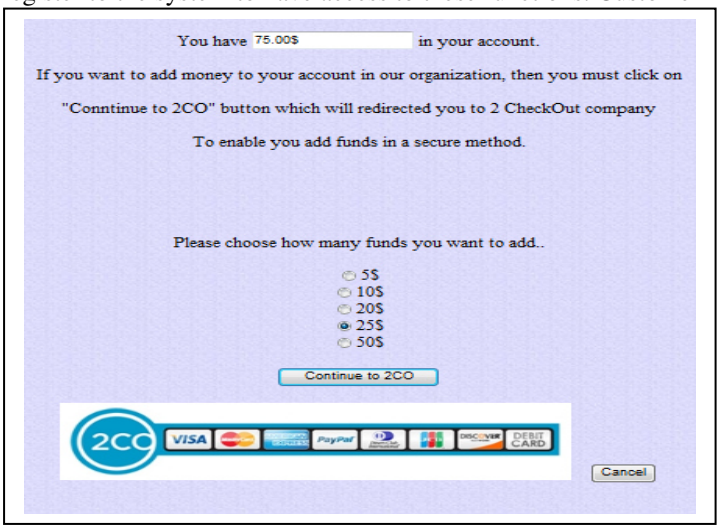

Figure 4. Add funds page.

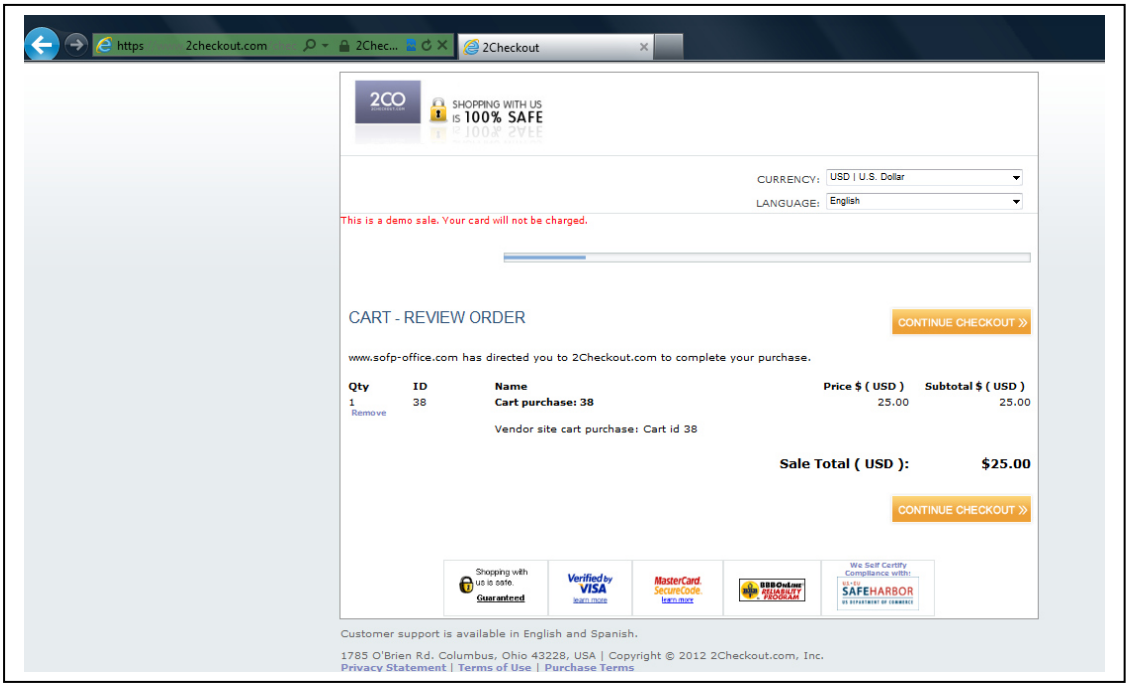

Figure 5. Redirecting authenticated user to 2CO.

Employee: the employee must first login through individual Uniform Resource Locator (URL) address. This role entitles:

1. Technical employee: This has the ability to solve problems such as payment problems and error messages.
2. Customer-support: employee has special control on the system and has the ability to interact effectively with users inquiries.

