

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Information Technologies



Bachelor Thesis

CMS for e-shop web site development

Moldir Sergaliyeva

©2016 CULS Prague

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

BACHELOR THESIS ASSIGNMENT

Moldir Sergaliyeva

Business Administration

Thesis title

CMS for e-shop web site development: approaches and methods

Objectives of thesis

The thesis is focused on the use and implementation of content management systems (CMS). The main aim is to create an e-shop for a private business by using CMS system and templates. Partial goals of the thesis are such as:

- to make a literature review for CMS for e-shop web site development
- to compare the current CMS systems and templates
- to develop a design of website including calculation of economic benefits

Methodology

Methodology of the thesis is based on study and analysis of information resources. The practical part consists of two major tasks. Firstly, to compare current CMS systems and select the best option for a particular company. Secondly, to design a website by modification of a CMS template. Based on results of the literature review and outputs from the practical part, final conclusions will be synthesized and formulated.

The proposed extent of the thesis

30 – 40 pages

Keywords

Content management system, CMS, e-shop, website, development, Joomla, WordPress, Drupal, web applications, profit, HTML, PHP.

Recommended information sources

Foundations of Joomla [online]. SpringerLink, 2015 [cit. 2015-09-04]. ISBN 978-1-4842-0749-9. Dostupné z: http://link.springer.com/chapter/10.1007/978-1-4842-0749-9_2

KLOOSTRA, Simon. Joomla! 3 SEO and Performance [online]. 2015: Springer science, 2015 [cit. 2015-09-04]. ISBN 978-1-4842-1125-0.

NAIK, Poornima a Rajani KAMATH. EXPLORING NEW TEMPLATE IN CSIBER'S EXISTING JOOMLA WEBSITE. ISSN 2321-3469

NIEDERMAN, Fred. Content Management Systems. Wiley Encyclopedia of Management. Chichester, UK: John Wiley, 2015, : 1. DOI: 10.1002/9781118785317.weom070014. ISBN 9781118785317.

PATNAIK, R a M MISHRA. Role of Content Management Software (CMS) in libraries for information dissemination. Noida: IEEE Xplore, 2015. ISBN 978-1-4799-7999-8.

Expected date of thesis defence

2016/17 WS – FEM

The Bachelor Thesis Supervisor

Ing. Miloš Ulman, Ph.D.

Supervising department

Department of Information Technologies

Electronic approval: 31. 10. 2016

Ing. Jiří Vaněk, Ph.D.

Head of department

Electronic approval: 1. 11. 2016

Ing. Martin Pelikán, Ph.D.

Dean

Prague on 01. 12. 2016

Declaration

I declare that I have worked on my bachelor thesis titled " CMS for e-shop web site development" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on 30.11.2016

Acknowledgement

I would like to thank Ing. Miloš Ulman, Ph.D. and all other persons, for their advice and support during my work on this thesis.

CMS for e-shop web site development

Souhrn

Tato bakalářská práce se týká výběru řešení pro webové stránky s pomocí CMS a šablony. Hlavním cílem této práce je analyzovat a navrhnout elektronický obchod s využitím software pro správu systému. Znalosti a zkušenosti z vývoje e-shopu, umožňují autorovi práce současného podrobného popisu nasazení funkčního webového obchodu. Teoretická část výzkumu usiluje o definici a popis CMS, založený na související literaturu. Také popisuje obecné principy webových stránek a jak jsou implementovány ve složitějších strukturách jako je e-shop. Cílem praktické části je vyvinout a vytvořit strukturu, která může být použita pro soukromé obchodní společnosti jako obchodní nástroj. Podrobný popis vývoje webových stránek ukazuje každý milník zřízení e-shopu. Převážná část e-shopu je vytvořena a zlepšena pomocí CMS rozšíření a konfigurace pluginů. K prokázání a zdůraznění výhod používání e-shopu pro maloobchodní obchodní společnosti je prezentována analýza nákladů a výnosů.

Klíčová slova:

Content Management System, e-shop, website, development, Joomla, WordPress, Web applications, HTML, PHP, Apache, MySQL, database, software, design, template, extensions, online-store, Ecommerce, business, server, benefit, hosting.

CMS for e-shop web site development

Summary

This bachelor thesis covers topic of selection of e-shop web site with aid of CMS and templates. The main goal of the thesis is to analyse and select e-shop using Content Management System software. Knowledge and experience from development of e-shop, allow author of thesis to present detailed description of establishing, functional web-store. The theoretical part of the research, aim on CMS definition and description, based on related literature. It also describes general principles of the websites, and how they are implemented in more complex structures, such as e-shop. The goal of practical part is to develop and create structure, that can be used for private business companies as trading tool. Detailed description of website development will show each milestone of establishing e-shop. Major part of e-shop is created and improved by using CMS extensions and configured plugins. To prove and emphasize benefits of e-shop usage for retail business companies Cost Benefit Analysis is presented.

Keywords:

Content Management System, e-shop, website, development, Joomla, WordPress, Web applications, HTML, PHP, Apache, MySQL, database, software, design, template, extensions, online-store, Ecommerce, business, server, benefit, hosting.

Table of Contents

1	Introduction	10
2	Objectives and Methodology	11
2.1	Objectives.....	11
2.2	Methodology	11
3	Literature Review	13
3.1	E-commerce	13
3.2	Static and dynamic websites	15
3.2.1	Static website	15
3.2.2	Dynamic websites	15
3.3	Concept of e-shop.....	16
3.4	Introduction in CMS.....	17
3.4.1	Joomla!.....	18
3.4.2	WordPress	18
3.4.3	3.4.3 Drupal	19
3.5	Templates in CMS.....	19
3.6	Description of CMS installation process.....	20
4	Practical Part	22
4.1	Comparative review of content management systems	22
4.1.1	Joomla.....	22
4.1.2	WordPress	23
4.2	The functionality of the "WordPress" and "Joomla!"	24
4.3	Installation of content management system "Joomla!"	25
4.3.1	Create a database and complete the installation	25
4.3.2	Upload files to FTP server and setting up permissions.....	26
4.3.3	Configuring the content management system "Joomla!"	28
4.3.4	Setting design templates	30
4.3.5	Modules and components	30
4.3.6	The creation of sections and categories	30
4.3.7	The creation of menu items.....	31
4.3.8	Filling up home page	32
4.3.9	Choosing e-commerce components	33
4.3.10	Configuring e-commerce components.....	33
4.3.11	Creating and configure databases	34
4.3.12	Setting security components	34
4.4	Cost benefit analysis of CMS implementation.....	35
4.5	Setting decision criteria and weights for decision-making	37
4.6	Selection of the optimal solution.....	39

5	Results and Discussion	40
6	Conclusion	43
7	References.....	44

List of pictures

Figure 1 XAMPP setup.....	26
Figure 2 LocalHost directory	26
Figure 3 Upload to Html Root	26
Figure 4 phpMyAdmin main page	27
Figure 5 User permission manager page for database	27
Figure 6 Setup configuration in Joomla!	28
Figure 7 VirtueMart categories manager	31
Figure 8 Menu Manager.....	32
Figure 9 VirtueMart extension install	33
Figure 10 VirtueMart configuration.....	34
Figure 11 VirtueMart Module Manager	40
Figure 12 VirtueMart Tax & Calculation Rules	41

List of tables

Table 1 List of main CMS platforms and Relational database management systems	11
Table 2 Features of Joomla and WordPress.....	23
Table 3 Description of protect extensions	35
Table 4 Cost of the services needed for website development	36
Table 5 Decision Matrix Analysis Showing Unweighted Assessment.....	38
Table 6 Decision Matrix Analysis Showing Weighted Assessment.....	38
Table 7 Decision Matrix Analysis Showing Unweighted Assessment.....	41
Table 8 Decision Matrix Analysis Showing weighted Assessment.....	41

1 Introduction

Today, with implementation of computers in all spheres over the world, people cannot live without computers, Internet and abilities that they give. "The World Wide Web has led to a new kind of software and web systems which are based on web technologies. Just like software in other domains, web systems have evolution challenges". [1]. Online shopping is one of the most successful branches of e-commerce allowing consumer to buy goods or even services. For development of web industry, a lot of web application, software and cores were created such as CMS.

A content management system (CMS) defined as software tracking of every detail of content on web pages, much like the local public library keeps track of books and stores them. [2] Content can be simple text, photos, music, video, documents, or just about anything that developer can think of. A major advantage of using a CMS is that it requires almost no technical skill or knowledge to manage. Since the CMS manages all the content, users do not have to. Available functions of CMS vary, but almost all of CMS are web based and offer some sort of access control. Many of the most popular websites in the world use free and publicly available CMS like WordPress, Joomla and Drupal. [3]

The thesis project aims to build an e-shop website using CMS Joomla!. The main advantage of Joomla is the fact that Joomla is designed to be easy to install and set up even if the person is not an advanced user.

Web site and e-shop have a lot of benefits. The main advantage is a profit, website with e-shop is advertising of the product, no need to own store, automatic book keeping etc. However, development of a website is not so easy for unskilled people. That is the reason why CMS were created, to make web site development available for anyone. Today, CMS based webpages are quite common because their usage has no limits in any sphere of life. [4]

Many web hosting services offer a single-click installation, getting a new site up and running in just a few minutes. The project includes creation of extended functionality such as static information provision for users, leaving a comment and feedback, communication with authors and other social functions. This bachelor thesis is focused on the application of the Joomla CMS, and a website-template design.

