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MODEL SURADNJE ZNANSTVENO NASTAVNIH INSTITUCIJA I GOSPODARSTVA

COOPERATION MODEL OF THE SCIENTIFIC AND EDUCATIONAL INSTITUTIONS AND THE ECONOMY

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ANALYSIS OF THE APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN PRODUCT PROMOTION AND SALES

ABSTRACT

Recent development of information and communication technologies increases the possibility of efficiency promotion and sale of products on the market. Web 2.0. technology based on HTML5 language allows customizing content for all currently available mobile devices that enables it. The above mentioned technology allows also, through its benefits, more effective overview of the content on the Internet browsers what makes the products and services more competitive. The paper is showing shaping the company's business model for the promotion and sale of dairy products. Based on the defined business model, the possibility of using information and communication technologies for business improvement is analyzed. Also, an example of the application of information and communication technologies in a defined business model is shown.

KEY WORDS

Web 2.0.; HTML5; e-bussiness; B2C; B2B

1. INTRODUCTION

Current development of information and communication technologies are assumption of more efficient development of all economic and social activities. Innovation originating in scientific knowledge, research and development is characterized as a high technological level, and dynamic market of electronic communications which are telecommunications basic determinant.

The application of information and communication technologies in the sales and promotion of products with a focus on products of the dairy industry will be investigated and described in this paper. It will also be described the application of a business model on the example of a company that specializes in sales of dairy products (primarily cheese). The aim of the research is to determine the effectiveness of the application of information and communication technologies in a defined business model.

The actuality of research is evident through a series of previous works published in this field. The study [1] shows the application of information and communication technologies in

enhancing the quality of life of blind and visually impaired persons. The paper provides guidance in the development and adaptation of web pages for the specified user group. The paper [2] explored the possibilities of online sales promotion and it sets theoretical model of relationship between sales promotion and encouragement of online and time and energy spent on the website searching. The level of risk of B2C model, security purchases through the e-business and the way in which companies can reach a competitive advantage in the market are presented within research [3].

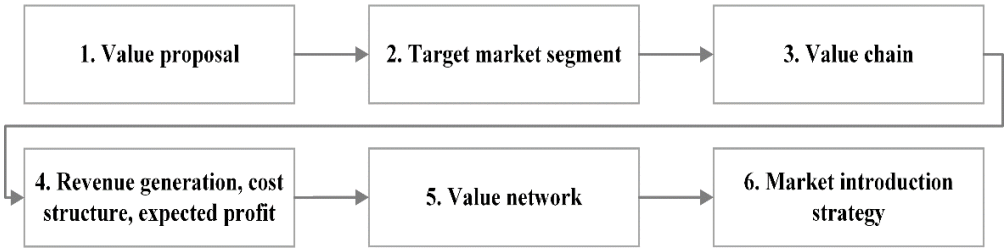

Figure 1 - Design of business model

Method of forming a business model according to Henry Chesbrough and Richard Rosenbloom, shown in Figure 1, is suitable for technological innovation witch are described through six basic steps [4]:

- Definition of the product or service and its value to the consumer,
- Target market for that product or service is intended, with the estimated size of the market and target market share,
- A description of the value chain necessary for the product or service, with the main elements of costs,
- A description of the structure of costs and potential revenue and profit of the product or service,
- The necessary arrangements with suppliers, partners and complementary to market participants and
- Draft strategy for the introduction of products or services on the market, as well as the actions necessary to achieve the desired position, with their estimated costs.

The final step is defined strategy ways of introducing products or services on the market [4], [5]. A business plan is a reflection of the business model in time and defines the way the company wants to make a profit.

In this paper, will be shown an example of the possibility of application of modern technologies to improve the functionality of the company's business for the promotion and sale of dairy products.

The goal of business model is to provide efficient access to products as well as help in choosing them by means of e-business.

2. METHODOLOGY OF RESEARCH

By analyzing the functionality and characteristics of current web technologies for the promotion and sale of dairy products, architecture information and communication system will be recommended. The proposed architecture will be based on Web 2.0 technology and uses all the advantages of HTML 5 programming language. The analysis comparing the

capabilities of native and mobile web applications in Table 1 shows the advantages and drawbacks of different versions.

