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Marketing Information Systems in the Development of Construction Facilities

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Abstract

In this paper, the object is research and development work in construction and the subject is the marketing information model of synergy between the research and development and information process. Based on the previous and researched possibilities provided by internet technologies, marketing information-communication process has been defined where synergy between the internet and the development process in construction is envisaged. The basic conclusion arises from a number of advantages provided by information technologies, so the synergy of marketing and development process becomes more efficient.

Keywords 1

marketing, development, internet, information and communication

1. Introduction

Construction in every national economy is an activity of special interest and significance. This activity shares its destiny with other participants but can be an exceptional stimulator of recovery and progress of economic trends. Namely, construction follows the course of the rest of the economy in times of crisis, but it is investment that can give an incentive to get out of difficulties in any national economy. The basic reason for this research is the state of construction in Europe and the Republic of Croatia. The results of this research show the movement of the volume of construction works in the Republic of Croatia and the average of the 28 EU member states

It was determined that the volume of construction works in the Republic of Croatia until 2010 was above the EU-28 average, while after 2010 it was constantly below the EU-28 average. This, in turn, would mean that the economies of other member states, and then their construction sectors, on average withstood the crisis better than Croatia. Also, it can be

noticed that the volume of construction works in the Republic of Croatia has been constantly decreasing since 2008. Thus, in 2015, the volume of construction works in the Republic of Croatia was lower by as much as 32 percent compared to 2010. [1]

Thus, some researchers have identified non-traditional forms of communication that occur during a crisis, including: Internet marketing that uses the Internet as a source of data, a means of exchanging information, communication, but also a medium through which companies and their products can be promoted [7]. As the financial crisis leads to reduced investment in marketing, virtual advertising is becoming increasingly important. [15]. Based on the previous facts, this paper investigates and defines the activities of research and development work in construction. As a starting point, a symbiosis of the process of research and development work with the marketing-information process enabled by Internet technologies has been proposed. Various methods have been used as part of the proposed processes, such as; analysis

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and synthesis, induction and deduction and especially abstraction and modeling.

2. Construction objects: Complex products in construction and their development

Construction is an extremely complex economic activity in its structure. Structurally, this activity consists of the design, construction and maintenance of facilities, and the production of construction materials and equipment.

The complexity of buildings is best seen from the analysis of their special features which are as follows: [14]

- Immovable buildings - they are produced on site.
- Large length of production process.
- Use of large amounts of reproductive material and equipment.
- Seasonal character of construction production
- Individual character of production..

According to Figure 1, it all starts with the creation of ideas about a possible new object or the need to adapt known types of objects in accordance with the new processes that take place in them. In addition to the function, changes in buildings also depend on various climatic, safety and other restrictions, and in construction these are also requirements for new aesthetic solutions.

After selecting the best idea, you can start creating a conceptual project that contains the following: [14]

1. A unique description of the intervention in space containing a textual description and a graphic representation of the intervention in space,
2. Technical description of the intervention in the area
3. Data from geotechnical and other research works, if necessary,
4. Technical solution of a temporary building, which contains a textual and graphic part, if necessary for the implementation of interventions in space.