2 Objectives and Methodology

2.1 Objectives

The thesis is focused on the use and implementation of content management systems (CMS). The main thesis aim is to create an e-shop for a private business company by using CMS system (Joomla 3.x) and templates. Next aim is to evaluate the profitability of the solution. Partial goals are such as:

- to make a literature review for CMS for e-shop web site development to compare the current CMS systems and templates
- to compare the current CMS systems and templates
- to develop a design of website including calculation of economic benefits

2.2 Methodology

Methodology of the thesis is based on study and analysis of information resources. The practical part is focused on comparison of current CMS systems and selection of the best option for a particular company. The design of the website will be done by modification of a template.

Nowadays, there are plenty of content management systems that are used to organize and facilitate collaborative content creation. Main difference of all CMS software, is a platform and supported databases.

Table 1 List of main CMS platforms and Relational database management systems

#	Platforms of CMS	Databases
1	Java	MySQL
2	ASP.NET	XML
3	Perl	Oracle
4	PHP	Apache Derby

Source: cmscritic.com

Following research aimed on two CMS system based on same PHP platform are WordPress and Joomla!. However, each CMS are more oriented for various needs (See more 4.1Comparative review of content management systems). Nevertheless, to create ready e-shop website with data inside Joomla! is used. [5]

Joomla! is widely used CMS system with great support and wide library of extensions. Template for Joomla! is starting point of website development. On official website <https://www.joomla.com/templates> there are only basic templates types for Blog, Corporate or Personal use. E-shop creation requires more advanced extensions so that there are template stores for different usage. JSN Kido and JSN Ferado are template that were chosen for e-shop because of its compatibility with e-commerce extensions (e.g. VirtueMart,etc.). [6]

Cost Benefit Analysis will be used as a tool used when evaluating the costs vs. benefits in an important business proposal. A formal CBA lists all of the project expenses and tangible benefits then calculates the return on investment (ROI), net profit values (NPV), and payback period. Then, the difference between the costs and the benefits from taking action are calculated.

A general rule is that the costs should be less than 50% of the benefits and the payback period shouldn't exceed past a year. [7]

To access Decision Analysis DMA (Decision Matrix Analysis) method is used. Decision Matrix Analysis is the simplest form of Multiple Criteria Decision Analysis (MCDA), also known as Multiple Criteria Decision Aid or Multiple Criteria Decision Management (MCDM). Sophisticated MCDA can involve highly complex modelling of different potential scenarios, using advanced mathematics.

A lot of business decision making, however, is based on approximate or subjective data. Where this is the case, Decision Matrix Analysis may be all that's needed.

3 Literature Review

3.1 E-commerce

E-commerce is the common term for any kind of commercial transaction that takes place through the internet. This transaction may be between a consumer and an online-only store, on the website of a big-box store chain, or even a business to business transaction.

Creating high-quality e-commerce system is impossible without a study of e-shop visitors. For this purpose, a variety of tracking technologies the seller will know what goods visitor select. This information is also used in the field of individual marketing and business, which is based on the stored preferences of individual consumers. [8]

The majority of websites for the storage of visitors use the cookie information. Cookie - is a line of text that contains the user ID and some user preferences, such as language, which he uses, or selected by them on website layout. However, such information may be stored on the server. Cookie only need to store the user ID, because it helps to identify the user and to record his actions. Cookie is created by a web-server and is stored in the user's computer. Read the cookie can only server that placed it on the user's computer, so other sites are completely deprived of the opportunity to obtain information about customer do some shopping or browsing. But for normal functioning cookie desirable to have one of the new user's browser has been installed, because it contains the early versions of defects due to which information can be read cookie and other servers.

When using basic authentication method, users log in to the site using an ID and password, to identify the visitors. If the user cannot use the tracking cookie, the identifier is added to the address for the same purpose - to identify the user. Another way to identify visitors - registration of their domain names or IP-addresses, and saves the data in a log file. [9] For example, Amazon.com uses cookie, basic identification and user address. The presence of different types of identification ensures all users the ability to use Web-pages of this site. Cookie contains a user ID, which is read at the time the user logs on the Web-page. The user then goes to the address that contains the identification number. If the user disables the cookie or comes on Web-site from another computer, it is better to turn to the identification of the base. If the ID and password coincide with the information stored in the database, the user is allowed to his personal page. Therefore, virtual shops

Amazon.com available for all categories of users. tracking technology must be determined at the stage of the installation site.

One of the most important aspects of e-commerce software - internationalization, which should not be confused with the localization. Internationalized programs enable shop owners and customers to operate anywhere in the world. They feature built-in currency conversion, thanks to which, the price of the screen is displayed in the user accepted in his country currency; store owner must make sure that the sales taxes and shipping costs have been adapted to a given country or state. The simplest software solutions using database tables with fixed prices for delivery, data on taxes and currencies, and more complex systems require the integration of delivery services like UPS (United Parcel Service - The single mail-order service (multinational company providing express mail service).

Partner, which provides delivery, determines cost of the transportation of certain goods in any region of the planet and how long it will take, and the connection to the bank provides a constantly updated exchange rate. Some service providers also support the updated database of tax data, which is provided to the permanent access of the sales system.

Online commercial proposals should include a variety of additional features, such as voice mail, chat rooms, newsgroups; automatic transmission of data to search engines to be run automatically when e-store created. [10]

Order Processing is a preparatory phase of the e-shop website development. General function of e-shop is virtual cart, in which the consumer, "add" all selected items. Among these functions must be present such that would allow the user to add items (goods) in the cart, remove items, and change the number of items in the basket. Once the customer has completed the selection of goods, list of selected goods presented, in which he can control and make changes to finalize order, to decide method of payment for purchase. At the program level, electronic store must support multiple payment technologies, including - payment by credit card using SSL (Secure Sockets Layer) and SET (Secure Electronic Transaction). Global or international payment system – is an electronic payment system that billions of users around the world.

The best-known today are the international payment system Visa, MasterCard, American Express, Diners Club. [11]

3.2 Static and dynamic websites

3.2.1 Static website

It is a regular set, consisting of several HTML-pages that are interconnected links (hyperlink). Since its inception the Internet all sites were just static. They represented a standard documents, visited by different users, in order to obtain any information of interest to them. These sites have the following disadvantages: mixing design (design of content) and content (semantic content)

Language HTML (HyperText Markup Language) to date, which is the accepted standard of hypertext markup, designed precisely to represent the appearance of the page. While the page static sites exist directly in the form of HTML-pages, and almost always in addition

to the information part, for which the user and the visited website contain certain "service setting" - header and footer, navigation menu, some additional text boxes, banners, links, quick access to the main sections of the site, etc. Therefore, those pages that display specific documents, very often the content and design (like the page as a whole, and its individual components) are mixed.

On modern websites usually every important document or page has a number of references to itself - it is, for example, and a link from a directory of articles and link from the home page of the announcements, and a link from the menu. Therefore, the publication of new material - is not only the addition of the actual page itself, but also edit all other pages that, one way or another, affects the action, and it is at times not only increases the complexity of the process, but also increases the risk of errors.

Static web site general difficulty is updating information on the website, therefore static web site, without prompt and regular updates will remain with old content.

3.2.2 Dynamic websites

The contents of such sites is not stored in the form of static HTML pages and stored in the database, and displayed "on the fly" directly to the user's request. There are many software systems and widespread and generally accepted programming languages, for example:

PHP, Perl, ASP, etc. They help to create a basis for flexible site.

In the process of creating such a site is added to the complexity of programming in a programming language. But only with the help of the programming is not possible to develop a functional design and create the future of the site - this is only possible when working with web site design. With this approach, the contents of the resource information will be separated from the graphics by creating a special site template, based on which will be generated by future pages of the site, taking into account the required clearance. Another advantage of dynamic sites is relatively easy resource administration, through the admin panel.

Thus, if the site is or will consist of many pages, or rather part of the process is planned to update it, the dynamic structure of a clear choice. And developers do not have to completely process all the pages with little design update or when new sections of the site. Office design the information content and is the main feature and most important advantage of dynamic sites

And here there is a collision with a dilemma: the usual sites on html pages - are difficult to support, and not suited to represent complex data structures. Dynamic sites are not just put forward new requirements for their creation and maintenance, and they are much more expensive to develop. And this is where the solution was found in the form of the creation of high-quality websites in the CMS base.

3.3 Concept of e-shop

E-shop - is implemented in the Internet representation by creating Web-server for the sale of goods and services to other Internet users. The virtual store is also known as an online store. To him fully fit the definition of a virtual enterprise. In other words, virtual store - a community geographically disparate store employees (salespeople, cashiers) and buyers who can communicate and share information through electronic means in full (or minimum) the absence of personal direct contact.

Benefits of online shopping for consumers:

Online store allows to purchase - without leaving the office at any time, and the selection and ordering of goods takes him a few minutes, if he knows exactly what he wants to buy.

Delivery service online store will deliver the selected goods at a convenient time and place. Besides the selection and evaluation of the properties of the goods takes place in the online store is much faster and more convenient than a regular store.

Furthermore, assortment online store is not limited (as, for example, the range is limited to a conventional store shopping pavilion area). Search by parameters, can simply specify the characteristics to be met by the goods, and then to choose from a list of models that meet selected criteria.

The cost of the work online store, including delivery, significantly lower than the average store. In contrast to the usual shop online store is able to serve hundreds of clients simultaneously. Although in practice this cannot be found. In addition, if the customer lives in another city, he gets the opportunity to not spend money on long distance phone consultations. All the information he can find on the pages of the online store. The main advantages of the e-shop reduces the number of personnel by reducing the amount of interaction with customers, rental space cheaper and easier to rent commercial space and placement of goods, there is no need for cash services, etc. As virtual store can be used as an effective method of marketing research. Any Internet user can quickly fill out a form, the proposed store it through the computer.