The employee's job page is shown in Figure (6):

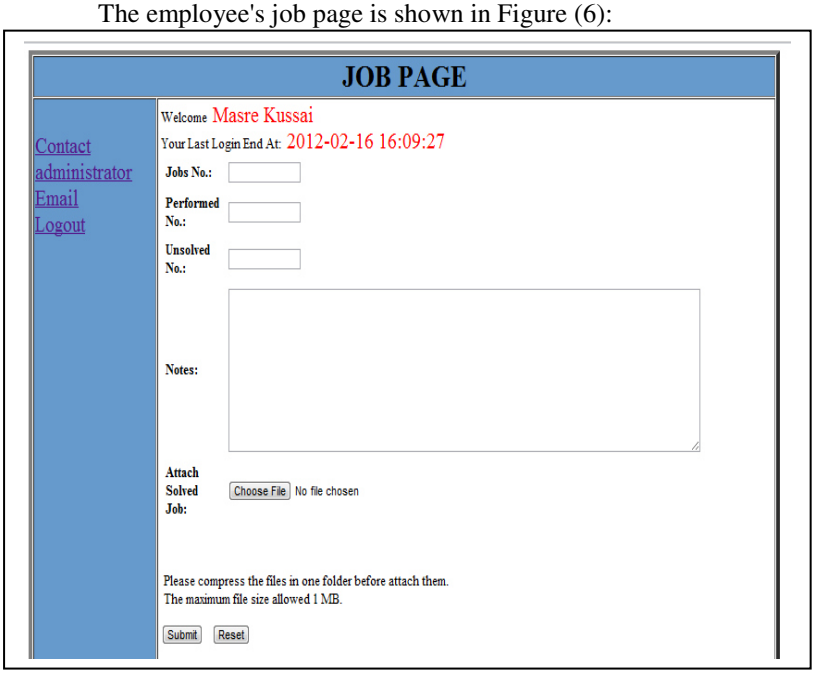

Figure 6. Job page.

Administrator: access to administrator main page is possible through individual URL address and access to it requires first logging in.

This role entitles managing the following:

- Category: adding a new category, viewing the list of all available categories, updating category information, removing a category image, or removing a category which in this case removing first all products in it and finally removing a category.

- Product: inserting new product into store, viewing the list of all available products in all categories, or viewing them grouped by specific category, viewing specific product details, modifying product information, removing product image, or removing a product from the store.
- Orders: viewing the list of all orders, or specific order details.
- News: inserting new news that appears in the news bar of users interface, viewing all the news which currently appear in news bar, modifying news information, or removing the oldest one.
- Employees: adding new employee, viewing list of employees with their completing job ratio, deleting an employee's job, making video or audio calls with them and answering their inquiries via phone or email.
- Email: the administrator can check his/her email.
- Statistics: viewing statistics about visitors (number within limited period, which pages they visit, which web browser they used, visits duration and from which countries).

Since the VO for this work is small ones, the person who is in charge of administration is essentially the same one who performs the duties of a manager. But for large VO, these are two different posts that carry separate rights and functions. The administrator main page show in Figure (7).

