

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & MANAGEMENT THE ISSUES OF CREATING WEB-APPLICATIONS IN E-BUSINESS

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ABSTRACT

The article presents the analysis of business processes in e-business. It describes the web-application model and structure, and a diagram reflecting business processes. The diagram was built in Diagram Designer software with the application of IDEF0 and DFD standards. The article concisely discusses the realization of web-applications in e-business assisted with CMS-system – WordPress

Keywords: *Business processes, technology of describing business processes, business process models, web-applications, architecture of web-applications.*

I. INTRODUCTION

Nowadays the development of e-commerce in Kazakhstan is in its very early stages. The popularity of online shopping has been increasing year by year, mainly because it is convenient for people to do shopping staying at home or office. One of the most attractive factors of online shopping, especially in big cities, is a lack of necessity to wait in a long queue or look for availability of essential commodities at stores.

Electronic business (e-business) has a great potential in our country and we should support and develop e-business by creating new projects, web-applications related to e-business in view of foreign countries' experience (the USA, China, Russia and etc.).

II. TECHNOLOGY OF DESCRIBING BUSINESS PROCESSES

Technology of describing business processes is a system of principles and standards allowing a scheme-building for enterprises' new and existing business processes. Three key methods of describing business processes are textual, table and graphic. The first two methods are rarely used nowadays, because they are considerably falling back presentation depicted graphically. Graphic presentation is the easiest to create and perceive among these three methods. Moreover, it presents an opportunity to analyze business processes targeted at their subsequent improvement, which is an objective of business process description.

Today there are a lot of technologies for business process description such as ARIS, IDEF0, SADT and etc.

Among the key standards of business process description are DFD (Data flow diagram construction) and WFD (Workflow diagram construction).

SADT stands for Structured Analysis and Design Technique, which assists integrating the modeling process, project configuration management, using additional linguistic means and project management, which has its own graphics language. The modeling process can be divided into several parts: expert survey, model and diagram creation, study of documents, model validation assessment and decision-making on their further application. This is a smooth-running process, since the experts must fulfill specific obligations and provide timely and correct exchange of information, while designing a business project. Nowadays the SADT technology is recognized as useful. Its part was published as a standard designed for functional modeling. This standard is a technology and standard of functional modeling and description of IDEF0 business processes.

IDEF0 (Integration Definition for Function Modeling) is a technology and standard for functional modeling and describing business processes. IDEF0 technology allows presenting the system studied in the form of block collection, which is functional and interrelated. The first stage of studying any system is business process modeling by methods of IDEF0 technology.

Business process is a collection of interrelated tasks aimed at offering a specific product or service for users. Block-schemes of business processes are applied as visual aids for graphical description of certain events.

As an example, I consider the stages of creating e-commerce systems as presented in Figure 1.



Figure 1 - Stages of creating e-commerce systems

At the first stage, formalization and decomposition of business processes of the domain are performed in IDEF0 notation. Performing the functional partitioning allows identifying the main business functions of the system and the hierarchy of business processes in accordance with the specified domain model. Functional decomposition is based on the analysis of the e-commerce system functions. This raises the question of what the system does, no matter how it works. The decomposition of business processes proceeds up to the level of elementary functions of minor significance, for example, user registration, filing an order, etc. At the second stage, the composition and structure of the database are determined. While creating database entities for e-commerce systems, it is convenient to use DFD notation, since such systems explicitly determine the data exchange, on the basis of which data storage media, their structure and connections are determined.

Currently, three types of business processes are distinguished:

1. Managing business processes that control overall functioning of the system, for example, strategic management or corporate governance.
2. Operating business processes that ensure revenues and are the basis of a company's business, for example, marketing, sales, supply, and production.
3. Supporting business processes that serve the core business. These include technical support, accounting and audit, staff recruitment.

Currently, there is one main rule for describing business processes, that is to describe only existing real processes by methods and algorithms that help perform tasks an organization has. The characteristics of primary and secondary inputs and outputs of business processes are shown in Figure 2.

Элемент	Определение и характеристики
Первичный выход	Основной результат, ради которого существует бизнес-процесс. Определяется целью, назначением бизнес-процесса.
Вторичный выход	Побочный продукт бизнес-процесса, который может быть востребован вторичными клиентами. Не является основной целью бизнес-процесса.
Первичный вход	Поток объектов, инициирующий «запуск» бизнес-процесса, например, заказ клиента, план закупок и т.д.
Вторичный вход	Потоки объектов, обеспечивающие нормальное протекание бизнес-процесса, например, стандарты, правила, механизмы выполнения действий, оборудование и пр.