Disadvantages of online stores for the buyer:

- It cannot be "feel", It cannot be learned more than is written (example: furniture, clothing);
- Warranty issues, accompaniment;
- Often long delivery (up to 6 weeks), especially within international shipping.

3.4 Introduction in CMS

The CMS upgrading with ever extension added. CMS become more than just a tool to handle information and share with it. Nowadays, a CMS can provide a platform for building more complex digital solutions. CMS`s now market themselves as platforms rather than products, and recently, even more broadly as web experience management tools.

The CMS divides the website into two components: design (appearance of the site as a whole, individual pages, specific pieces of information) and content. Website design is included in the templates and varies considerably less than content. Typically, developers choose the technology best suited to the task. But obviously, to make a highly-functional Web site "manually" by one person is extremely difficult, not only because of the required skills, but simply because of time costs. Therefore, developers

often resort to using CMS systems such as Joomla, adding there needed functionality of its own design. [4]

Technology for creating Web applications are constantly evolving, and all the time there are new items. Therefore, to implement the best ideas need not only possess basic skills at the appropriate level, but also constantly evolving and developing new technologies.

Development based on CMS eliminates manual programming, because desired module is selected from components already available in the platform. Integration also occurs quickly, as each Supplement is created under a single standard. To assess the benefits of such systems, it helps to look into past ways of development to see how to create Web sites before and after the emergence of CMS. Given the above objectives, the creator of website has to choose the most optimal basis for developing. Therefore, two CMS systems presented:

3.4.1 Joomla!

Content management system, written in PHP and uses as storage of the contents of a MySQL database. Joomla! is free software protected by the GPL. One of the main features of Joomla! is the relative ease of management using the almost limitless possibilities and flexibility at manufacturing sites. CMS Joomla! includes various tools for making a website. An important feature of the system is a minimal set of tools during setup, which is processed as needed. The CMS manages all your content, so you don't have to. CMS also helps you track your content easily and help you develop and manage your content in the best possible way. [12] This reduces clutter and unnecessary administrative panel elements, as well as reduces the load on the server and saves space on the hosting.

3.4.2 WordPress

WordPress was developed first as a blogging platform, but through years and with the introduction of custom post types (CPTs) in version 3.0 it has evolved into a fully functional content management system. Knowledge of PHP and HTML is not required unlike for Joomla or Drupal. preinstalled plugin and template function allows them to be installed very easily. All is needed to do is to choose a plugin or a template and click on it to install. It's good choice

for beginners. To have a useful support, there must be a large community of users, who will be a part of e.g. a discussion board. [13] On the script's homepage it is possible to view thousands of graphics templates that can change website's look. Can be found there both free and paid templates. The paid ones are often more advanced as well as more interesting. But big disadvantage of using WordPress as CMS is that, WordPress requires more knowledge about PHP, CSS, HTML, SQL queries.

3.4.3 Drupal

CMS Drupal is written in PHP and requires a MySQL database. Drupal works well with a variety of web servers such as Microsoft SQL Server, Apache, SQLite, MySQL and MariaDB. In addition, it supports various software, such as Flash, Flex, Ajax, Java, PHP, etc.

Drupal CMS is considered one of the friendliest engines, which does not require any technical knowledge to manage it. Drupal is suitable for creating simple and complex websites

3.5 Templates in CMS

Appearance of the web sites based on CMS is determined by the established template. Some of the commercial templates allow development teams to purchase a periodic subscription for their products, for example, a month or a year, which allow to get the templates produced in this period. The template system allows to easily change the appearance of the site: the location of the modules, fonts, and more. Users able to choose one of several maps. In the network there is a huge selection of ready-made templates, both paid and free. There is also a software for self-creation of original patterns. There are custom modules layouts including left, right, centre, and any other arbitrary block position. If desired, the contents of the module can be included in the content material. [14]

3.6 Description of CMS installation process

The way of CMS installation effects on its functionality limits.

There are options listed below available to:

- 1) Installation of CMS copy (with Sample Data) on local computer (or server). This is sometimes referred to as a 'localhost' installation. Installing with Sample Data enables explore a Joomla! site before creation of the content. This is a good option for check everything before upload on hosting to view functionality of Joomla!.
- 2) Installation a copy of CMS (with Sample Data) on a Hosting server. This is sometimes referred to as a 'remote host' installation.
- 3) Use an existing CMS web site limit to add content to an existing site and do not have any manipulating functionality with the content.

The first step of development - defining the structure of web site design, principles of operation and location information. At this stage necessary software selected and installed.
[15]

There are general requirements for CMS installation:

Downloading and installing some software that CMS needs to run locally. This is a web server called Apache, a database MySQL and a scripting language called PHP. There are special server clients - which include every requirement as one package called XAMPP to create e-shop and run CMS locally.

Consider the mechanism of the Internet.

The network is connected by channels of communication (and communicating via a specific Protocol) computers.

This means that there are some public computers with special software (servers) that store the data files.

With custom computers can send requests to servers and to receive in response to these data, of which a special program (browser) collects the page in the usual form.

Data transfer in most cases is via the HTTP Protocol, that's why links to sites begin with "http:// ". In fact, scoring field of the browser the link of the website that user give the command "connect via HTTP to a specific computer, get data from it and display them."

DNS distributed network of domain names. It is on the computers on the LAN receives the request sent from the browser. Basically the browser in response to send a link to a website, receives from the computer a DNS address to a specific computer.

The basis of CMS are executable files in the programming language PHP and database is in MySQL format. A database is a set of tables, in which it is possible, using special commands to write and read data. The text of the article is also stored in one of the cells of that table.

After the transfer of distribution files to the virtual hosting and transfer domain name to open a page in installation of CMS.

Joomla! CMS is a computer application that allows the creation and modification of a content using a simplest user interface to avoid high-level programming details unless required in advanced web development. As a computer application Joomla! has different versions with a difference in GUI.

- Version 2.5 (the version that replaced versions 1.6 & 1.7) was released January 2012 and reached end of support on December 31, 2014.
- Version 3.6 (is the current version in the 3.x series), released in March 2016.

However, version of an application is not only thing that create alternatives of Joomla`s usage and its application. [16]

4 Practical Part

Following chapter include reviews of CMS, their description and differences. During practical part of the research comparison of the CMS is done to choose correct CMS for e-shop website development. Installation of CMS and setting up parameters are main goals of practical chapter.

4.1 Comparative review of content management systems

There are a number of factors that need to be taken into account, such as cost, time, quality, flexibility and control of CMS system. WordPress more refer to “plugins” for view of templates and various look of web content, while Joomla refer to an “extensions” with adding of functionality. The basic difference between WordPress and Joomla is that Joomla is a portal- or community type site while WordPress is a blog. Both overlap each other in several areas and can be extended beyond their original purpose thanks to the use of plugins.

4.1.1 Joomla

Joomla a content management system that keeps track of every piece of content on a website. It helps to manage simple text, photos, music, video, documents. The main advantage of this CMS is that it requires almost no technical skill or knowledge. Joomla is used all over the world to build websites of all shapes and sizes.

Table 2 Key features of Joomla

User management	Content Management	Banners management
Languages Manager	Polls	Search tool
Newswire Management	Template Management	Expansion functions
Contacts	Security module for multi-level authentication	Templates
Custom circuit module location	Creating own components, modules, plugins and templates	Public "bug tracker"
Multilingual	Database support (Microsoft SQL Server, PostgreSQL)	

Source: joomla.org

4.1.2 WordPress

WordPress it's quite a popular content management system website, with which blogs are created daily, news projects, and online shopping. It can be made even more functional by connecting additional themes and plugins. With WordPress, can be quickly created a blog, without further technical problems.

Table 3 Key features of Wordpress

Integrated system statistics.	More than 50 languages.	Privacy settings.
Widgets for the sidebar.	Topics.	Plugins.
Support for gzip	Portable base	User Profiles
Dynamic generation of page	Persistent URLs (NC)	Templates
Password protection	Multipage article	Download files
Categories	Bookmarks	Publish via email

Source: wordpress.org

Table 4 Features of Joomla and WordPress

Type of CMS	Joomla	WordPress
The visual editor	Yes	Yes
Graphical Editor	Yes	No
Templates	Yes	Yes
Support for plug-ins	Yes	Yes
Multi-language	Yes	Yes
Support NC	Yes	Yes
Tools geolocation	Yes	Yes
Batch upload files	Yes	No
Statistics	Yes	Yes
Advertising Management	Yes	Yes

Source: socialcompare.com

4.2 The functionality of the "WordPress" and "Joomla!"

CMS Joomla! It includes a minimal set of tools during setup, which is supplemented, as necessary. This reduces clutter unnecessary administrative panel members, as well as reduces the load on the server and saves space on a hosting.

Joomla! It allows to display the interface front and backend in any language. Product extensions contains many language packs, which are set by regular administration tools. Functionality can be increased with additional extensions (components, modules and plugins).

There is a security module for multi-level authentication of users and administrators (using a proprietary algorithm authentication and "reference" sessions). The advantages of the system is the fact that all of the components, modules, plugins and templates can be written to, place them in a structured directory of extensions, or edit existing extension at its discretion.