Table 1 - Advantages and drawbacks of developing web technologies

Methods of web application development		
Characteristics	**Native applicative solutions**	**Web solution based on HTML5 language**
Cost	High initial cost and ongoing investment.	Modest initial investment.
Portability	Separate version required for each operating system.	Easy creation of cross platform versions.
Maintenance	Complex to maintain and slow to roll out changes.	Relatively simple to maintain with instant updates. Easy
Speed of Delivery	Starts from scratch, slow to develop, and requires a lot of testing.	Starts from scratch or optimized from desktop solution. Moderate time to develop; requires a lot of testing.
Performance	Runs locally with quick loading and fluid interaction.	Internet reliance results in slower load and response.
User Experience	Made for mobile: smooth, fast, and intuitive to use.	UI performance is slower and normally optimized from desktop, so less satisfying.
Integrated Device Features	Integrates with all device features and other apps.	Very limited device integration. from
Push Notifications	Cost-free notifications can be sent directly to users' devices in real time.	Not possible.
Offline Features	Best support for offline features, native data storage.	Limited offline support.
Future Proof	Native apps can take advantage of device innovation instantly.	Slow or impossible to adopt device innovation.
Cost	High initial cost and ongoing investment.	Modest initial investment.

Source: [4]

The development of e-business based on HTML5 technology can make products and services more accessible to users. Different types of mobile devices and the supported operating systems can make native applications more efficient in promotion and sales of dairy products.

In the research the analysis of the effectiveness of business models using HTML 5 technology will also be presented.

3. ANALYSIS OF THE APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE PROMOTION AND SALE OF DAIRY PRODUCTS

One of the key parameters of the decision on the introduction of modern information and communication technologies in the distribution process is the dispersion of the distribution area. In this study, analysis was carried out for the territory of Bosnia and Herzegovina, which has an extremely unfavorable dispersion of business objects that are found in many smaller towns. Among these towns is a significant geographical distance, but also extremely inadequate infrastructure routes, making it difficult and significantly more expensive distributive role in this market.

During the introduction of information and communication technologies in the distribution process is necessary to pay attention to the current institutional, infrastructural and other specifics because it is impossible to apply the positive achievements from other locations.

Thus, the fundamental suggestions for all decision-making regarding the application of information and communication technologies monitor progress and constantly studying the results of research in other markets. Finally the introduction and maintenance of such systems is, due to high costs of implementation, development and further improvement of technology, still necessary to put in the relative ratio together with other parameters such as the amount of salaries, cost of maintenance of information systems, the projected savings etc. An important paragraph in the introduction of information and communication is adequate readiness, particularly in infrastructure and human resources, since the implementation of the software without the appropriate standards in storage and logistical capacity or with a lack of expert knowledge responsible personnel makes little sense [4].

3.1 Analysis of the current business model

Key segments of the business model is to allow the user evaluation of products or services depending on user needs. The user will select a particular product or service if [5]:

- Thus achieves greater benefits (example - a better quality of service),
- Achieves the same benefits, but at a lower cost and
- Remains loyal.

The product or services are differentiated if the user perceives a higher and / or a new benefit in the use of that product or service. Differentiation can be achieved in the following ways:

- The introduction of new products and services,
- Improving of existing or adding new features product or service,
- Highlighting the reputation of the trademark,
- Building a wide network of users,
- The timing of entering the market,
- Segmentation of markets and selecting target markets and
- The establishment of support services and maintenance.

Because the business is conducted in the time of development of modern technologies, innovations are an important prerequisite for business success, and survival in the market. As the possibility of the application of modern technology in today's business is introduction of online orders and sales of certain items (dairy products).The market is divided into segments within which individual user groups have homogenous needs and between them there is no overlap of needs. Most often are analyzed the needs of the market segment. Sometimes the products or services which is being developed for the entire market is adjusted to the needs of a particular market segment [5][6]. An example of segmentation of the market in terms of users is shown in Figure 2.