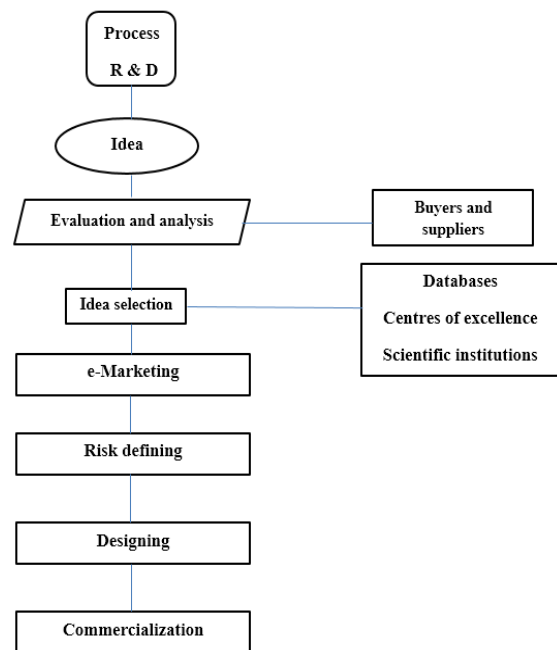


Figure 1: Product-object development process in construction

After selecting the right idea and creating a conceptual design, a marketing plan is set and marketing activities are carried out in order to research the market. These activities are most efficiently carried out using information and Internet technologies and possibilities. The market segment in all construction companies is geographically limited and these are not administrative boundaries but cost constraints because the greater distance from the company increases not only traffic but also labor costs [12]. As part of market research, the essential elements of the marketing mix in construction should be especially emphasized. This primarily applies to all qualitative components of a new product. In particular, the method of price formation in accordance with the type of payment should be determined. If it is a prefabricated building, then it is necessary to define some elements of distribution. All the features of the marketing mix are united by promotion and efficiency in practice will be best ensured via the Internet. The Internet is a network that includes a large number of other networks and services that provide but also exchange many services and thus the processes in which producers, intermediaries and consumers participate at negligible costs [17].

The main project obtains a building permit and the building constructed according to the main project can obtain a use permit. The detailed design will best serve larger and more

demanding buildings or buildings where there are, for example, differences in levels. Execution project translated into simple language can be extremely useful as a guide or guide for masters and contractors. [8] Project documentation, especially for the construction of a new development facility should include new methods that model spatial relationships, geographical parameters, lighting analysis, quantities and technical descriptions details of some elements of buildings in three dimensions. In particular, elements of the BIM method should be included, which visually and computationally encompasses the entire process from construction, information, process modeling to building maintenance [19]. As part of development design, the best combination of BIM with the kanban lean tool, which involves monitoring each phase of the process, refers to interventions in the event of a disturbance. Such a combination is known as KAN-BIM [18]. Fully equipped documentation can serve and enable the commercialization of a new development building. After the successful completion of previous development procedures is the next commercialization.

3. Marketing information and communication system in construction sector

3.1. Development of information internet technologies

In the second half of the twentieth century there was a rapid development of information especially Internet technologies that enabled the development of the economy and society as a whole. In this sense, the Internet development achievements that can help in the process of development of buildings as complex products in construction are investigated below. It all started when a networked hypertext system was developed for CERN called the World Wild Web (www for short) that included HTML language and HTTP protocol, so after installing it on a computer, the first web server was created. HTML (Hypertext Markup Language) is a programming language used when creating Web pages using standard codes, which is used to define the appearance of a document. HTTP (Hypertext Transfer Protocol) is a set of rules that determine how two devices or programs can communicate [16]. After the development

of the possibility of connecting and working between two or more computers, the Web 1.0 portal was defined, which enabled the connection of commercial with non-commercial networks and communication itself became more efficient and cheaper[5].

Every entrepreneur should open a Web portal on the most famous social networks, because this is the minimum that every particularly new entrepreneur should do. With this, they will master working on the Internet in a short time and discover new possibilities. This is especially true for market research, because with minimal costs it will determine the possible boundaries of the market segment and even the group of the most important customers and suppliers. After determining the market segment and the grouping of the most important customers and suppliers, the entrepreneur can proceed to the opening of a personalized Web portal [11]. In construction, this solves the problem of too much information and communicates only with the target group of customers and suppliers, which is also the transition to the phase of determining the market segment in the supply and sales market. After determining the target group of customers and suppliers, the conditions have been created for a more precise approach to the market public, and other platforms such as blog, twitter and especially CRM can be used for that. The most widely accepted definition of a blog is that it is actually an online diary, the author of which publishes various current comments, news, almost every day, which describe events about the company's business with photos and links. This is a very convenient way to communicate for consultation changes between already known business partners [17].

The development of Internet technologies has enabled more precise and secure connections with customers and suppliers such as CRM (Customer Relationship Management). CRM or customer relationship management is the process of managing interactions with existing as well as past and potential customers. It is one of many different approaches that allow a company to manage and analyze its own interactions with its past, present and potential customers [3]. This approach to communicating with customers has the following advantages: [10]

- Easier to find profitable customers.
- Integrated distribution assistance.
- Improved sales efficiency.

- Increased price competitiveness.
- Facilitated product presentation
- Better interactive cooperation with customers.
- Individualization and personalization of marketing messages.
- All customers connected on one platform.

The main components of CRM are building and managing customer relationships through marketing, observing interpersonal relationships by stages, then managing those relationships at each stage and controlling the distribution of information. The next form of internet marketing communication is a forum created by the technological evolution of bulletin boards. Therefore, in a technological sense, forums are Web applications that manage user-generated content[6]. In earlier periods, online forums could be described as a web version of an electronic list or newsgroup; allowing people to post messages and comment on other messages. Subsequent developments have mimicked different newsgroups or individual lists, providing more than one forum, dedicated to a particular topic [4]. The development of technology and information technology has enabled direct synchronous communication where the company communicates simultaneously with multiple business partners. This type of internet communication is known as video conferencing. This involves connecting individuals and groups through telecommunications networks and video technology so that participants have the impression of attending meetings simultaneously in the form of a live video link on a computer screen. [13].

