



# Development and Exploitation of Software Complex of Virtual Community Life Cycle Organization

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## ABSTRACT

This paper presents development of software complex of virtual community life cycle organization. The investigations stages and directions of virtual community life cycle, introduction of indicators of tasks directions of virtual community life cycle organization, determination of criticality of indicators of virtual community life cycle organization, definition of socially-oriented risk of virtual community life cycle are enabled to develop a software complex of virtual community life cycle organization. Software complex of virtual community life cycle organization consists of three levels: management level, level of performance, level of databases and information resources. Developed software tool "Virtual organization of community life cycle" is an important and actual task. The software tool is the basis for increasing the efficiency of creating a virtual community and improving its functioning throughout its existence. The attainment of the objectives and the development of virtual communities based on software complex of virtual community life cycle organization are developed in this studies.

## Keywords

Virtual community, lifecycle, directions, indicator, manager, software tool

## 1. INTRODUCTION

Virtual communities have become an extremely popular phenomenon, and with each passing day their number is growing, and existing communities are rapidly developing. As a result, the creation of virtual communities grew into a separate type of professional activity, and virtual communities become a certain type of project. However, observations showed that often treating to virtual community as a project (with clear goals, objectives, sequence of steps) they were failures. That is because the virtual communities treated as a traditional project, but there are things that go beyond the traditional project. In this paper, we investigate the appearance of the project by type of the virtual community, its features complex of works associated with the project activity of the virtual community.



## 2. RELATED WORKS

Considering the rapid development of virtual communities actual are the following directions of scientific research:

- Safety and information wars in virtual communities (propaganda or disinformation spreading) [1];
- creation and management of virtual communities [2, 3];
- creation and management of information content of the virtual community [4];
- users attraction and monitoring of virtual community, socio-demographic characteristics users of the virtual communities [5, 6];
- marketing and advertising in the virtual community [7];
- research of virtual community life cycle organization [8-11].

Monitoring of users, content, marketing component help to highlight the directions for virtual community life cycle organization. Also, these studies are needed to allocate the parameters of the indicator directions for tasks of virtual community life cycle organization. Research on security of virtual communities help eo form socially-oriented risks with virtual community life cycle organization.

However research on virtual community life cycle organization is incomplete and imperfect, are sporadic. The researchers representing only conceptual models of virtual community life cycle, models frequently consist of only four elements.

## 3. BACKGROUND STUDY

Any project consists of a sequence of stages, which have title and certain characteristics, namely project life cycle. A virtual community life cycle – execution of tasks and it stages by time period, from planning to create a community to full its liquidation. For qualitative creation and management of virtual community structured life cycle, includes the following steps: planning, analysis, designing, development, testing, implementation, exploitation, comprehensive verification, conservation community, liquidation. And dedicated stage, characteristics of the virtual community, was named virtual community life cycle directions [12]:

- user direction (processing of activities of participants and users of virtual communities);
- informational direction (content of virtual community);
- resource direction (technical and technological support for creating and managing of virtual community);



- reputational direction (support of content of activity and its virtual community ranking, positioning of the virtual community).

**Virtual community life cycle directions** – is the focus of the implementation stage of virtual community life cycle organization, resulting tasks performed during all directions.

The process of implementation stage in four directions is distributed nature, separate components that perform performers of virtual community life cycle organization [13]:

- **manager of creation of virtual community** – a specialist responsible for success of virtual community life cycle organization;
- **analyst** – responsible for analyzing the data in a certain field;
- **performer of stages** – responsible for the implementation stages;
- **performer of directions** – responsible for execution of tasks directions.

For effective implementation of stages of virtual community life cycle happening execution of tasks directions. For perform the tasks directions of virtual community life cycle organization introduced indicators [14]:

- **Planned indicator** (*IndPlan*), which consists with reference indicator (*IndReference*) and indicators analysis of the subject area of virtual community (*IndAnalysis*);
- **Real indicator** (*IndReal*), which consists with input indicator (*IndIn*) and output indicator (*IndOut*).