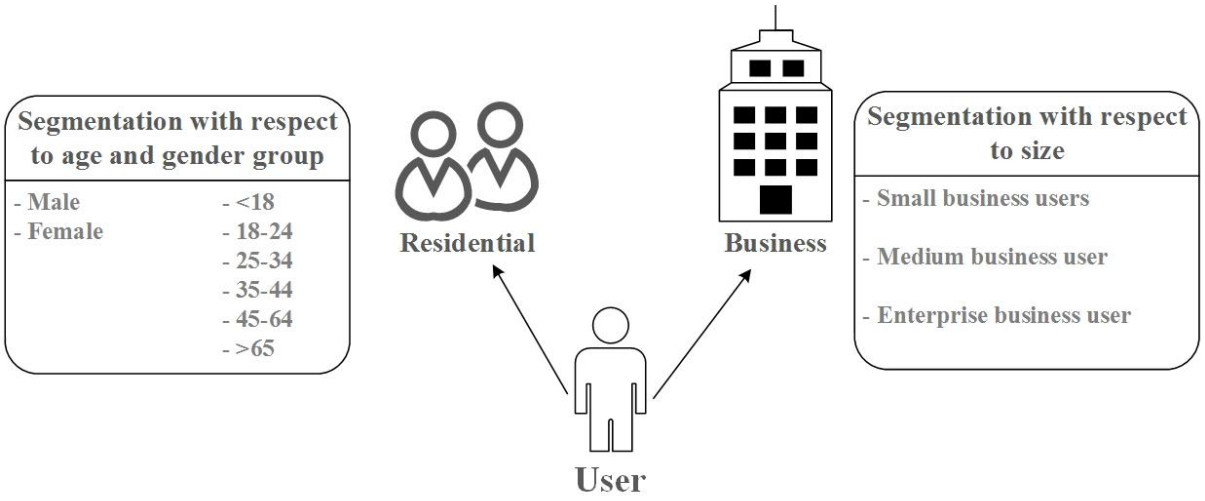

Figure 2 - Example of market segmentation

For an innovative product or service it is necessary to determine the relationship to existing products or services on the market.

New product or service may be independent of existing products or services. If they are dependent on each other can be a substitute or complement of another product or service [5].

3.2 The value chain of information and communication technology

Basic value chain of information and communication technologies includes elements shown in Figure 3 [5]. When developing a business model for a new product or service (promotion and distribution of dairy products), the company may include all or only certain elements of the displayed value chain. Defined in this way, the value chain is called the internal value chain.

Figure 3 - The elements of the value chain

According to the above image elements of the value chain include:

- **Content** - offer of dairy products from different manufacturers that are offered to users of the e-business,
- **Services / applications** - a unique interactive interface based on the principles of e-business,
- **Server** - service models based on the concept of cloud computing,
- **Network** - a network infrastructure that includes all the relevant factors of the system,
- **The customer premises equipment** - a mobile terminal devices and computer equipment for access to services and
- **User** - all interest groups.

New product or service should be evaluated in terms of the existing value chain in order to define possibilities of expanding the application of new services or products.

4. THE APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES FOR IMPROVING BUSINESS EFFICIENCY

The introduction of information and communication technologies in businesses, particularly those with activities in the field of production and distribution of dairy products, brings many benefits and offers a lot of advantages:

- Increase the speed and accuracy of logistics operations,
- Reduction efforts of employees,
- Improving control of operating,
- Improve capacity utilization storage and equipment,
- Reduction of needed inventory in stock,
- Reducing the cost of storage and
- Reduction of paperwork.

The objective of the business model, shown in this study, is to allow easier access to the products and the provision of information by using e-business model. Through Web access, users can find information about suppliers, as well as the full range of products. It gives customers the ability to order online, payment can be made via the electronic enrollment data from the credit card customer, until the entire purchase process ends with the delivery of the product in the shortest possible time, with the majority of the activities carried out automatically, without human intervention.

4. 1 Web 2.0. technology

During the development of e-business of company it is necessary to observe the rapid growth of the use of mobile devices. According to a study [7] 80% of users access the Internet has a smart mobile device, as shown in Figure 4. In order to maintain the competitiveness of the company in the market and increase the number of users and customers is a key step is the development of support for the e-business and through various platforms for mobile terminal devices.