Additional opportunities that can increase the effectiveness of marketing activities in the process of building development are social networks. We can define them as a Web-based service that allows an individual to create a (semi) public profile and within a restricted system, articulate a list of other users with whom he shares connections and see and compare his contact list with those made by other users within the system. [2] There are several ways to use a social network, such as: creating your own profile and areas of interest and preferences, searching and finding old or making new friends, sharing pictures and videos, but you can become a member of certain interest groups.

There are several types of social networks, and on this occasion, Facebook, Instagram and LinkedIn will be especially highlighted and most available in practice. [9]. All of the above social networks provide the opportunity to personalize mutual information after synchronous discussions.

3.2. Marketing information and research process in the development of new buildings

Research and development work on the development of a new building is a very complex highly professional and activity in which, in addition to construction and architecture, other technical and economic staff should participate. Figure 2 just shows a symbiosis of marketing information with the development process into one information and communication system, where Internet technologies participate in each phase.

Figure 2. shows the marketing research and development process aimed at a new construction product, and in accordance with this process, an information process takes place in which Internet technologies are an effective aid. The basic premise for such an approach is that the company has a fully established involvement in all the necessary Internet technologies in order to be able to use all the opportunities provided by numerous platforms.

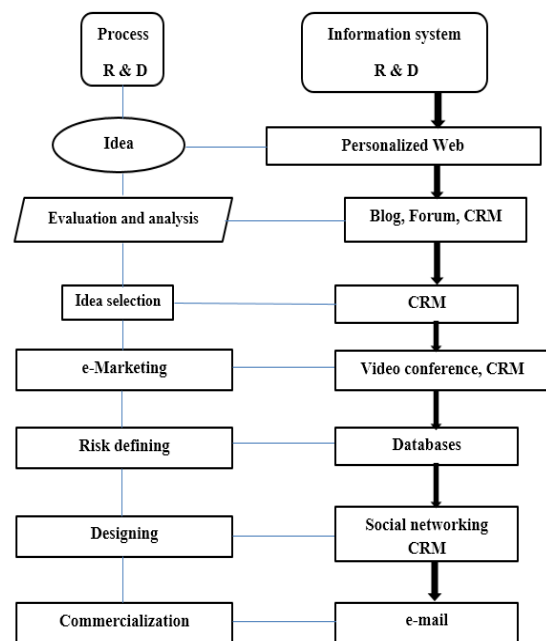


Figure 2: Symbiosis of marketing and with the information system of construction product development

At the very beginning of the R&D process in order to develop a new building, Internet technologies can be included through a personalized website. Therefore, it can be concluded that information technologies can help in the development of new complex products in construction and ensure a lasting connection with target customers and suppliers and other parts of the relevant environment.

4. Discussion

Research on the object and subject of this topic has shown that it is an important activity in construction because only the results of research and development work can be a guarantee of lasting competitiveness and thus profitability. In this sense, a common process of developing a new product in construction has been proposed, and that is a construction object. The analysis of the construction object shows that it is an extremely complex product, so its development consists of several complex activities. In addition, the development process is supported with Internet information technologies, which reduces costs throughout the process and increases overall efficiency.

Internet possibilities have been explored and the necessary applications proposed in all phases of the development process where the ultimate goal is the preparation of project documentation that covers the entire life from construction through maintenance or operation and, in some cases to recycling the facility. The aim of supplementing this topic may be to research the technical details related to the operation and maintenance of the new facility. In addition, new functional, environmental, static and design requirements and constraints will imply the need for constant additions and reconstructions of the already built facility, which will cause the need for new methods of maintenance and operation.

5. Conclusion

Previous considerations point to the conclusion that qualitative progress is needed in Croatian construction, and this is certainly more attention to research and development work. In this way, the construction company becomes

more competitive and less dependent on other trends in the economy. The scientific contribution of this article is in the right definition of the research process with the aim of developing a new facility as the most complex product in construction. This is especially emphasized after the explored possibilities and synergies of Internet technologies in the development process, which is the starting point of this research process. Since the appropriate participation of databases and scientific institutions has not been determined, this is a certain limitation and reason for continuing the research.

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