There is a regular release of updates. There is a public "bug tracker" (Bug Tracking System). There are also Trackers migrating from older versions of Joomla, Tracker wishes extend the functionality and so on, where the Joomla post comments on the work of CMS, which is subsequently examined its developers, as appropriate, in the next update of Joomla! fixes to solve certain problems. Description and keywords to improve search engine rankings can be created for each dynamic page. Beginning and ending publication of any material can be programmed on the calendar. The ability to restrict access to certain sections of the site for registered users only, and with the release of Joomla! 1.6 access both to the section and to a particular material to within a particular communication material and user. Customizable elements layout on the Templates is one of the template manager feature. Different modules (the latest news, visitor counter, detailed statistics, guestbook, forum, etc.) can be set to improve functionality. The ability to create not one but several forms of feedback for each contact. Support for more than 360 news feeds around the world. Built-in visual editor TinyMCE is helpful tool to edit using GUI.

Structurally, the system is a core to which are connected components. The components can be composed on the functional purpose of the module, plug-in and / or template:

Modules - elements that are displayed on the user page in the form of separate blocks.

Plugins - items displayed in the administrative toolbar and adds extra functionality. patterns - the element responsible for the unified registration of the entire site. The core of Joomla! includes: unit (functionality defined HTML-code inside it) and its variants with enhanced management capabilities with the administrative panel: banners (modules for advertising), contacts (block to accommodate the contact information and feedback forms), news feed (RSS

subscription); material with tags (keywords) and categories (folders) for navigation users an editor for easy processing of the material. Creating own extension is carried out by writing a plug-in PHP using to communicate API Joomla!

4.3 Installation of content management system "Joomla!"

XAMPP Installation is essential to run Joomla! on “localhost” there are chosen the Apache, MySQL, PHP and phpMyAdmin since these are necessarily required for Joomla installation. The rest of components, just extended functionality that are not required for run “localhost”. There are components of XAMPP listed below with their description:

4.3.1 Create a database and complete the installation

Browsing URL- <http://localhost/phpmyadmin>, the phpMyAdmin interface appears, where new database created. For example, our database name is “thesiswebsite”. Joomla zip package is extracted in “XAMPP” folder in “htdocs” to finalize installation on localhost. Once the package extracted, Joomla installation can be proceeded. For initializing the Joomla installation, browsing this URL- <http://localhost/joomla> needed and the main configuration page viewed. [17]

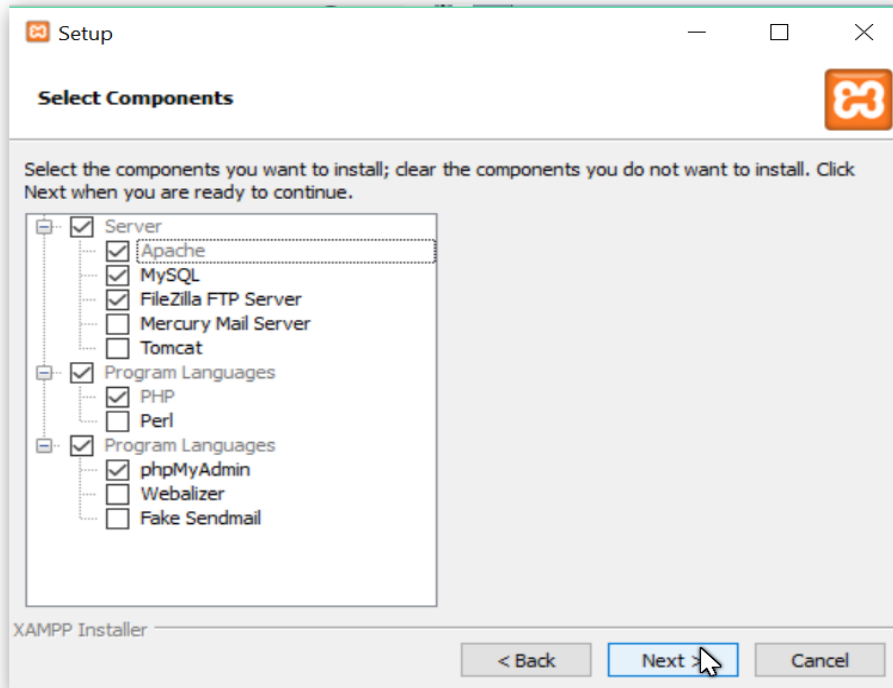


Figure 1 XAMPP setup

Source: Own PC

4.3.2 Upload files to FTP server and setting up permissions

Most convenient way to copy these files is using an FTP client program, such as “FileZilla”.

All files from directory localhost (with XAMPP, the directory will be xampp/www/directory) and uploaded to the remote host HTML directory for a domain.

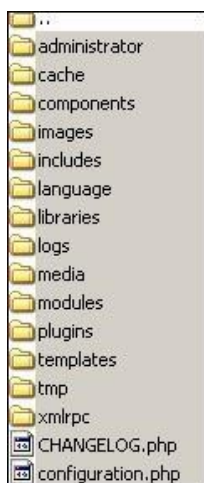


Figure 2 LocalHost directory

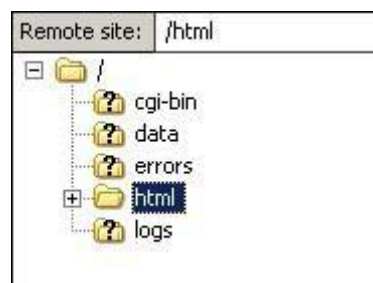


Figure 3 Upload to Html Root

Source: docs.joomla.org

Copying the Contents of Local MySQL Database to the Host MySQL Database.

In Joomla! all the contents of the site (articles, menus, users, and so on) are stored in the MySQL database. Copy this information to the host database is required. This is done by creating an export file on developer's local system and then importing this file into host MySQL database, as follows:

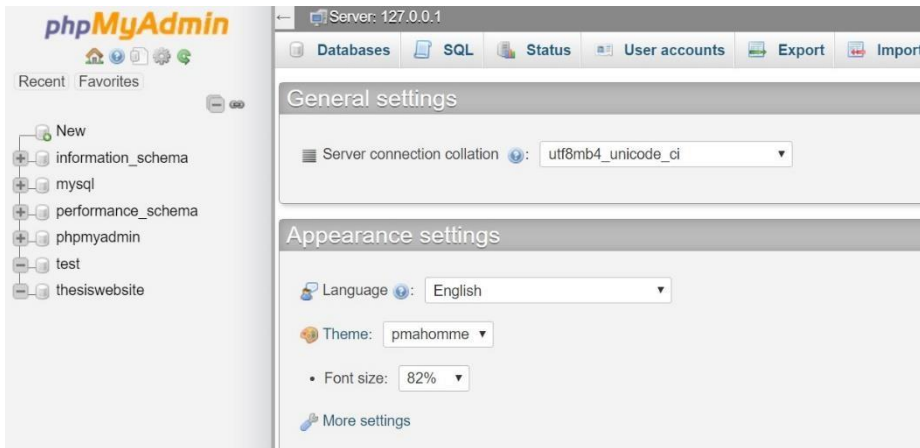


Figure 4 phpMyAdmin main page

Source: Own PC

Setting up permissions needed to allow privileges or add users allowed to use or edit databases (depend on privileges given to user) as shown below:

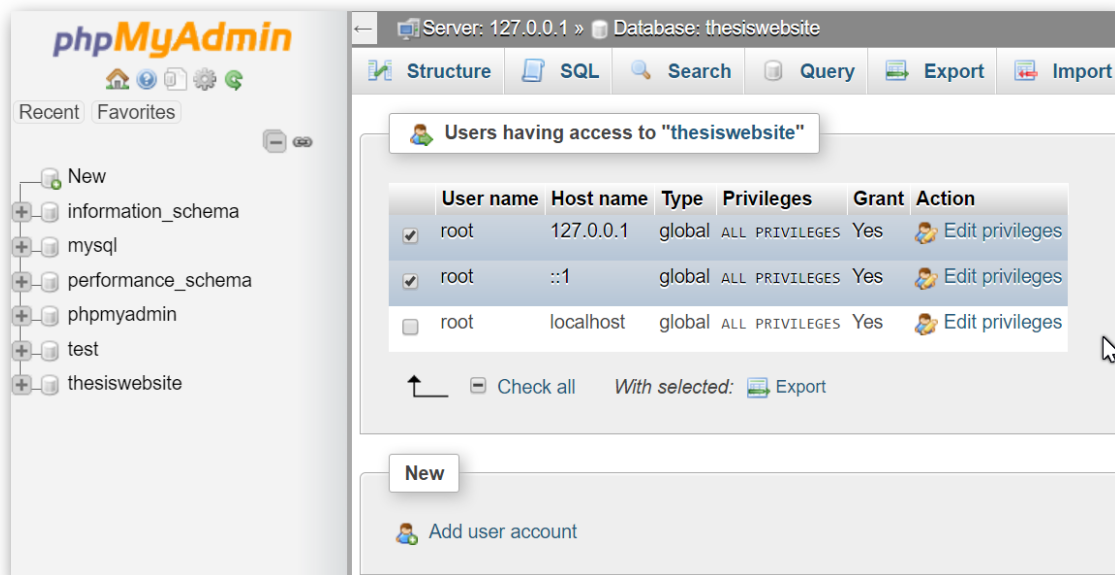
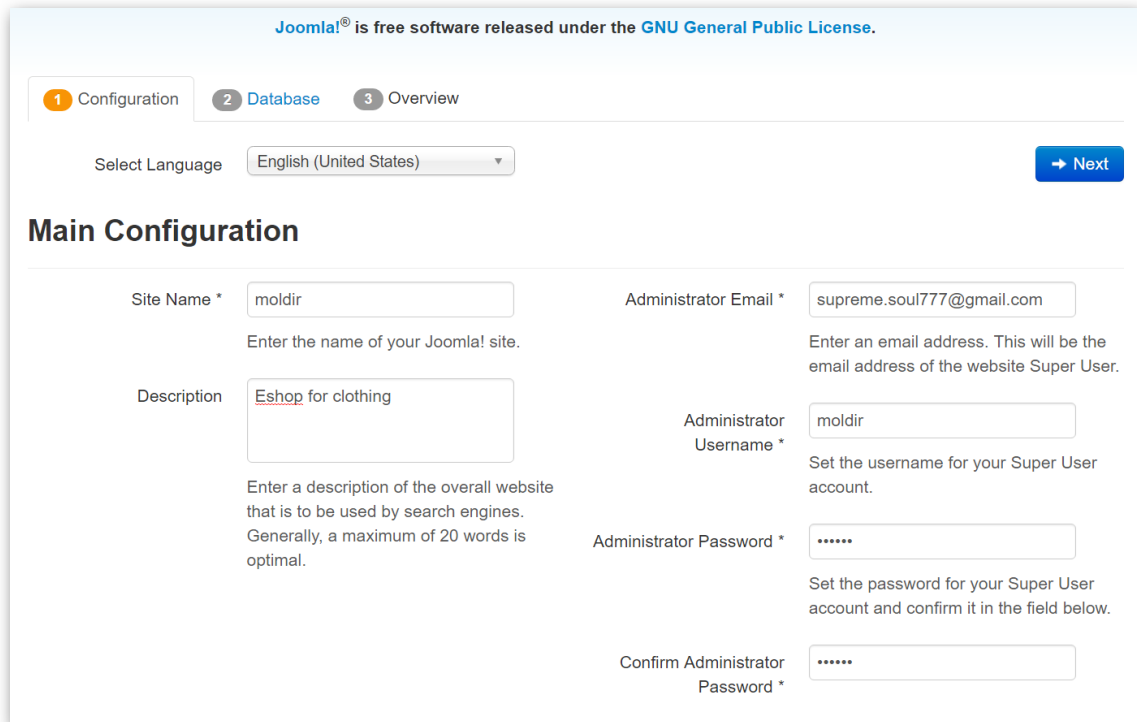