Figure2. The characteristics of primary and secondary inputs and outputs of business processes

The primary input initiates the start of the business process. For example, in the application business process, an order entry is the primary input. In this process, a user who makes an order uses a cart, which is also an entry, but in this situation, the cart is a secondary input, and it is not a business process.

Classical methodology for describing business processes. After the description of the external environment of business processes, it is necessary to describe their inner structure. Previously, functions, composing business processes, were shown in the vertical direction, whereas interactions between the functions, including material and information flows of processes are described horizontally.

III. APPLICATION MODEL DESCRIPTION

Consumer behavior has dramatically altered over the last decade, so have technological changes. Application is using computer technologies to increase purchase effectiveness [1]. On account of my interest in online business I also decided to study clients' attitude to online shopping and especially factors impacting on their attitude. The main aim of this research is to analyze the factors influencing on customer experience of online shopping, the factors attracting clients from traditional physical stores and restaurants to application. Sampling of this research includes generally employees of public organizations, white-collar workers of private organizations, students, the reasons of using application are scarce resources and time. According to the research results, among three key factors selected for this study – convenience, interactivity and perceived risk – the most attractive and influencing factors for online buyers are accessibility (easy to use), personalization, responsiveness and confidentiality [2]. Distrust to anything new and unusual poses a serious challenge among online buyers. However, it is not a key factor attracting clients to use traditional physical stores [3]. It is expected that this research will not only assist applications to create successful strategies for online buyers, but also serve as a background for future researches in the sphere of online orders [4].

Business model is a compact simplified representation about business aimed at integral representation and comprehensive analysis of whole system of the interrelated business processes [5]. Business model creation can be applied as one of the steps of strategic planning [6]. An application model was also created as a part of my research. The application model reflects all main business processes necessary for full-fledged functioning of web-application in e-business. This model divides business processes into levels and indicates workflow direction [7]. The application model is depicted as a diagram in Figure 3.

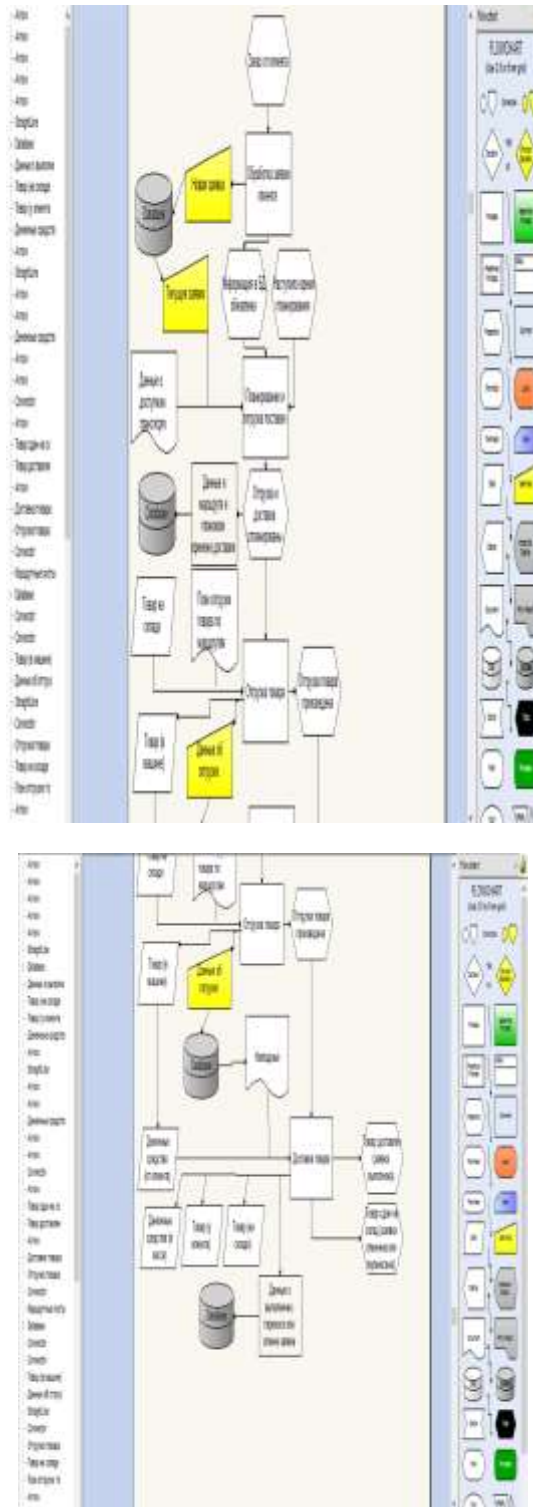


Figure 3 – Web-application business processes model

The application model was created via Diagram Designer software program. All elements were created as processes, events, connections, comments, references and etc. The first tier of model description is client's order, which further proceeds into client's order processing and defined as a new order. It directly enters the database. Subsequently, it is reflected in the active order system [3]. Information in database is updated in the aftermath of order processing and

