VIRTUAL REALITY AS MARKETING TOOL FOR DEVELOPER PROJECTS

Ing. Pavol Kaleja; prof. Ing. Mária Kozlovská, Ph.D.

ABSTRACT

Virtual reality, in area of software and hardware equipment, experiencing very rapid develop worldwide. This equipment should give realistic experience to observer in virtual reality environment. Devices for control and display virtual reality environment are very important in this area. Contribution in the introductory part describes the categorization of virtual reality in construction and architecture with regard to the virtual reality tools that are widely used in marketing of development projects. These technologies radically improve communication between developers and clients, especially in the phase when the building is not built yet, but the developer has to start sell real estate (or rent it). In the case study are presented marketing tools based on virtual reality implemented for development project Paseo Grunty in Kosice.

Key words: *Virtual reality, Marketing mix, Dynamic visualizations*

1 INTRODUCTION

The rapid development of information and communication technology also enables rapid progress of various modern forms of marketing. Example applications of modern forms of marketing on the basis of information and communication technology is the application tools of virtual reality (VR) within development projects, whether it is the construction of residential buildings or retail buildings. Selling of real estate can begin before their realization. The success of the presentation and sale of real estate lies on effective marketing (Ryoo at al., 2016). The clients are often in contact with the development project primarily through its visualization (Wergles N., Muhar A., 2009). Therefore this area is constantly and rapidly developing to satisfy customer needs for obtaining as much information about the project as possible. The current trend moves virtual reality as a modern marketing tool closer to the customer. Visualization development from static to dynamic and immersive forms of presentation in virtual reality (W. A. abdelhameed 2013). These technologies make it possible to enable a client to browse all the premises in an apartment building. He receives information about the apartment layout, size of rooms, the price of the apartment and, of course, on its orientation relative to the cardinal. Virtual reality can simulate the view from the window designs even though the apartment buildings does not yet exist. According to our survey, 94% of potential users would like to use tools of virtual reality in the process of acquisition of immovable property (Budzák, 2016). Therefore, the standard approach to vendor marketing mix (Wongleedee K. 2015), can be significantly upgraded thanks to VR.

2 VIRTUAL REALITY AS A MARKETING TOOL

The basis of VR is to display the real environment as faithfully as possible in an artificial virtual environment and work with this environment in real time. Virtual reality is actually a shift from simple (two-dimensional) human interaction with the machine , to a position where this interaction takes place in three-dimensional environments. These methods tend to be enhanced by the use of special peripherals that provide visual, tactile, auditory and positional interaction (Saturday, Hrozek 2013). For virtual reality in general , the following characteristics are valid :

- all actions take place in real time , preferably immediately in response to user action ,

- virtual world and the objects placed in it have three-dimensional character , or at least create the impression,
- Users are allowed to enter the virtual world and move in it by different paths (walks , flies , jumps, quickly moves to a pre-defined location),
- virtual world is not static and therefore the user can manipulate its parts , while virtual bodies run on animation curves , and affect the user and each other.

By (Saturday, Hrozek 2013) Virtual reality in construction due to dynamics of the observer and the environment can be divided into four basic categories described below.

SESO - static environment and static observer

Virtual reality in marketing has been used for many years by means of static visualizations of interior and exterior, by which developers and architects present their projects (Kaleja, Kozlovsky 2014). The group of static visualization is therefore now also its most common form. In a static visualization we are talking about static image rendering (imaging of 3D) models, which cannot be manipulated in real time. The notice of static visualization is thus limited to the image content when it is observed. An example would be rendering of any building. In a static visualization observer can watch a still-rendered images of the object in the environment (Fig. 1).

Fig. 1 Static visualizations of development project Paseo Grunty Košice

DESO - Dynamic environment and static observer

In this category we include virtual reality video tours, thus higher form of visualizations, represented by camera motion in a virtual environment, which is not be modified. Camera movement is precisely given and except for the general action (Rew, Play, Pause, Stop, FF) it cannot be redefined in any way. The alternatives are also video presentation GIF picture.

SEDO – Static environment and dynamic observer

This includes the most common panoramic tours of exteriors and interiors (Fig. 2). 360 degree panoramic tour is based on the principle where the user can control scanning cameras. The camera can be rotated 360 ° degrees horizontally around the y-axis and 360 ° degrees vertically about the x axis. Two types of visualization grade 360 °. 360 ° image rendering speed and 360 ° video rendering speed. In case of 360 ° visualizations Rendering images through observation point are defined in one place and the image that the user can watch is static and unchanging. For videos, the user can move the camera on the path traversed by the camera in a virtual environment but it cannot be controlled. If the user wants to see some place or further details, they simply stop the video and can look around. In either case, however, elements of the observer in a virtual environment can be edited.