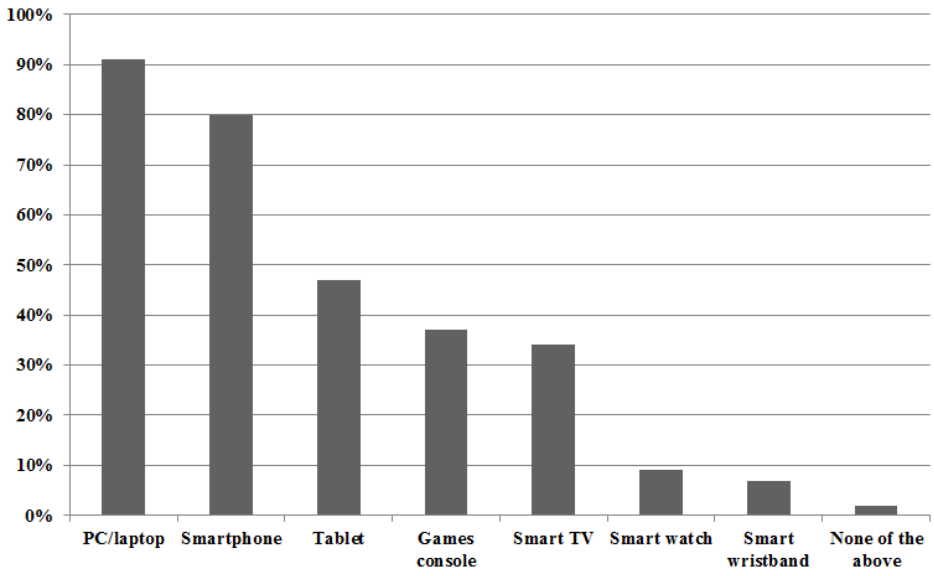

Figure 4 - The used terminal devices of users with internet access [7]

During the development of e-business support for multiple mobile platforms is essential to use advantage of HTML 5 language that enables responsive design available for multiple device types (desktop, smartphone and tablet).

Customizable or responsive website design does not require making a number of different models for different devices and device platforms. Adjustments to various devices (screen size) is needed, which does not include the added expense of all the different devices, but the cost depends on how your page is demanding (complexity, variety of content and capabilities required) detail is shown in Figure 5.

Figure 5 - Adjusting content to customer equipment

Everything you see on the monitor of desktop computer or laptop is also visible on your cell phone or tablet, but adapted to their screen size. The content of information affects the efficiency of search engine optimization - SEO module that also allows the objectives of the company and the market, all with the goal of more efficient promotion of products.

Web solutions based on HTML5 language are independent of the platform and are developed by traditional Web programming, which makes them more affordable for business.

4. 2 The model of e-business distribution and marketing products

More efficient distribution and promotion of dairy products is possible by using Web 2.0. technology. As one of the e-business model in this paper is a web interface based on Web 2.0. technology. Figure 6 shows the graphical appearance of a web model for the distribution and promotion of dairy products for Bosnia and Herzegovina (LiSIR).

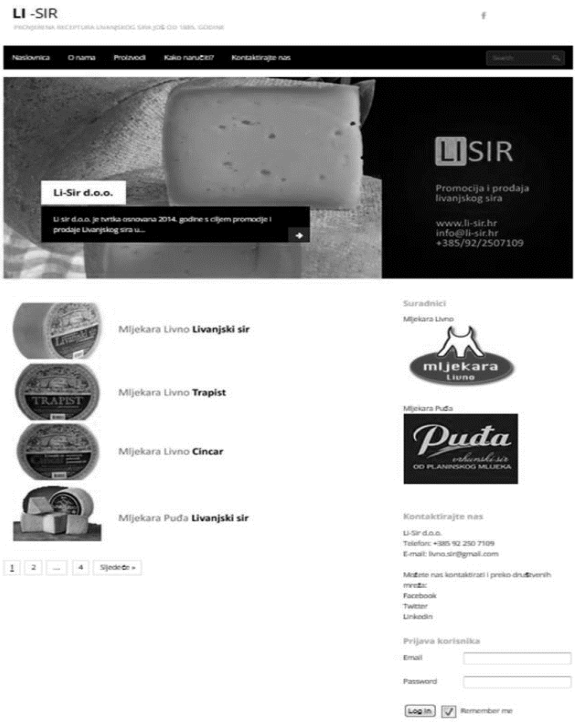

Figure 6 - Web 2.0. interface company for distribution and promotion of dairy products

Website is divided into five main segments: Home, About Us, Products, How to order and Contacts. The site is developed by HTML5 technology, PHP 5 programming language and CSS3 elements for graphical planning, and for the database MySQL server is used.

