

Platform for E-commerce in Ciudad Bolivar Locality

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Abstract— This paper presents the design of a platform of electronic marketing, aimed at the community of Ciudad Bolivar locality in Bogota Colombia. The platform allows the offering of products and services to local residents and aims to improve competitiveness and economic development of local enterprises; especially small and medium enterprises, allowing in the process the creation of new market opportunities and business objectives. Also in this paper is shown a socio-economic study of the Ciudad Bolivar locality, that allow the reader to be located in the society above which the platform is implemented, finally is submitted the structural design and application software deployed in a virtual server on the Internet.

Keywords—content management, electronic marketing, free software, ICTs, joomla, mysql, php .

1. INTRODUCTION

The Ciudad Bolivar Digital Locality agreement under the leadership of Francisco José de Caldas Distrital University was conducted during December 2009. 10,000 surveys in homes and 1,000 in stores were carried out at the 19th Ciudad Bolivar locality as a significant sample of a population of approximately 650,000 inhabitants.

According to the analysis of these surveys, three basic variables of the locality were found as representative of the necessities in this area: poverty, education and employment. The following results were obtained:

1. There is a very high level of poverty with 94% of the population belonging to 1 and 2 social layer; 5.3% of homes in the locality are considered to live in poverty by the UBN (Unmet Basic Needs); 0.5% of the people live in miserable conditions; 3.3% of the families in Ciudad Bolivar live in houses with inadequate conditions; 7.6% live in overcrowding conditions, and 1.7% have no school attendance.
2. The average of illiteracy is 4.6 %, being the second highest level between the 20 existing localities in Bogota.
3. In 4.5 % of homes there is high economic dependence [1].

Ciudad Bolívar has a particular environment which has allowed the development of service activities and the creation of an important trade center. Its main production activities are: food merchandising, groceries in general, drinks, tobacco, pharmaceuticals', dentistry products, medicaments, perfumery,

cosmetics, personal and cleaning products, hardware store, lock services, windows and glass manufacture, cookware retail, miscellaneous stores, suits, corsetiere's, shirts, food and drinks production, leather processing and tannery, amongst others.

Due to the aforementioned problems and taking into account the commercial activities, an initiative to design an electronic pilot platform for marketing of easy handling has emerged, which allows the offering of goods and services to the people in the Ciudad Bolivar Locality. This initiative also seeks to improve the development conditions of the same, especially of those small and medium enterprises. Some of the developments for electronic marketing are:

- In [2], a conceptual model for the application of the electronic trade for the SMES (Small and Medium Enterprises) in Mexico is proposed, which works as a basis for the application designed.
- In [3], many applications used for the solutions to the reinforcement of the trade model in the SMES are presented, among which can be found: an application in Colombia of virtual stores for SMES in high risk zones in Medellin; a platform for the pharmaceutical sector in Venezuela (TIC-FAR-VEN), and the introduction of a business and services platform for 240 pharmacies in Uruguay. These tools for information and communication technology attempt to improve integration of the SMES into the global market, enhance overall competitiveness, and to promote the innovation of business practices, the trade negotiation and the cooperation process.

2. TRAFFIC STUDY FOR THE PLATFORM

The study of data traffic is explained as follows, which may support the web platform.

1.1 Traffic analysis

The location of the website is on a net server which offers some characteristics like 1GB of disk space, 30 GB of data transfer per month, and a dedicated E1 channel.

The features of this service are modeled as a lock queue type M/M/N/N, due to the fact that it is a net service with a net server without queuing, and with the possibility to save N network elements with infinite population capacity [4].

To analyze a user who wants to publish information, there is a channel E1 of 2 Mbps (250 KBps) capacity and every announcement on the website has a size between 50 and 70 KB, as the images are reduced to a maximum size of 300 x 250 pixels before being published. The most critical moment comes when the publication requires 70 KB, reason by which the capacity of the network elements must be calculated with this information:

$$N = \frac{250 \text{ KBps}}{70 \text{ KB}} \approx 4 \quad (1)$$

This system is designed for a Blocking Probability (PB) of 5%.

Therefore for $N = 4$ and $PB = 5\%$, the offered traffic is $A = 1.5$ Erlangs.

The system is designed to support a high traffic per user (A_u), of approximately 0.003 Erlangs, which corresponds approximately to 87 publications in one day per user. Therefore the maximum number of simultaneous users that the website may support is the following:

$$U = \frac{A_c}{A_u} = \frac{1.5 \text{ Erlangs}}{3 \text{ mErlangs}} \approx 500 \quad (2)$$

1.2 Maximum Publications per Month

One of the limitations of the contracted browsers is that it allows a maximum of 30 GB for the monthly transference to the browser, taking into account this information and the traffic analysis the number of publications per month in the website can be estimated:

$$\text{Quantity Publications} = \frac{30 \text{ GB}}{70 \text{ KB}} \approx 428571 \quad (3)$$

3. DEVELOPMENT OF THE PLATFORM

In this paragraph the technical requirements and the design methodology for the platform of virtual marketing can be known.