Figure 5 User permission manager page for database

Source: Own PC

4.3.3 Configuring the content management system "Joomla!"

Main configuration of Joomla! CMS is done during first launch of Joomla URL: <http://localhost/joomla/installation/index.php> and stands for defining name of website and identifying of administrator.



The screenshot shows the Joomla! installation configuration interface. At the top, it states "Joomla!® is free software released under the GNU General Public License." Below this, there are three tabs: "1 Configuration" (active), "2 Database", and "3 Overview". A "Select Language" dropdown is set to "English (United States)", and a "Next" button is visible. The main section is titled "Main Configuration" and contains several input fields with labels and instructions:

- Site Name ***: Input field with "moldir". Instruction: "Enter the name of your Joomla! site."
- Description**: Input field with "Eshop for clothing". Instruction: "Enter a description of the overall website that is to be used by search engines. Generally, a maximum of 20 words is optimal."
- Administrator Email ***: Input field with "supreme.soul777@gmail.com". Instruction: "Enter an email address. This will be the email address of the website Super User."
- Administrator Username ***: Input field with "moldir". Instruction: "Set the username for your Super User account."
- Administrator Password ***: Input field with "*****". Instruction: "Set the password for your Super User account and confirm it in the field below."
- Confirm Administrator Password ***: Input field with "*****".

Figure 6 Setup configuration in Joomla!

Source: Own PC

The advantages of the system are the fact that all of the components, modules, plugins and templates can be written to, place them in a structured directory of extensions, or edit existing extension when needed.

Content Management System «Joomla» has a modular structure and in its basic version does not provide all the necessary capacities required for the implementation of the finished project. There is a division into components and modules in the «Joomla». "Components" are called extensions that add additional functionality to the content management system. "Modules" are called elements of the data output, the display of which is configured separately for each page of a web-site. Typically, complete with components and modules are available to ensure the conclusion of interactive elements and any information stored in them in any prescribed pattern place.

Module - this is a specific portion of the site; the position is determined through the admin interface. As the module can be presented: Site menu, a list of recent articles, hit counters, search, user authentication, forms, surveys, and contacts, any static and dynamic information to the user.

It should be noted separately that position O modules are defined in the registration template, the current page. Furthermore, «Joomla» there is a special table module positions. To indicate in the system module active, following menu items has to be entered. "Extensions" - "Module Manager"

When using standard design templates or templates based on standard design layout - no change is needed to produce.

Component structure allows for flexibility and high functionality of the system. Using only necessary for the site, modules and components, web-resource administrators protect themselves from bottlenecks and vulnerabilities present in the unused components.

As an additional component to the CMS «Joomla» is possible to set: forums, guestbook, blogs, galleries, online shopping, video conferencing, document database, and more.

If necessary, there are many companies that provide paid services to create components to customer's specifications. In fact - any task required the administrator, can be solved by the integration of third-party components.

Loading components are similar to downloading templates from a menu item in the "Extensions" modules are managed through the "Module Manager."

After installing the system on the website set database hosting. The second step - is to install plug-ins, including an online store, such as Hikashop, Virtuemart, or others. After the second step, a working area for the development of Internet store and the next step - is the development of architecture online store. Architecture online store - is the relationship of individual objects functionality, providing the entire spectrum of the complex function features an online store. A well-designed architecture is competent online store provides a quick and easy search of the necessary data and the use of services.

4.3.4 Setting design templates

Currently, there are many sites where free templates for Joomla! Are available as well as sites where commercial templates are available. Joomla website and uploaded the templates (JSN Kido, JSN Ferado) through the Extension Manager. The process is the same for templates, modules, plugins and components. Joomla template manager allow to take more than one template and combine them for different webpages of the website

4.3.5 Modules and components

Module is typically considered to be an add-on to the site that extends the functionality of another part of the system. It usually has fewer options that are configurable by the end user and most of the time does not handle any storing of information into the database. A module usually occupies a secondary portion of the web page and is not considered the primary focus of a page. Plugin will manipulate output already generated by the system. It typically does not run as a stand-alone piece but takes data from other sources (i.e. the content) and manipulates it before outputting to the user window. A plugin typically does not display directly to a user but does it's work behind the scenes.

4.3.6 The creation of sections and categories

At the moment, the web store is built, but don't have any products in e-shop. Configuring components of VirtueMart in Joomla control panel, and setting up store.

Creating the main settings of the store: Payment options (PayPal account can be created and make the store point to customers PayPal account, so when people purchase from web-store, they will send money to web-store owner PayPal account), shipping options, notifications.

Creating the categories: The categories encapsulate products entered in database. For adding a new product category, VirtueMart extension was used. Creating a new category as a result, will form new class of the same type of product. Information pertaining to the new category filled as a description for products will be shown. Aside from general information, Meta information of category can be added. As an illustration, below shown process making a new category of women cloth.(See Figure 7)

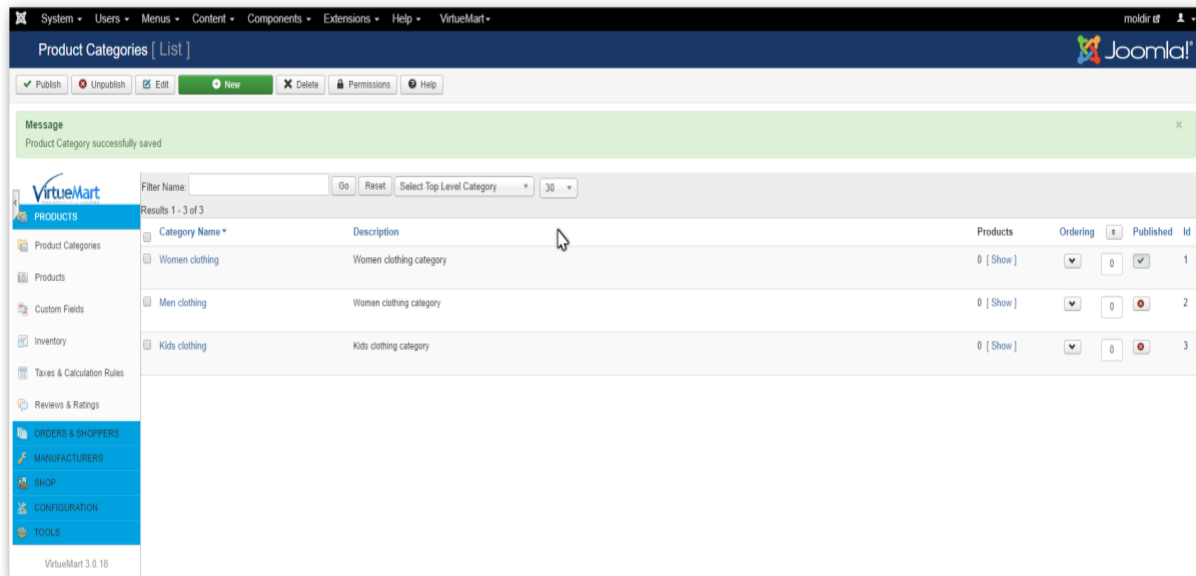


Figure 7 VirtueMart categories manager

Source: Own PC

4.3.7 The creation of menu items

Creating a Menu Items are stands for displaying the webpages on the e-shop. It allows categorizing and modifying of e-shop content. Menu items stands for splitting of e-shop structure and creating connections with modules, articles, images.

When menu item type, a pop up containing several types will be shown to web-designer. From the VirtueMart category, selected item needed to display in the menu of the website. For demonstration, “Home” page shown below (see Figure 8 Menu Manager).