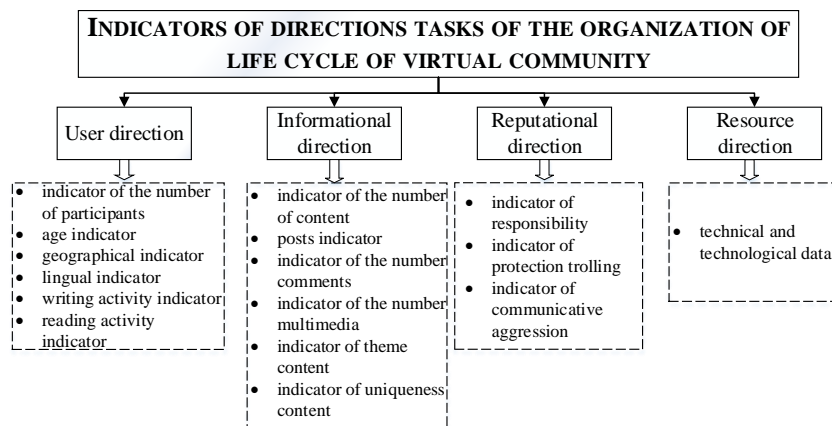
Highlighted basic indicators of tasks directions of virtual community life cycle organization, which are the primary data of the community:

- indicators of the user direction  $Ind\_Us(Task_i)$ ;
- indicators of the informational direction  $Ind\_Inf(Task_i)$ ;
- indicators of the reputational direction  $Ind\_Rp(Task_i)$ .

Tasks of resource direction performed without indicators a based on technical and technological characteristics. Set of indicators of tasks directions of virtual community life cycle organization is show next (Figure 1).

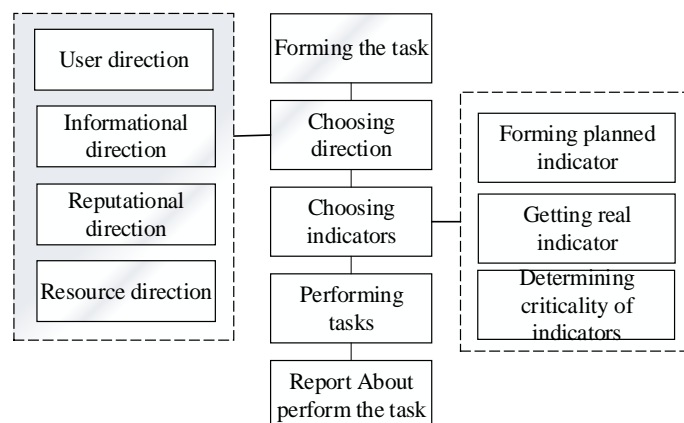


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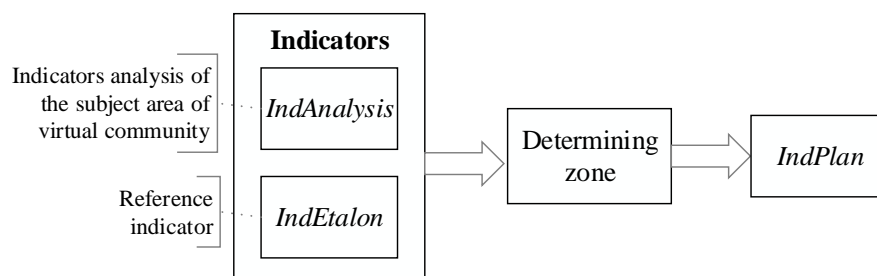
**Figure 1. Indicators of tasks directions of virtual community life cycle organization**

According to organizational management algorithm for the effective implementation of stages of virtual community life cycle happening perform the tasks directions, as shown in the following scheme (Figure 2):



**Figure 2. Formation of the tasks directions**

The process of forming of planned indicator to perform tasks directions of the organization of life cycle of virtual community [14] is described in the following scheme (Figure 3):

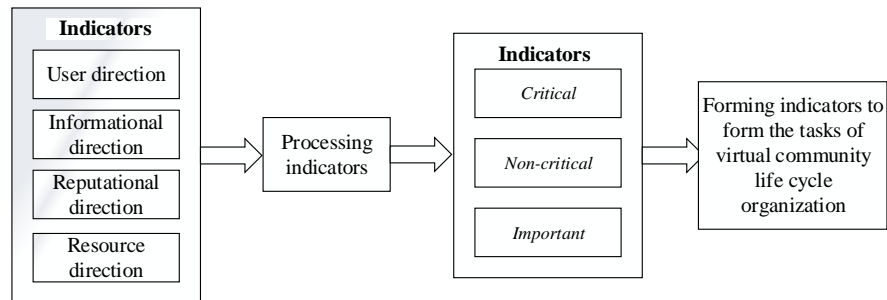


**Figure 3. The scheme of forming planned indicator of virtual community life cycle organization**



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The process of determination of the criticality indicators to perform tasks directions of the organization of life cycle of virtual community [14] is described in in the following scheme (Figure 4):