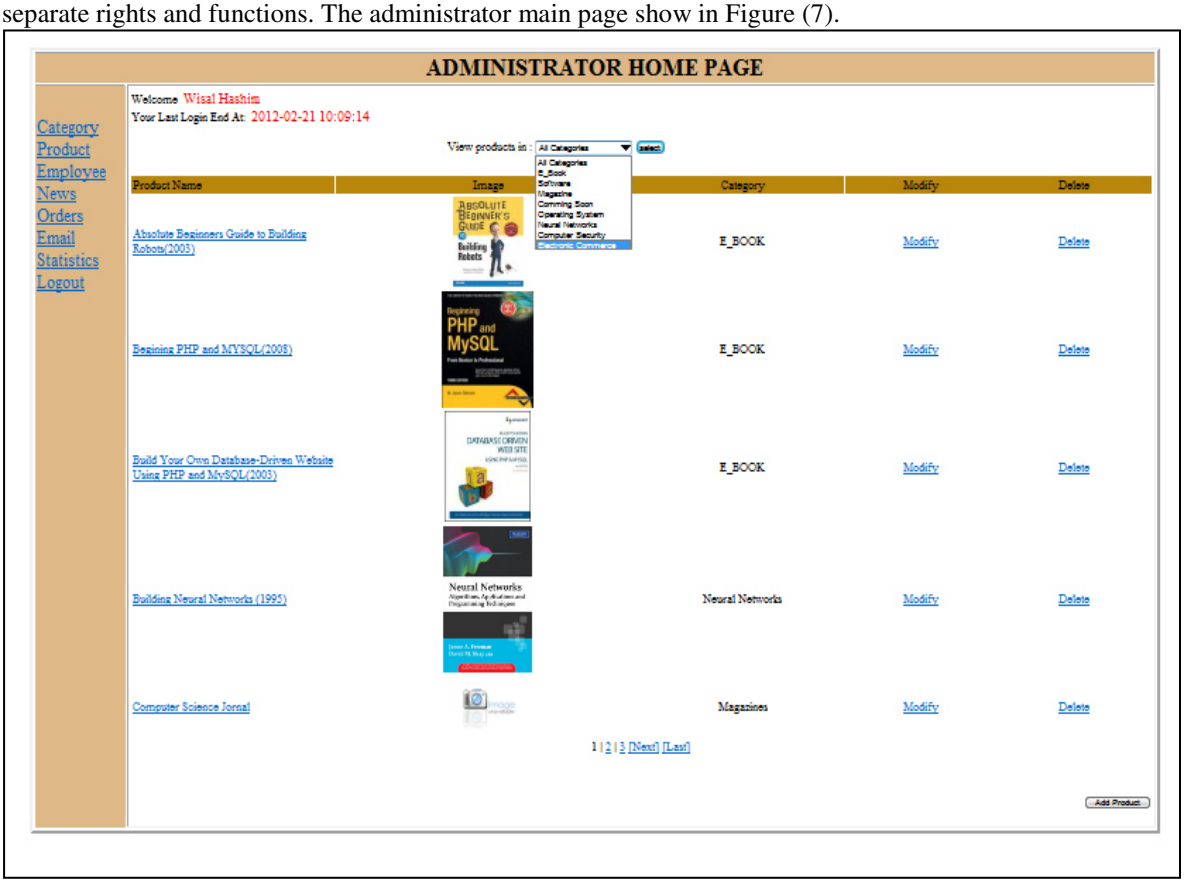

Figure 7. Administrator main page.

13. Financial transaction

When a customer wants to buy a product, a check page appears to a customer.
The steps of the check process are:

1. Check the "customer" to see if this is a registered person or not.
2. If this is not a registered person then rotate him/her to new customer registration page.
3. If this is a registered person then check the "customer" to see if he/she has enough money in his/her accounts to buy what he/she intends to buy.
4. If not, show him/her failed page.
5. If yes, insert the order details in the related tables, and a thanks page will appear.
6. Send e-products to the customer email to download them.

When the customer wants to add money to his/her account then he/she will rotated to 2CO company. The main reason for choosing this company in addition to using SSL certificates is the variety of payment methods that this company provides and it can deliver money to many countries including Iraq.

2CO company requires opening a merchant account which in turn requires first time registration in their system (which is free) and completing all required information pages and finally paying the fee of opening this

account. From this account, the administrator opens a wizard bank account which is necessary to allow the organization to receive its money. Reaching this company is made through the path http://www.2checkout.com.

After the customer completes the payment process at 2CO, the company sends two immediate emails-notices one to the customer and one to the administrator. When the administrator receives this message, then he/she updates customer account and sends a confirm message to the customer email about his/her account. From this moment, the customer can use his/her account to complete purchase process.

14. Conclusions

From the work several conclusions can be drawn, they are:

1. It represents a future opportunity for self-employment market, because its financial requirements are not large and so it can help people to begin their small online work, since it requires a small budget, a reliable internet line and a good knowledge of certain web development language.
2. It is simplifies administration and therefore, allows users of all skill levels the opportunity and means to update assigned sections in different areas.
3. Changes in environment do not usually affect it, because it is relatively easy to switch to other options.
4. Using a trusted and affordable international electronic money transfer company to complete the payment transaction in a secure way is an essential step to assuring parties, the customers and the seller. In this work, 2CO company was chosen. In addition, the system has a protected database due to the use of encryption technique for its sensitive contents and it protects location where the database files are stored. It also used password and session to protect area of the organization, which is only available to those users approved to access secure contents.

15. Recommendations

Several points can be used to improve and develop the current system. These are left as recommendations for future work, which are:

1. Adding permission level so that one administrator can do everything, while others can only perform limited functions as add/update product and manage orders.
2. Explores the possibility of using more e- payment mechanisms.

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