A. UML Modeling

UML (Unified Modeling Language) can be used to model different system types: software, hardware and real world organizations. UML offers nine diagrams among which can be found the static or structural models, as well as the dynamic models and those of interaction. For the structural model the diagram of classes is specified, given that it fixes the characteristics of the object oriented programming, and in the model of interaction is described a model of a diagram of specific sequences detailing the dynamic relationship between the web and the users [5].

4. CLASS DIAGRAM

In Fig.1 the class diagram of the developed website is described, in which the different classes, attributes and relations involved in the design of the website can also be described. As the main class can be found "Website My Market" and so parting from it classes like "users", "modules", "components", "plug-in", "language" and "templates".

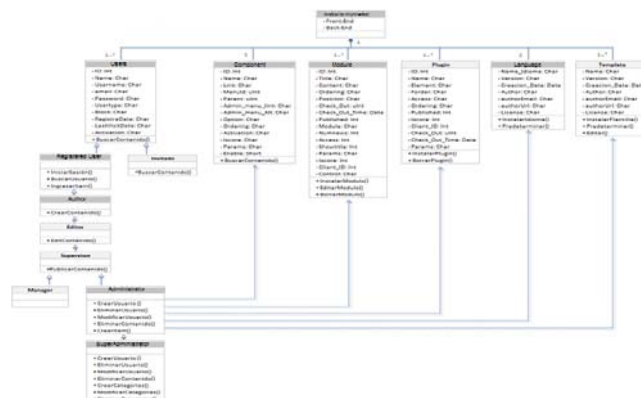


Figure 1. Class diagram used in the design of the Platform of Electronic Marketing

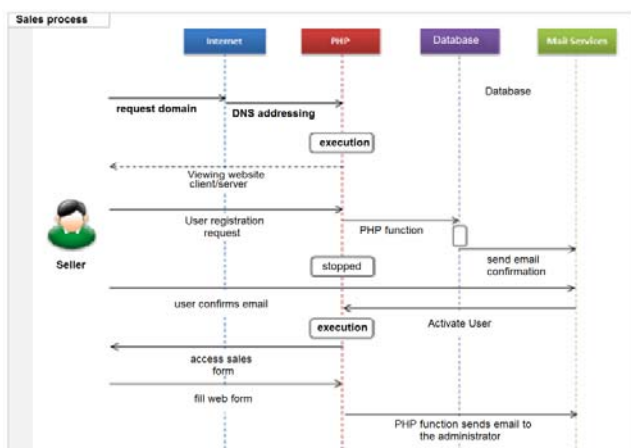
Six classes that interact with the Front (visualized page by the user) and the Back (Administration management space) are established, in each one of them there are attributes, and public and private operations.

5. SEQUENCE DIAGRAM

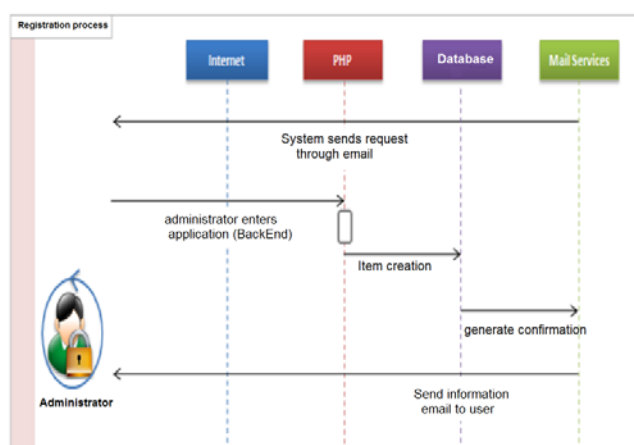
To describe the behavior of the website regarding the flow control and data between the elements in the modeled system, a sequence diagram, considered a selected interaction diagram, is used as long as it contains details of the scenery implementation, including the objects and classes used to introduce it, and the interchanged messages between the objects.

In Fig. 2a, the sequence diagram illustrates specifically the sales process, where it can be observed how the salesman interacts with the different objects in the website and how after an application process of DNS (Domain Name System), he accesses the PHP code (Hypertext Preprocessor) to enter the site [6], and subsequently makes a requirement for registration to create a user in the database. During this process an authentication of the e-mail account registered by the new user is made. After a confirmation of the registered e-mail account, the user activates in the database and gets the required privileges for any desired publication.