On the home page there are basic information about the company, news and current affairs in their business. Also can be found the registration form for all clients who wish to be registered users, and product's order form.

A large number of users of social networks is enough reason to create company profiles for the purpose of advertising. Therefore, in order to promote company created profiles, currently, the most frequent social networks Facebook, LinkedIn and Twitter.

New and innovative forms of promotion are key to attendance of the company's website which also has a positive effect on sales of the product. Native or organic promotion is one of such forms which includes native promotional formats designed for targeted platforms that take advantage of the ways to use them. An example of such forms of promotion is reflected in the use of "sponsored announcement" on the Facebook platform. Insurance company Standard Life is applying this form of promotion on the Facebook social network has achieved a 100% increase in attendance sites compared to standard ways of promotion [8].

Cancellation of purchase represents a significant problem in terms of loss of income. According to a study [9] 70% of all online purchases canceled for the following reasons, shown in Figure 7:

- Unexpected delivery costs,
- The need to create a new account,
- Conducting research,
- Safety issues related to payment,
- Unclear checkout and
- Difficulty of finding coupon code.

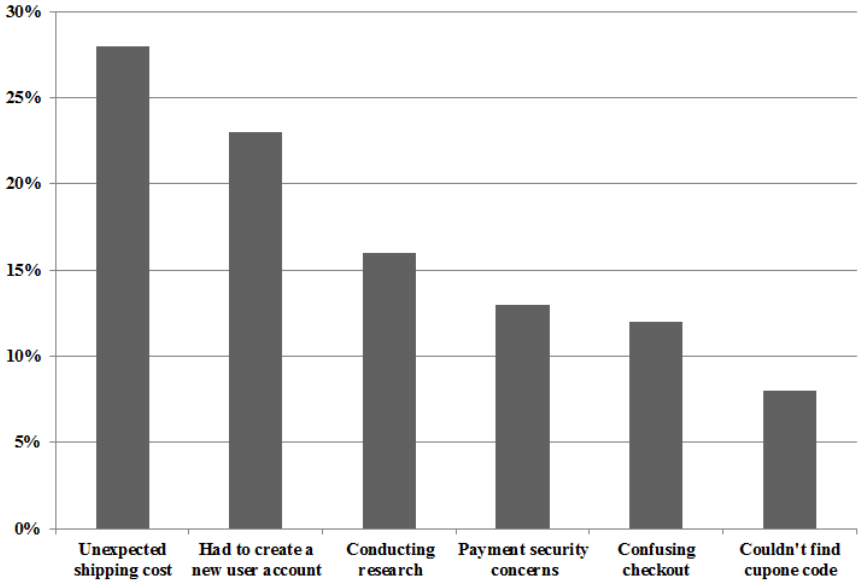

Figure 7 - Reasons for cancellation of the online purchase [9]

These problems can be avoided or reduced access which includes the use of carefully selected methods. Some of these methods are [9]:

- Application of interactive tools such supports in deciding whether to buy,
- Improving the functionality of search and
- Providing policy of purchase and assessment of total cost as early as possible in the process of buying a product.

In addition to these methods can be applied to the following:

- Provide opportunities for registration without the need to create a new account using the application possibilities of already existing accounts created on one of the more representative online platform (eg. Google, Facebook, LinkedIn)
- Special attention should be paid to safety issues, as a key factor of e-business. The required level of security system should be achieved by implementing multi-layer security model using the following mechanisms:
  - Encrypting the entire client-server communication
  - The implementation of two-factor authentication
  - The implementation of internationally recognized standards and recommendations of information security such as ISO / IEC 27001, 27002, COBIT, TM Forum, etc.
  - Connect the platform to implement online payment with a high level of information security implemented (for example. PayPal)
- Development of an intuitive interface to effortlessly use the Web or mobile applications

According to the above, it is necessary to consider many factors and manage them carefully in order to reduce the number of canceled purchase of products in order to achieve higher efficiency of online sales.