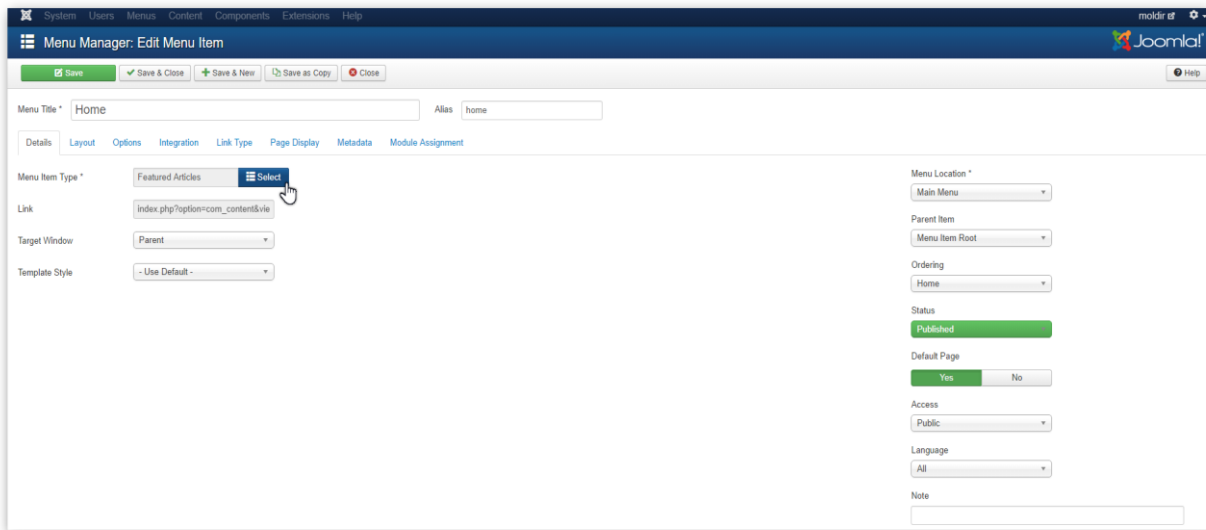


Figure 8 Menu Manager

Source: Own PC

4.3.8 Filling up home page

As was mentioned in previous (see 4.3.7) Home page customization can be done in Menu Manager. Menu manager is an editor to make a connection between modules, rest of menus, and articles. Modules stand for creating some feedback action on webpage, while article is just an informational text. Bunch of the parameters can be edited (e.g. position, visibility, status, ordering or integration). Homepage consists from menus and links to other webpages for each menu template can be established. Rest of the homepage is articles with a descriptions and main extensions (see Figure 9). [18]

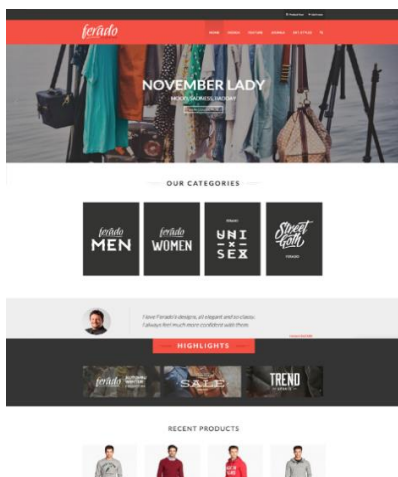


Figure 9 Homepage of JSN Ferado template

Source of figure: Own PC

4.3.9 Choosing e-commerce components

Component is the most extensive add-on. This typically adds completely new, or different, functionality to web-site and extends the overall site possibilities. A component handles data manipulation as well as input and storage into the database. A component on most sites occupies the main area of the website layout and is the primary focus of the page. There exist plenty of extensions for e-commerce like HikaShop, Eshop, VirtueMart. These extensions difference are insignificant. However, for requirements of e-shop, component with widest support and compatibility with templates VirtueMart is obvious selection. VirtueMart is a Joomla Shopping Cart / e-Commerce extension to add functionality for eshop. VirtueMart enables to manage shop's content (categories, products), handle advanced prices management, heavily personalize store by providing an easy interface to customize all the VirtueMart views. Managing custom fields for users, their addresses and products, manage an affiliate program, easily handle the translation of the shop's content in multiple languages, show statistics. VirtueMart is free software released under the GNU General Public License. [19]

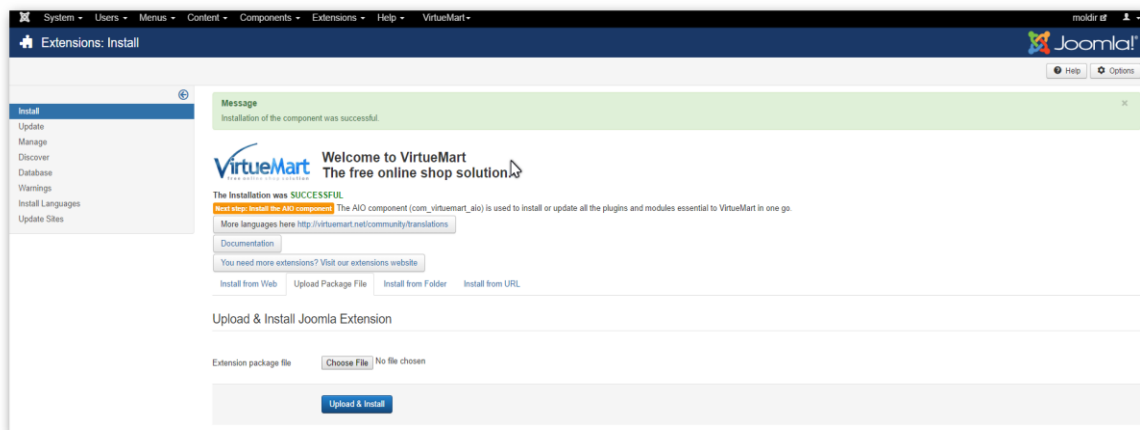


Figure 10 VirtueMart extension install

Source: Own PC

4.3.10 Configuring e-commerce components

VirtueMart is a component that has deep customizable configuration such as shop, email, own templates, SEO (Search Engine Optimization), product ordering settings. Generally, those configurations are predefined for e-shop not oriented on high sales like “EBay” or “Amazon”. Nevertheless, there is no need for deep changes in configuration.

Essentially shopfront section has to be changed depending on needs and offers of the seller.[19]

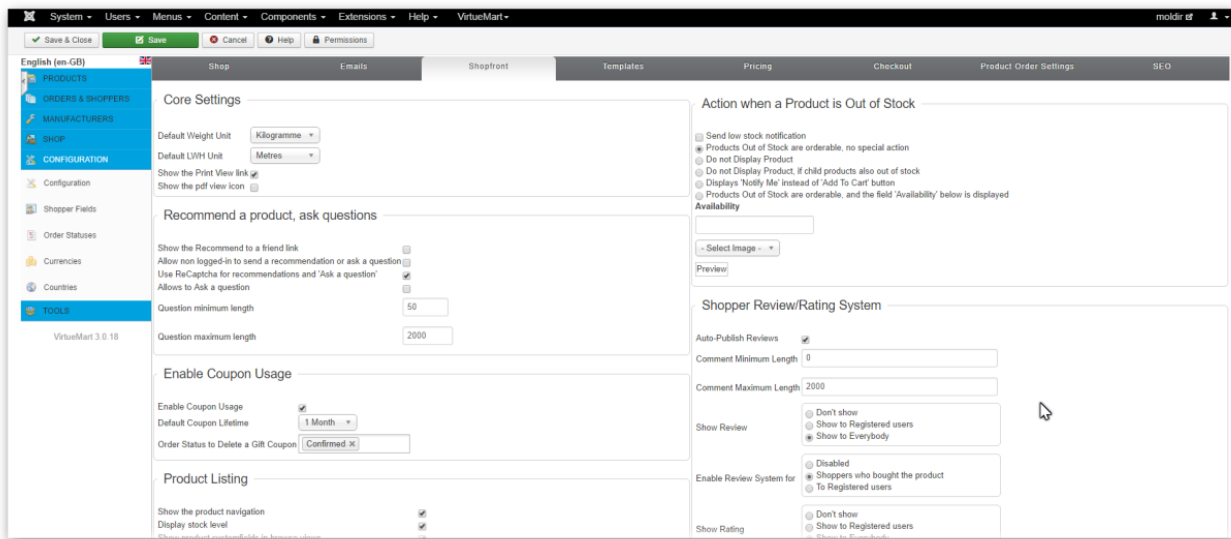


Figure 11 VirtueMart configuration

Source: Own PC

4.3.11 Creating and configure databases

Databases of a products has to be filled via VirtueMart component, to make connections between menus, modules and database (e.g. Shopping cart). Adding products: For this stage products added by filling the name, image, description, price, and pertaining category of the product. In case of downloadable content, uploading of files can be done.

4.3.12 Setting security components

There are two ways to protect websites from online threats. Cloud (hosted outside of local storage) – It's always good to have cloud-based security providers like My Joomla, Cloud Flare, SiteGuarding, Incapsula or SUCURI. Plugins/Configuration (On developers server/website) – let's go through the following plugins. Difference between Cloud and Plugin protection is mainly cost of service. For almost all plugins its free.