Fig. 2 360° panoramic visualizations of development project Paseo Grunty Košice

DEDO - dynamic environments and dynamic observer

Dynamic Virtual Reality is the highest form of virtual reality that lets 3D objects and virtual environments themselves in some way modify and thus obtain more necessary information. With dynamic virtual reality (VRDEDO) interactive environment allows us to move around the building, pass the building interior, simulate different environmental conditions in real time to adjust the architectural design and many other features that are based on the unlimited possibilities of virtual reality. These functions can therefore be helpful to all participants in the construction, whether it is a developer, architect, designer, contractor or individual user. This categorie is also a very popular for the technology of mixed reality (AR) (Mesárošová, Hernandez, Mesároš 2014).

- All four categories of VR can significantly promote the project level information within its marketing mix in all its parts:
- Product- through a clear understanding a client has a clear idea of the product and the size of the apartment, the apartment layout, the view from the apartment window designs.
- Price- VRDEDO applications allow clients to have updated information on the price in respect of a particular apartment.
- Distribution road- VR applications are spreadable online which is the most effective form of distribution.
- Promotion- visualization and applications VRDEDO are often a key form of promotion of the project.

3 TREATMENT FOR VR THE RESIDENTIAL HOUSE - CASE STUDIES VRDEDO

The Faculty of Civil Engineering Technical University has implemented the key marketing tools for the residential building project Paseo Grunty Kosice (Fig . 3). Developer required processing an environment that benefited all four categories of virtual reality SESO , DESO , SEDO , DEDO. The project offers 55 residential units with balcony (or terrace) and 60 underground parking spaces in an enclosed area . The project offers apartments in energy class A , where each apartment comes with a parking spot in the underground garage and housing cell in the hallway of the apartment.

Fig. 3 Development project Paseo Grunty Košice

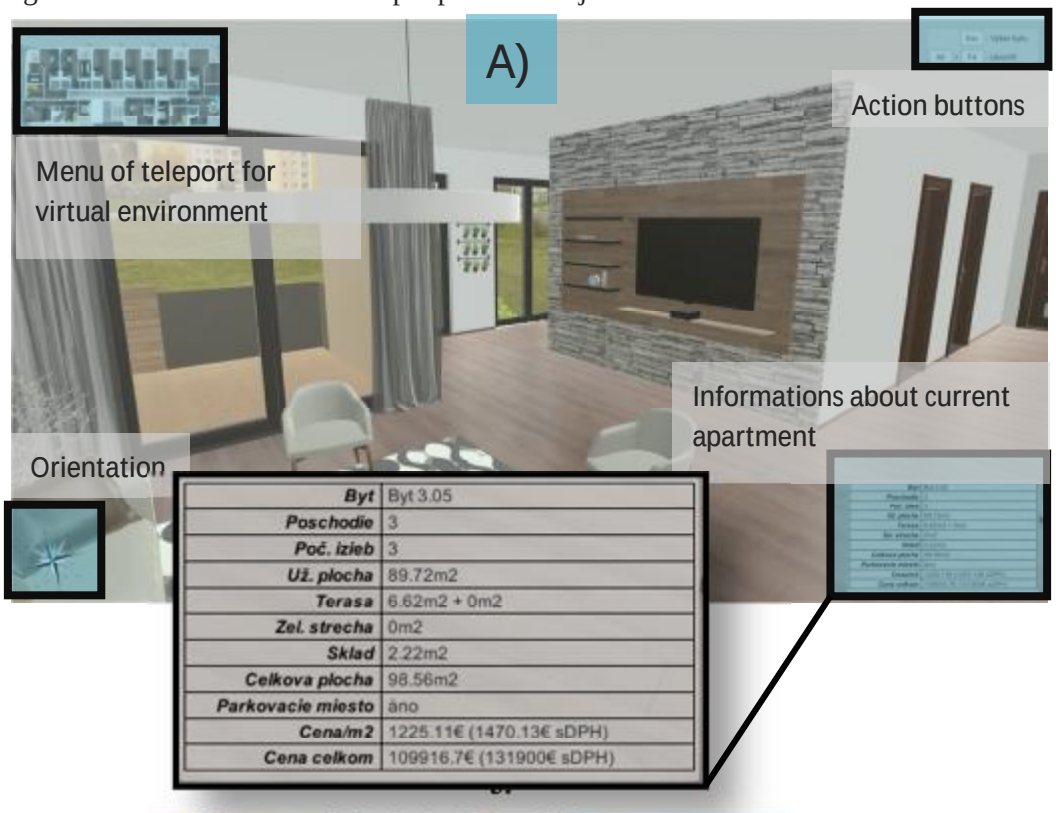
Processing and marketing tool using virtual reality technology generally requires software and hardware which include drone, data processing equipment and equipment for displaying virtual reality . The software package is primarily where software development and visualization applications arise . In order to be able to simulate the view from the terraces of each apartment, and yet existing building , we had to take a picture of a site by the Drone (Fig . 4).