5. ARCHITECTURE OF THE SYSTEM BASED ON COMPUTING IN THE CLOUD

For described solution, architecture of the system based on computing in the cloud is proposed. Information provided by the interactive interface is created from all interest groups and suppliers of dairy products (Figure 8). Social networks are an important part in the process

of promoting new products so their integration is also a necessity. Attractive ads on portals social networks can create more effective online sales.

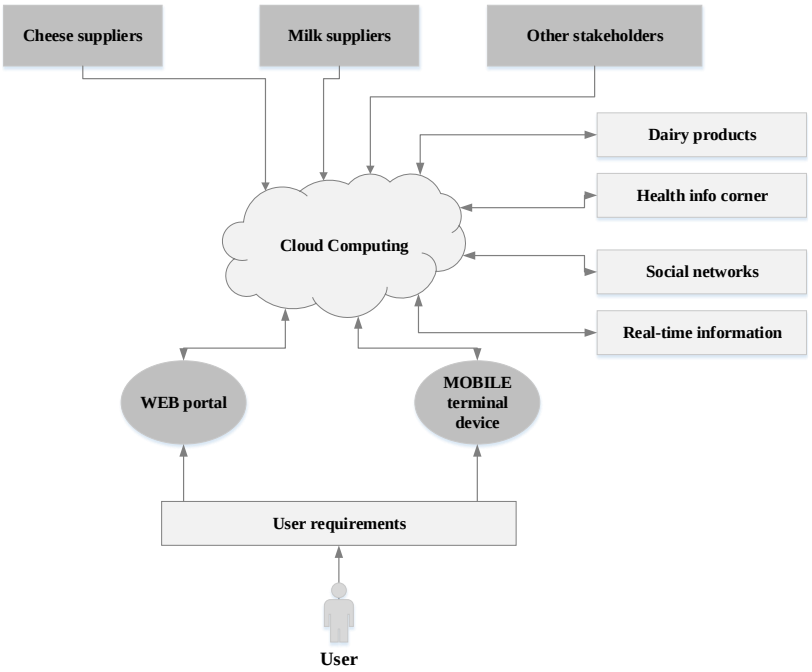

Figure 8 - Architecture LiSir system for the distribution and promotion of dairy of products

CC platform can be described through five basic characteristics, three models of services and three different implementation models [10]. Five basic characteristics are described as follows:

- *On-demand self-service*. A consumer has unilateral provision of computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service's provider.
- *Broad network access*. Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., smartphones, tablets, laptops, and workstations).
- *Resource pooling*. The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or data centre). Examples of resources include storage, processing, memory, and network bandwidth.
- *Rapid elasticity.* Capabilities can be rapidly and elastically provisioned, in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.
- *Measured Service.* Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

The most significant possibility in case of *CC* platform are the models of delivering the service. The mentioned models allow delivery of the defined aspect of computing as service. According to the mentioned literature three basic architectures of service delivery are defined: Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). The mentioned service models have the following definitions [11]:

- *Software as a Service (SaaS*). The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a Web browser (e.g., Web-based email), or a program interface. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.
- *Platform as a Service (PaaS).* The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or -acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.
- *Infrastructure as a Service (IaaS).* The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications; and possibly limited control of select networking components (e.g., host firewalls).

CC platform can be implemented in three basic scenarios of service delivery [11]:

- *Private cloud.* The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.
- *Public cloud.* The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.
- *Hybrid cloud.* The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).

By applying the concept of cloud computing the user is allowed the accurate and updated information regardless of the access technology use. Service Provider unique concept of promotion and distribution of products has no additional investment in the development of solutions dependent on specific devices. Described HTML5 technology by its responsive design allows that in the most efficient way.

6. CONCLUSION

New technologies are an important variable in economic growth. Investments in Internet technology and new business models allows the inclusion of companies in the Internet economy and create opportunities for development and growth of the business beyond the physical market. This is especially important for companies and economies that operate in the markets of limited size.

This paper has tried to answer the question of whether is possible this way of sale of dairy products, which are necessary investments in order to improve e-business and is it possible to follow the trends set by the major world markets. When the perception of people that shop online is changed it can save time and money, without having to think about risk of purchase on the internet.

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