Table 5 Description of protect extensions

Protect extensions	Description
1. R Antispam	is to prevent spamming for forums
2. Marco's SQL Injection	protects against SQL injection & local files inclusion attacks
3. Centrorra Security	has built-in malware and security scanner that helps to identify any security risks
4. Brute Force Stop	help to prevent hacking from brute force attack
5. KeyCAPTCHA	help to stop forms being spammed
6. AntiCopy	helps to restrict web page printing, copy page contents, disable right click, highlight and copy functions using JavaScript
7. Antivirus Website Protection	is to prevent/detect and remove malicious viruses and suspicious codes
8. Incapsula	let managing security & CDN from Joomla admin.
9. Security Check	web firewall helps in protecting for more than 90 attack types
10. Akeeba Backup	It helps with one click backup; exclude specific files/folders, restore, etc.

Source: [21]

4.4 Cost benefit analysis of CMS implementation

Cost Benefit analysis explained as a procedure for calculating all costs involved into project development and possible profits to be derived from a business opportunity or proposal. CBA (Cost Benefit Analysis) includes both quantitative and qualitative factors for analysis of the values for a certain project or investment opportunity.

Consider case of business start-up company "L.A. Showroom" located in Los-Angeles ordering e-shop that require basic functional retailing web-store for clothing. Company has warehouses, suppliers, etc., but lack web-store based on CMS. For small business companies like in case mentioned earlier only solution to buy ready web-store paid one time to reduce price. The most basic shops start at around 1,000 USD but if the customer wants some extra features the pricing increases quickly.

Website development for ecommerce is impossible without analysis of the cost needed to establish web-store and net profit based on theoretical knowledge and comparative analysis. Cost of website development and keeping it "online" depend on the scope of work required

and placement of the website. Preliminary analysis of website cost depends on following milestones: registering a domain, hosting, web designing, maintenance.

Every website needs a domain name to be hosted online. Brand new domains will cost about \$10-15 a year, depending on registrar and TLD (top-level domain). Registrar is the company like GoDaddy, BlueHost, etc. Top-Level-Domain refers to: .com, .org., .net

Hosting on servers varies by limitation defined by the server type

Shared server: Many websites are hosted on the same server, because it's cheapest way to host on server. Spend as little as \$3.95/month

Virtual Private Server (VPS): Many websites are hosted on the same server, but each account gets more control, similar to what dedicated servers provide. In comparison with Shared server it's still sharing of the server, but the customer has the freedom to do with the website. More expensive than shared hosting, but gives the customer more control over the hosting environment. Expect to spend at least \$29.99/month.

Dedicated Server: Website developer in control of the server. Developer choose what software to run, how many websites to host, etc. Dedicated servers are best for sites that are highly trafficked, and need extra security. Dedicated servers are the most expensive way to host a website. Expect to spend at least \$99.99/month

Table 6 Cost of the services needed for website development

Services	Cost
Registering a Domain	\$10 - \$40.
Hosting	\$200 - \$500 (yearly registration)
Web Designing	\$500 - \$5000 (\$500 "basic" websites, "advanced" websites \$5000)
Maintenance	\$100 - \$1000 (TLD), like ".com", ".org", or ". company".
Total	\$810 - \$6540 (\$810 for "basic" websites, "advanced" websites \$6540)
Total per month	\$67- \$540 (\$67 for "basic" websites, "advanced" websites \$540)

Source: [22]

First option – basic eshop with template (one time pay), second option – monthly fee (basic eshop with template). In the case, the owner of an online store is the seller. Therefore, all profits from the sale of goods, is the net profit.

The average price of a clothing is \$20-40

The minimum number of orders per month is 10-15;

IPM = Income per month = \$200-600 Considered average price is \$400

NP(Net profit) = IPM (Income per month) – CPM (Cost per month)

NP(Net profit) = 400 – 67 = \$333

ANP (Annular Net Profit) = 333 * 12 = \$3996

E = ANP (Annular Net Profit) / CWD (Cost of Website development)

E = 3996/810

E = 4.93 is a factor the overall economic efficiency.

Return on Investment (ROI) = CWD / NP (3.3)

T = 810/3996

T = 0.202;

Payback Period = 2.4 months.

Create an online store in the industry is a worthwhile investment. The store will start to make a monthly profit of \$400 in 2 months 13 days.

4.5 Setting decision criteria and weights for decision-making

Decision Matrix Analysis will help to decide between several options, where many different factors should be taken into account.

To use the tool, options as rows on a table are selected. Setting up the columns to show the factors needed to be considered. Scoring each choice for each factor using numbers from 0 (poor) to 5 (very good), and then allocating weights to show the importance of each of these factors.

Multiplying each score by the weight of the factor, will show its contribution to the overall selection. Finally adding up the total scores for each option. The highest scoring option will be the best option. Essentially store needs a supplier of clothing. Following decision matrix will help to decide to choose one of supplier. He has four options. Factors that he wants to consider are: Cost, Quality, Location, Reliability, Payment options. [23]

Table 7 DMA Showing Unweighted Assessment

Factors:	Cost	Quality	Location	Reliability	Payment option	Total
Weights:						
Supplier 1	3	0	1	3	2	
Supplier 2	3	1	2	1	1	
Supplier 3	1	2	2	3	3	

Source: mindtools.com

Table 8 DMA Showing Weighted Assessment

Factors:	Cost	Quality	Location	Reliability	Payment option	Total
Weights:	4	5	1	2	3	
Supplier 1	12	0	1	6	6	25
Supplier 2	12	5	2	2	3	24
Supplier 3	4	10	2	6	9	31

Source: mindtools.com

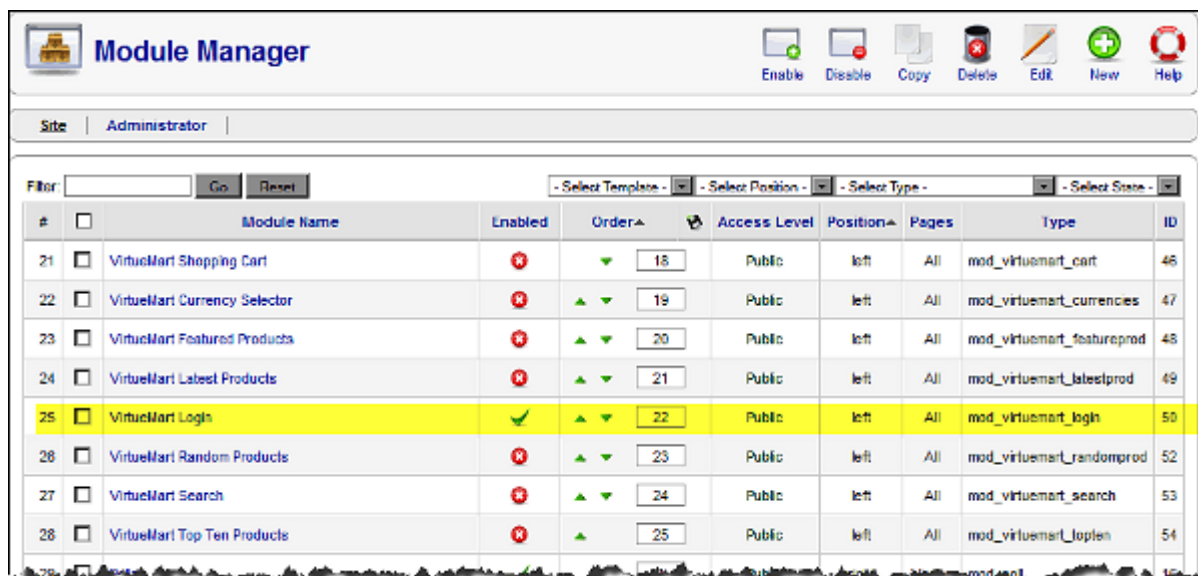
This makes clear to the caterer that Supplier 3 is the best option, despite the lack of flexibility of its payment options.

4.6 Selection of the optimal solution

Easiest way to find SME (Small Medium Enterprise) companies that need implementation of E-shop in CMS is to find companies requests on startup announcement websites like <http://500.co/startups/>, <https://angel.co/companies> . Companies there hire web developers on a “freelance” base contract, to buy from developers their websites and maintain for their particular business type. SME startup companies are in risk as well as web-developers. Companies may expect more than web-developer can give. On other hand developer may expect higher fee for website.

5 Results and Discussion

Creating of e-shop website depends on database and view of the website. View of the website is mainly template. Databases and adding functionality is possible by stablishing correct configurations and adding data into Extensions. VirtueMart is extension that can be configured by adding various plugins inside to create some additional functionality.



#	<input type="checkbox"/>	Module Name	Enabled	Order	Access Level	Position	Pages	Type	ID
21	<input type="checkbox"/>	VirtueMart Shopping Cart	<input checked="" type="checkbox"/>	18	Public	left	All	mod_virtuemart_cart	46
22	<input type="checkbox"/>	VirtueMart Currency Selector	<input checked="" type="checkbox"/>	19	Public	left	All	mod_virtuemart_currencies	47
23	<input type="checkbox"/>	VirtueMart Featured Products	<input checked="" type="checkbox"/>	20	Public	left	All	mod_virtuemart_featureprod	48
24	<input type="checkbox"/>	VirtueMart Latest Products	<input checked="" type="checkbox"/>	21	Public	left	All	mod_virtuemart_latestprod	49
25	<input type="checkbox"/>	VirtueMart Login	<input checked="" type="checkbox"/>	22	Public	left	All	mod_virtuemart_login	50
26	<input type="checkbox"/>	VirtueMart Random Products	<input checked="" type="checkbox"/>	23	Public	left	All	mod_virtuemart_randomprod	52
27	<input type="checkbox"/>	VirtueMart Search	<input checked="" type="checkbox"/>	24	Public	left	All	mod_virtuemart_search	53
28	<input type="checkbox"/>	VirtueMart Top Ten Products	<input checked="" type="checkbox"/>	25	Public	left	All	mod_virtuemart_top10prod	54

Figure 12 VirtueMart Module Manager

Source:packtpub.com

Joomla plugin VirtueMart, are able to block access to website based on Geo-location information from IP-addresses. Blocked visitors will either see a textual message or they will be redirected to another URL, both of which are configured in the settings of VirtueMart configuration. Geo-blocking stands for adding new functions as taxes and special calculations rule. [24]As an example consider e-shop located in EU. In case if customer is outside EU, VAT rule to pay additional tax will be applied.