In Fig. 2b the registration process for the new users and products made by the administrator of the application is shown. For this procedure the administrator counts with a tool (Backend) to facilitate and accelerate the administration tasks.



a)



b)

Figure 2. Sequence diagram UML for: a) The Publication Process and b) The Registration Process

In Fig. 3 the sequences diagram which describes the sale process can be seen, and the integration process between the system and the users during the purchase of articles published previously can also be observed. First, the potential customers enter the application on the Internet and search for the articles they might be interested in, during this process the user interacts with both the PHP code and with the database. As the customer can also consult all articles included in the application, after they determine their purchase, they can get some information to allow the contacting of the user that originally established the publication of the product.

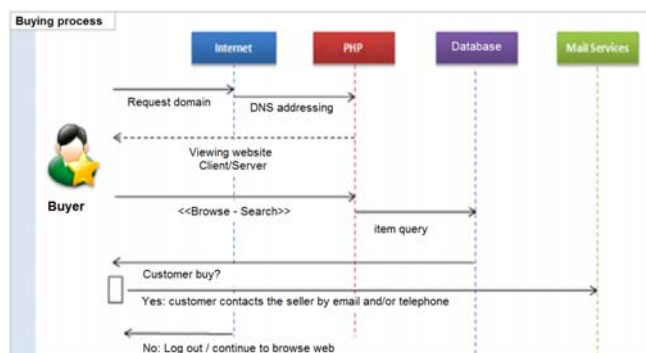


Figure 3. Sequences diagram UML for the purchase process used during the design of the Platform of Electronic Marketing

6. FUNCTIONAL STRUCTURE OF THE PLATFORM

This map allows visualizing of the architecture of the pilot electronic marketing platform named “Mi Mercado” developed on the content management Joomla 1.5 [7], which works with PHP and one MySQL database [8], as is shown in Fig. 4.

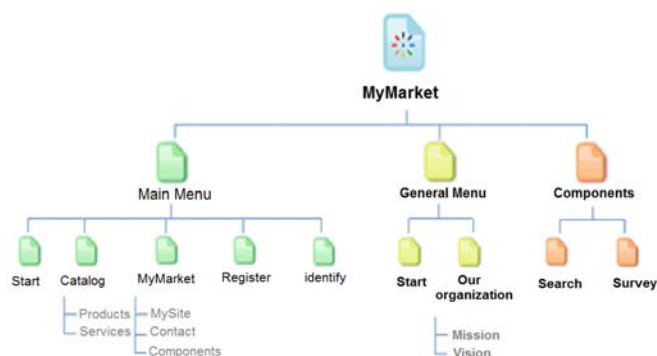


Figure 4. Functional structure for the Platform of Electronic Marketing

6.1 Design and development of the platform pages

Two fundamental parts form the platform:

The head (Fig. 5) and body of the site. Table I contains the explanation for each component in the head of the platform electronic marketing which are listed in Fig. 5.



Figure 5. Head of the platform on the front page

TABLE I. HEAD COMPONENTS DESIGNED FOR PLATFORM OF ELECTRONIC MARKETING

| # | Element | Morphosyntax | Semantic |
|---|-----------------------|--|---|
| 1 | User Menu | Four hyperlinks and system's date | It contains the add-ons referring the hyperlinks and system's date. |
| 2 | General Logo | It is located on the left top of the page, has no background and a PNG format. | It contains the initial link to the home page, it shows a text box with a help commentary indicating the function of the hyperlink, when placing the cursor on. |
| 3 | Browser | Text box with logo and information content. | <i>Ajax</i> function which searches the page content, when the user clicks the box, the predictive text disappears and the color background changes. |
| 4 | Main Menu | Boxes with gradient orange color and white. | Extended Menu by means of <i>Javascript</i> which allows visualizing hyperlinks. |
| 5 | Image Carousel | Box of 240x720 pixels, which allows reflecting images. | <i>Javascript</i> add-ons which changes the image into a carousel with 30 seconds for each transition. |

Fig. 6 shows the developed page body.



Figure 6. Body of the Front Page Platform

The add-ons corresponding to the page body in the platform of electronic marketing in Fig. 6 are explained in Table II.