proceeds into the planning and shipping stage. Moreover, information appears with details on transport available to deliver the order. Then it passes into planning stage, shipping and delivery is planned. The details on route and delivery time planned also appear in the database. Subject to commodity available in stock, order shipping plan is processed by route, which passes into order shipping. After order shipping the data is included into the database, the order is handed to a courier with bill of parcels on the commodity delivered. Then the courier delivers the parcel. The delivery result can vary: commodity is delivered (the order is accomplished) or commodity is returned to the stock (the order is cancelled or postponed) [7]. Cash assets are transferred to the account; commodity is delivered to the client or returned to the stock. The data about order accomplishment, postponement or cancelation appear in the database of the organization.

The key business processes of the application are more concisely depicted in Figure 4:

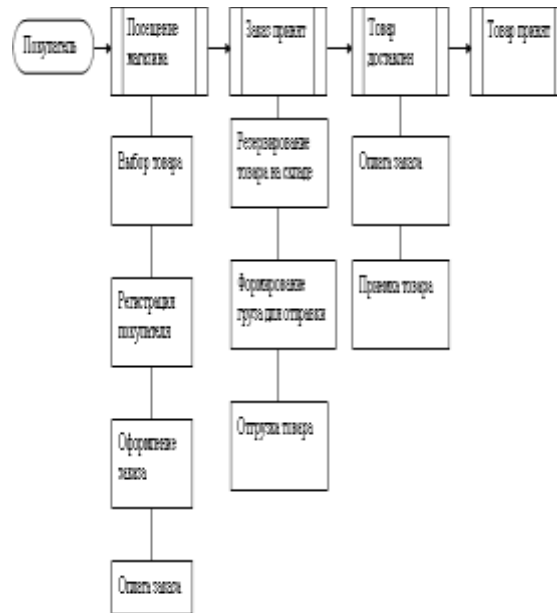


Figure 4 - The key business processes of a web-application

Positive factors obviously demonstrate the effectiveness of e-commerce for entrepreneurship [9]. First, the initial costs for creating e-commerce are much less than it is required to establish small business enterprise. Secondly, fewer licenses and permits are required to start an online business [10].

The popularity of online stores has been growing yearly, mainly because it is convenient for people to do shopping staying at home or office [11]. One of the most tempting factors in online shopping, especially during the holiday season is that it saves from standing in long queues and searching for a certain product in a store.

Technologies make our life even easier than we can imagine. We had to do the shopping when we needed something, but now we do not even have to leave our home, because everything is available on Internet and is easy to find in few clicks. Online shopping websites are growing rapidly to meet the growing needs and desires of customers to purchase a product without distracting from their work [12]. Web-applications can now be found in large numbers and help a user to navigate numerous sites in search of what he/she needs. The best quality applications were created to make life easier for users [13].

IV. THE ARCHITECTURE OF A WEB-APPLICATION

Available functions description of a web-application in e-business:

1. Any member can register and browse products available at website.
2. Only a registered user can purchase several products regardless of the quantity.
3. Contacts page is available to contact the website administrator for queries.

4. Two roles are available: “User” and “Administrator”.
5. A visitor can view the available products.
6. A user can view and purchase products.
7. An administrator has some additional privileges, including all the privileges of a visitor and user.
8. An administrator can add products, edit product information and remove products.
9. An administrator can add users, edit user information and expel a user.
10. An administrator can send an order to the user based on an e-mail confirmed order.

Setting up WordPress technology for further use to create a web-application. The application is described in Figure 5.



Figure 5.-WordPress SMS-service setting up

MySQLPHPMyAdmin database connectivity of the OpenServer local server is presented in Figure 6.