Fig. 4 Photoshooting with drone for simulation of view from apartments windows

Developer could present the project of a yet unrealized apartment building in a fully dynamic virtual environment that supports glasses Oculus Rift and start selling apartments before starting construction. We are talking about interactive virtual tour of categories dedo (VPDEDO) (Fig. 5), which is a separate Windows applications programmed in Unity 3D development software. This application allows the client before the execution of the works:

- freely walk around the whole complex of residential building,
- enter into any room and underground garage apartment building,

- VR decorate each apartment by the furniture from the information database received about each apartment after entering into it,
- understand orientation relative to the cardinal points through real-time North Star, freely wandering around nearby,
- watch a view from every window of the construction and residential building terraces,
- together with the architect developer pass the subject and discuss at a retail location or online.



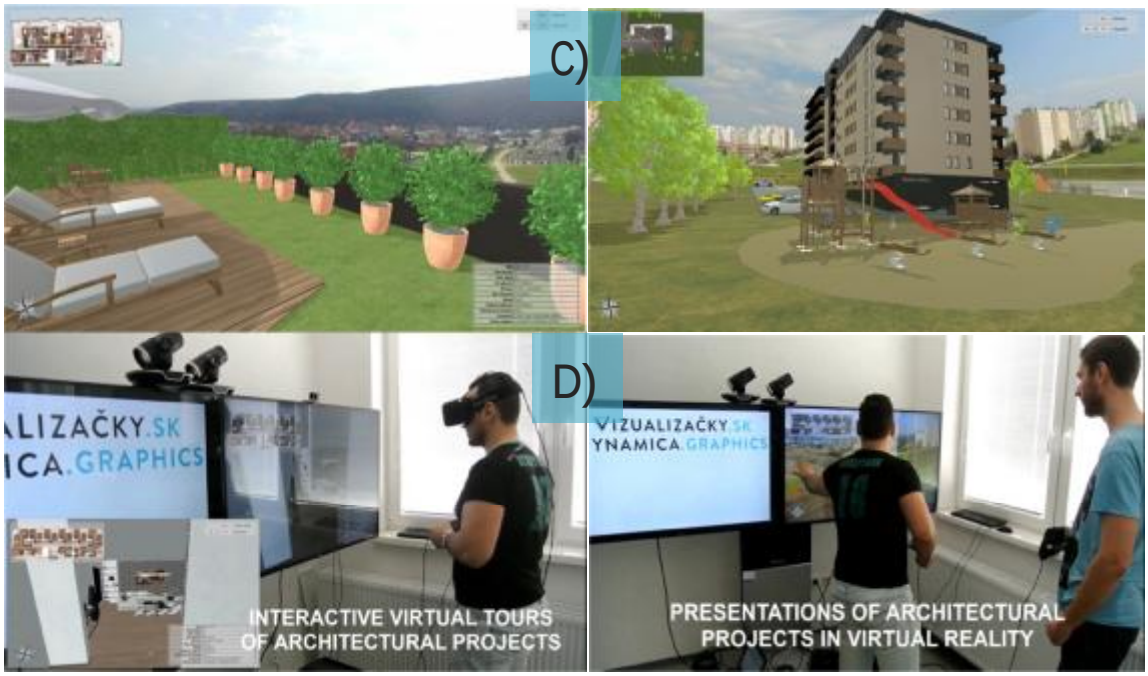


Fig. 5 Graphical User Interface VRDEDO
A) Graphical User Interface VRDEDO, B) Menu of teleport for virtual environment, C) Free walkthrough around object D) Control options of VRDEDO

With the ability of virtual reality a client may walk around the building and a residential area seen with a broader relationship and view from every window of the construction, balcony or terrace from a human perspective (Fig. 6). Finally, the layout of housing can be seen, with the size of individual rooms, their illumination and overall impression. Interactive virtual tour in the category dedo (VRDEDO), the user can run on their PC without the need for additional installation of any other software. Very effective use of VRDEDO can also be found at the point of sale, when the developer of the project with the client can pass through objects, presenting the details of the project (Fig. 7). VRDEDO is often used in the opening events of development projects.

4 CONCLUSION

The possibilities of virtual reality technologies today are very effective at removing barriers in communication between the developer and his client. Finally, these technologies allow the launch of a marketing campaign development project or the actual sale of the property long before starting the project. The present classification of virtual reality technologies in view of the dynamics of the observer and the environment allows us to classify each VR technology available in construction and architecture. The present study confirms the possibility of practical application of VR through VRDEDO built project in the Paseo Grunty Košice. It also affirms the effective impact on increasing the information level of the marketing mix of the project.

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