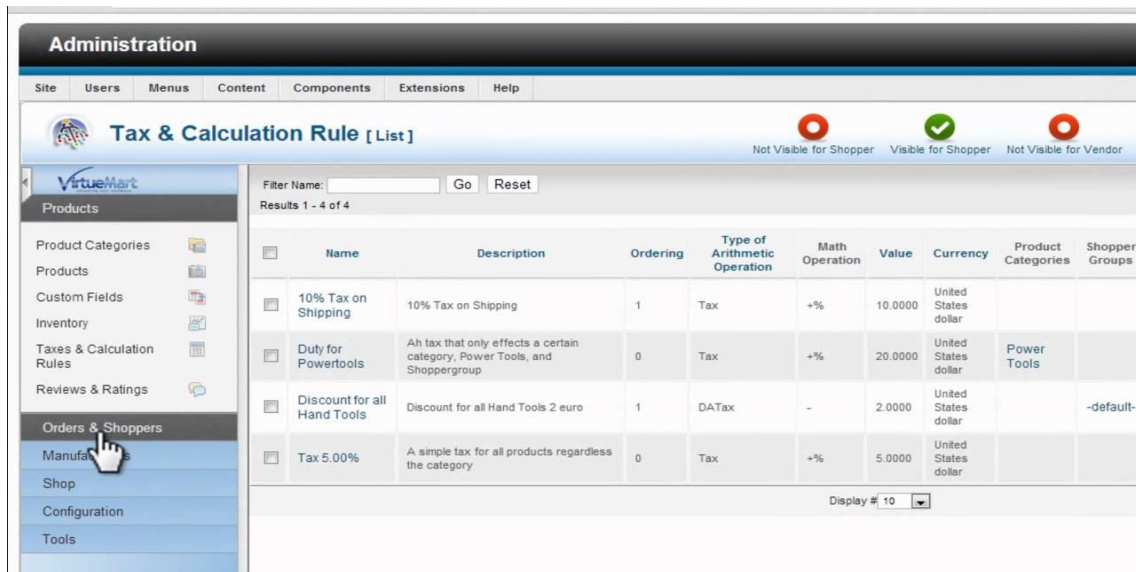


Figure 13 VirtueMart Tax & Calculation Rules

Source: i.ytimg.com

Anonymous customers see Price where VAT (20%) is included. VAT applied to Countries in European Union Location of e-shop is very important to analyse CBA and decision-making process. Consider comparison of location factors in case if shop is in Europe or USA.

Table 9 DMA Showing Unweighted Assessment

Factors:	Delivery Price	Delivery speed	Taxes	Delivery safety	Payment options	Population	Total
Weights:							
Europe	0	2	1	3	3	1	
USA	3	3	3	2	3	3	

Source: mindtools.com

Table 10 DMA Showing weighted Assessment

Factors:	Delivery Price	Delivery speed	Taxes	Delivery safety	Payment options	Population	Total
Weights:	4	1	2	5	3	6	
Europe	0	2	2	15	9	6	34
USA	12	3	6	5	9	18	53

Source: mindtools.com

From decision matrix analysis is obvious that shop located in USA is more profitable.

6 Conclusion

As the conclusion of the Bachelor thesis project main aim: creating an e-shop for an inter private business company by using CMS system had been reached. It was determined the relevance of creating an e-shop selling clothing. All the advantages and disadvantages of e-commerce were considered. The software needed to create an e-shop has been studied. Were considered the most popular CMS, "Joomla!" was chosen. Site design was developed, and template had been implemented. CMS were created in localhost on private PC and ready to be exported. "Joomla!" extensions have been studied and installed, plugins and components for extensions needed for the organization of trade via the Internet had been configured. The result was to create an online store, with an up-to-date design and user-friendly interface. Web-store prepared for hosting on server or export on any host. The initial cost of website development and monthly costs were identified during the calculations. Decision analyse comparison, that show benefit of location has been done. The cost of the creation of the store were set amount of \$810; monthly expenses are \$67. The minimum annual income predicted, amount is \$3996. According to estimated calculations the store will give profit after 2 months 13 days.

Factor the overall economic efficiency was 4.93, indicating that the economic feasibility of the project.

7 References

1. MENS, Tom, Alexander SEREBRENIK a Anthony CLEVE. *Evolving Software Systems: Computer Science* Springer-11645. Illustrated. US: Springer Science & Business Media, 2014. ISBN 3642453988, 9783642453984.
2. PATNAIK, R a M MISHRA. *Role of Content Management Software (CMS) in libraries for information dissemination*. Noida: IEEE Xplore, 2015. ISBN 97814799-7999-8.
3. Hackos, *Open Source Content Management Systems: Php-Nuke, Zope, Slash, Drupal, Mediawiki, Wordpress, Moodle, Web2py, Sobi2, Mambo, Midgard, Joomla, Dotnetnuke*, Wiley, 2013.
4. M. Rodseth, "Choosing a Content Management System.," HUGE, 2014. J. A. Metla, *Participation Technologies: A Framework for the Development of an Online interactive GIS application*, 2012.
5. BARKER, Deane. *Web Content Management: Systems, Features, and Best Practices*. Illustrated. Brewster, MA: O'Reilly & Associates Incorporated, 2016. ISBN 1491908122, 9781491908129.
6. NAIK, Poornima a Rajani KAMATH. *EXPLORING NEW TEMPLATE IN CSIBER'S EXISTING JOOMLA WEBSITE*. ISSN 2321-3469
7. LAYARD, Richard a Stephen GLAISTER. *Cost-Benefit Analysis*. Illustrated, reprint, revised. New York: Cambridge University Press, 1994. ISBN 0521466741, 9780521466745.
8. NIEDERMAN, Fred. *Content Management Systems*. Wiley Encyclopedia of Management. Chichester, UK: John Wiley, 2015, : 1. DOI: 10.1002/9781118785317.weom070014. ISBN 9781118785317. Available on: <http://doi.wiley.com/10.1002/9781118785317.weom070014>
9. K. Hulewicz, "SEO for Beginners, part 3: How to Create Product Descriptions That Search Engines Will Love," 09 April 2015.
10. BALTZAN, Paige, Kathy LYNCH a Julie FISHER. *Business-Driven Information Systems, 3rd Edition*. 3. Australia: McGraw-Hill Education Australia, 2015. ISBN 1743762119, 9781743762110.
11. CTI Reviews. *E-Business and E-Commerce Management: Business, Business*. 5 ed. USA: Cram101 Textbook Reviews, 2016. ISBN 1478401648, 9781478401643.
12. Joomla!® Documentation [online]. US: Rochen, 2016 [cit. https://docs.joomla.org/Portal:Learn_More].
13. MESSENLEHNER, Brian a Jason COLEMAN. *Building Web Apps with WordPress: WordPress as an Application Framework*. Illustrated. US: "O'Reilly Media, Inc.", 2014. ISBN 1449364799, 9781449364793.

14. MOORE, Alannah. *Create Your Own Website The Easy Way: The no sweat guide to getting you or your business online*. 1. Portland: Octopus Books, 2016. ISBN 1781573840, 9781781573846.
15. MARRIOTT, Jennifer a Elin J. WARING. *The Official Joomla! Book*. 2, illustrated. USA: Addison-Wesley, 2013. ISBN 0321821548, 9780321821546
16. DEXTER, Mark a Louis LANDRY. *Joomla! Programming: Joomla! Press*. Illustrated. US: Addison-Wesley, 2012. ISBN 0132780836, 9780132780834.
17. BINTU, Harwani. *Foundations of Joomla!*. 2. New York: Apress, 2015. ISBN ISBN 978-1-4842-0749-9.
18. RADTKE, Angie. *Joomla! Templates: Joomla! Press*. Illustrated. USA: AddisonWesley, 2012. ISBN 0133011577, 9780133011579.
19. J. HORTON, Building E-commerce Sites with VirtueMart Cookbook, Birmingham: Packtpub, 2013. ISBN 978-1-78216-208-7
20. KLOOSTRA, Simon. Joomla! 3 SEO and Performance [online]. 2015: Springer science, 2015 [cit. 2015-09-04]. ISBN 978-1-4842-1125-0.
21. *Joomla! Extensions Directory*TM: <https://extensions.joomla.org/> [online]. US: Rochen, 2016 [cit. 2016-11-27]. Dostupné z: <https://extensions.joomla.org/>
22. H. Shi. *The Economics of E-Commerce and Networking Decisions: Applications and Extensions of Inframarginal Analysis*. Illustrated. US: Springer, 2013. ISBN 1403938377, 9781403938374.
23. *Decision Matrix Analysis: Making a Decision by Weighing Up Different Factors* [online]. NY US: Mind Tools Ltd, 2015 [cit. 2016-12-01]. Dostupné z: https://www.mindtools.com/pages/article/newTED_03.htm
24. *Joomla! Extensions Directory*TM [online]. Open Source Matters, Inc. US: Rochen, 2016 [cit. 2016-12-01]. Available on: <https://extensions.joomla.org/support/knowledgebase>