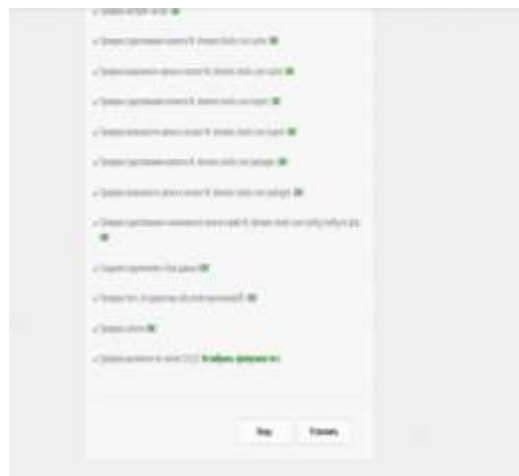


Figure 6 - Database connectivity

Furthermore, successful installation of CMS-system core set must be reported, which includes configuration file, access rights to configuration file, track update, and administrator account generation. Installation report is presented in Figure 7.



Figure 7 - Installation report

Home page information:

- Web-application home page (for users), repair section (for administrator).
- Web-pages, including the following content:
- Home page
- About company
- Commodity list
- Order page
- Contacts
- Administrator's page
- Input-into-systempage
- Registration page
- Delivery

Online purchase. Anyone can browse the web-application and commodity available in stock, but each user must log in by his/her user name and password to purchase and order commodity. Unauthorized users can register proceeding to the registration page. Administrator has an exclusive access to alter the roles.

Designer on default can only be "Administrator". When a user logs in at the website, his/her role on default is "User".

Home page. Home page consists of main content, where a user can browse all products available at our website.

Data management. Data description.

This database consists of:

- Users: information about user and administrator is added into the database with the application of unique identifier.
- Purchases: detailed product information is kept in this table. Покупки

Orders: client's order, information about status and delivery is presented in this section as shown in Figure 8.

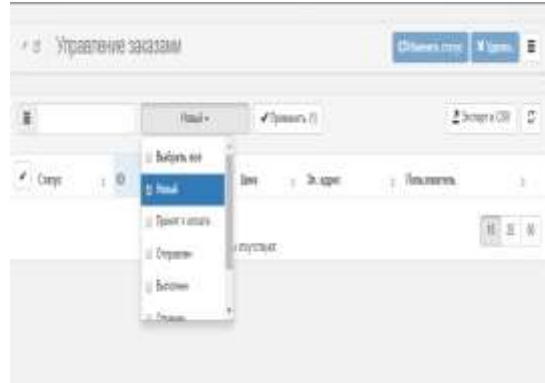


Figure 8 – Order management in administrator system

Data object

- User: ID, User name, Password, Email, Role
- Purchase: identifier, product, product identifier, price, category, image, description
- Orders: identifier, client, product, quantity, price, date, commodity shipped.

Order catalogue in WordPress is created and adjusted via creating a document “Catalogue” in the menu “Resources” and adjusted by commodity, categories, and resource groups as depicted in Figure 9.

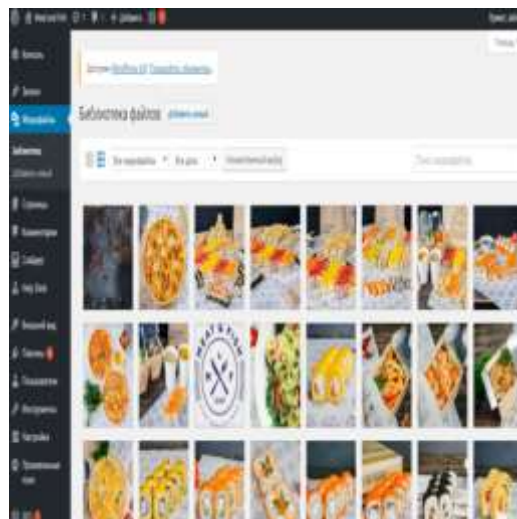


Figure 9 - Menu for order catalogue creation and configuration

The catalogue does not impose any restrictions on adding or editing products. There is also an option to mark a new product that just appeared on the site. After setting up the catalogue with all the necessary information, the “Products” section in the catalogue will look as shown in Figure 10.