TABLE II. BODY COMPONENTS FOR THE PLATFORM OF ELECTRONIC MARKETING

| # | Element | Morphosyntax | Semantic |
|---|--------------------------|-----------------------------------|---|
| 6 | Catalog: Services | 10 Subcategories with hyperlinks. | It contains hyperlinks to the services categories. |
| 7 | Catalog: Products | 10 Subcategories with hyperlinks. | It contains hyperlinks to the products subcategories. |
| 8 | Main Menu | Menu accordion type | <i>Javascript</i> function that shows submenus accordion type with an |

| | | | |
|----|-------------------------------|---|---|
| | | | opening and closing when clicked. |
| 9 | Main Article | Predefined text that can be formed with <i>cascade type pages</i> . | The main article is chosen from BackEnd to be located on the website. |
| 10 | Survey | It contains logo, question and four answers (2 buttons) | <i>Joomla</i> proper module that allows conducting and quantifying surveys; it limits the voting direct from the PC itself. |
| 11 | Who is On Line? Module | Visualizes the registered users in texts. | <i>PHP</i> Function that counts the connected users at the portal, both registered ones and visitants. |

7. RESULTS

To be able to measure the short to long-term impact of the results it was necessary to arrange training for forty traders, merchandisers, and service persons in the community of Ciudad Bolivar, where it can be observed by way of a survey, the improvement of the trade conditions for the inhabitants, with the use of a settled tool for electronic marketing. The results of the surveys were evaluated from the following questions:

The local traders were asked: Was it easy for you access to the platform? 80% of respondents found it to be easy, 10% to be slightly difficult, and 10% reported that it was difficult. This confirms the simplicity of the chosen model design for the interaction. In the same way traders were asked: Do you think this application can increase sales in your store? The results are shown in Fig. 7.

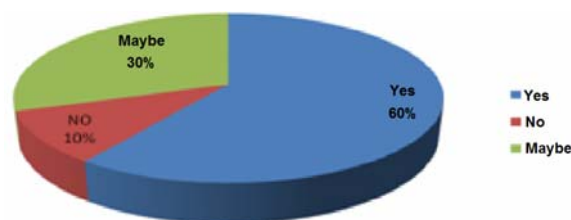


Figure 7. Results to the question: Do you think this application can increase sales in your store?

The local traders were also asked: What do you think, will be the impact of this application in your store to the market of your neighborhood or locality? 70% of the sample considered the impact is likely to be positive.

The answers to the question: What do you think will be the impact of this application in your store to the outside market of your neighborhood or locality?, are shown in Fig. 8.

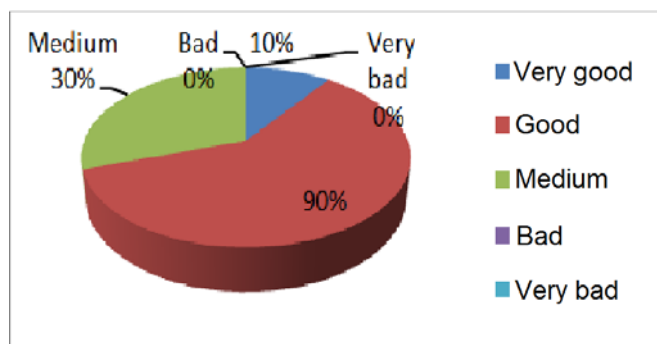


Figure 8. Results to the question: What do you think will be the impact of this application in your store to the outside market of your neighborhood or locality?

After carrying out the training, 60% of the traders considered that they might be able to interact in an independent way with the website and 40% think it likely to be done; however they considered that in case they felt uncomfortable with it, they would search for help at the tutorial section of the website.

The majority of the sample did not have advertisement for their stores on the internet and found the platform a good alternative to incorporate their stores in global marketing.

8. CONCLUSIONS

The web application allows the SMES and freelancers to offer services and products. By generating a more interactive and faster marketing environment, the application then becomes a tool which diminishes the unemployment in the local area.

On the other hand, the traders consider the platform as a useful tool for marketing, because through the Internet it is possible to find new clients.

A significant part of the economy in the locality is based on the SMES, which constitutes an income source to hundreds of families. Those groups manufacture quality products, but these have great deficiency in their administration processes, which carries as a consequence the loss of participation in marketing, of growing opportunities, and of the possibility to show their products to a greater and more varied customer field. In addition to that, one of the obstacles against the economic growth of these enterprises is the low income level of their clients, which leads to a lower sales profit.

Currently in the SMES there is a predominant lack of computers, and ignorance of the potential services that these can offer, which entails a technological delay, thus restraining the increase of competitiveness by the traders.

The generation of higher sales levels, to increase the income and to improve the life quality of the people, is one of the important issues in the locality. Since trading implicates for the SMES the development of operative and distribution processes or the assistance of intermediaries in the locality, the electronic marketing is seen as an alternative instrument to massively extend and encourage trade transactions of the products from the enterprises in this sector.

One of the main barriers to this project is the lack of resources to implant a massive diffusion campaign of the platform in the locality. In order to change that, it is proposed a gradual diffusion that takes advantage of others' initiatives and be supported by them, such as "The Interactive Portals from ETB (Bogota Telecommunications Company)", located in the locality.

Finally, it is recommended to measure the impact of the platform in the short and long term, to consider the implementation of new possible enhancements of the same.

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