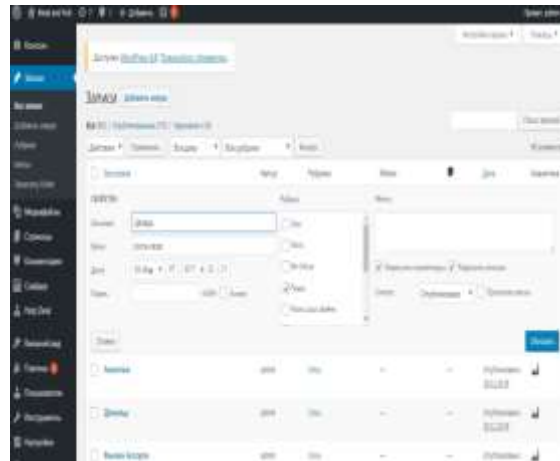


Figure10 – “Records” section in the catalogue

General system settings allow opting authorization data: access control to contexts and resource groups, password change, lock period, password recovery, email address, type of mail sent, alternative URL, minimum password length, automatically generated password and etc. All the above listed features are displayed in Figure 11.



Figure 11 - WordPress admin system settings

Each WordPress add-in setting for creating a web-application requires knowledge of HTML, JavaScript, PHP. The system provides only a common framework of the web-application and allows writing the codes independently.

Technical description of the user interface. The Internet-store is created with the help of WordPress technology located on the OpenServer local server. The administrative part of the web-application was developed, a template for application design was used and website application was created, the main page of which looks as depicted in Figure 12.



Figure 12 – Homepage of the application

When choosing a necessary thing, one can add his/her preferences to the wish list. Thus, a user can find desired products without wasting much time. A list of desired purchases is displayed in Figure 13.

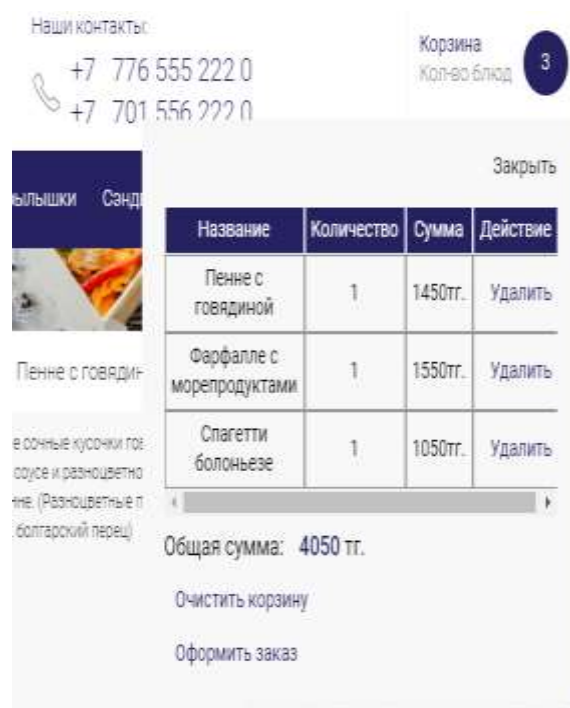


Figure 13 – Creating a wish list

A shopping cart of an online store displays the quantity of products, the price per item, as well as the cost of delivery and also the total cost of the order. In order to place the products in the cart, one must select the desired product in the store and click the "Add to cart" button. The cart interface is shown in Figure 14.

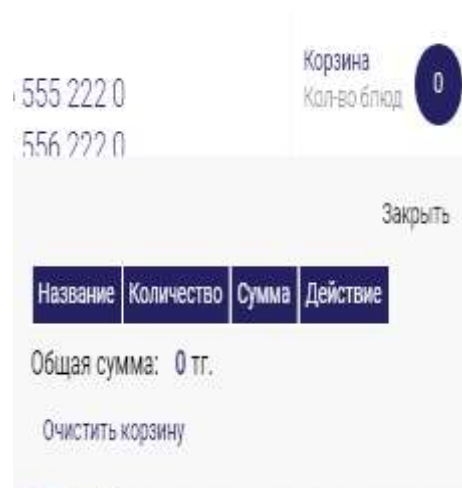


Figure 14 - Cart interface

V. PROSPECTS FOR THE WEB-APPLICATION DEVELOPMENT IN E-BUSINESS

There is a great prospect for the development of this application in Kazakhstan and perhaps subsequently beyond our country. For larger enterprise with a huge number of orders, it will be necessary to integrate the application with the 1C: Enterprise software for full control, recording the orders and distributing letters to customers with the function “Send notifications to all users”, then selecting from the categories “Received orders”, “Orders awaiting fulfillment”, “Orders executed, pending confirmation” and “Completed orders”[14].

With such expansion of the application, the number of products should be increased, and with a large number of orders, the number of couriers delivering goods will grow, and, accordingly, the profits of the application will rise. All orders will be stored in a common database, uploaded daily to the reports via 1C:Enterprise software as shown in Figure 14.

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