**Figure 4. The scheme of determination of the criticality indicators to perform tasks directions of the organization of life cycle of virtual community**

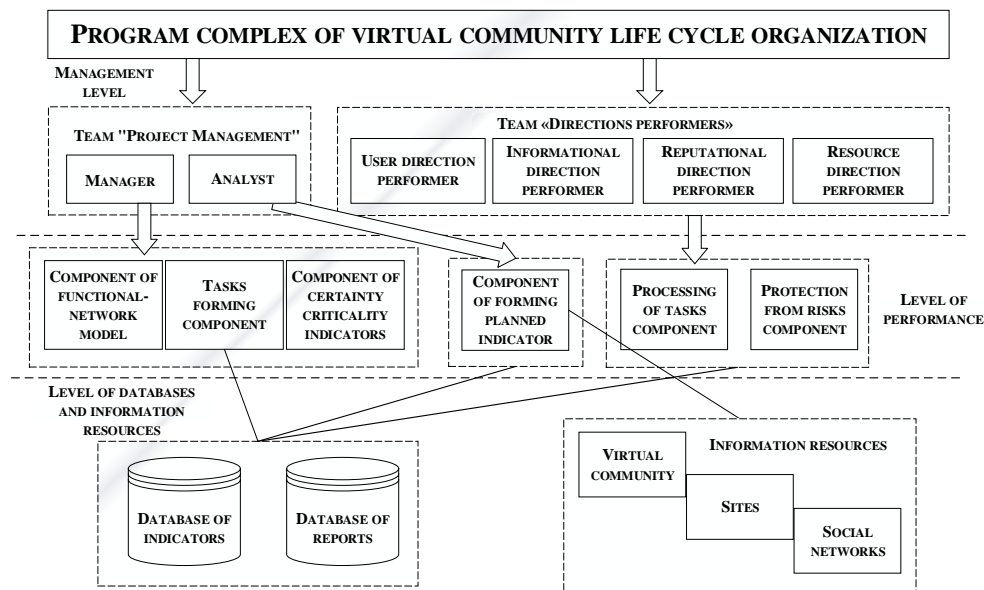
Creating a virtual community has its own specifics and in risks in particular. Therefore, the description of virtual community life cycle organization highlighted a number of socially-oriented risks and described in [15], namely:

- the risk of a negative-minded audience ;
- risk of reducing the quality of content;
- the risk of anti-legal materials and activities of community;
- the risk of losing control of the community.

Based on conducted researches, highlighted the features of virtual communities and developed a software and algorithmic complex of virtual community life cycle organization (Figure 5).

#### 4. METHODOLOGY

The structure of the program complex of virtual community life cycle organization shown next.



**Figure 5. Structure of the program complex of virtual community life cycle organization**

The structure of the program complex of virtual community life cycle organization consists of three levels:

- management level;
- level of performance;
- level of databases and information resources.

#### 4.1 Management level

Fulfills duties of this level team of performers, which provide process of implementation of virtual community life cycle organization. The functionality of this level are used throughout the life cycle of the virtual community. Management level consists of two teams and six workplaces.

**Team "Project Management"** – team of performers, which provide process of implementation of virtual community life cycle organization. Performers of this team engaged in formulation of tasks, analysis, adoption key decisions of virtual community life cycle organization. Team "Project manager" has two workplaces "Manager" and "Analyst". **Workplaces "Manager"** responsible for virtual community life cycle organization. The main functions of the workplace is to create tasks, distribution of tasks between performers team "Artists", documentation and acceptance the key decisions regarding the organizational process of creating of the virtual community. **Workplace "Analyst"** responsible for analyzing the data in a certain field. Specialist of the workplace is the analyst. Due to project constraints of the virtual community, analysts may be several. As the analyst is not a particular profession, by specialty analyst is divided into: marketing analyst, systems analyst, financial analyst and others.



**Team «Directions performers»** – team of performers, which responsible for implementing the tasks directions of virtual community life cycle organization. Workplaces correspond to directions of virtual community life cycle organization, namely: user, informational, reputational, resource. The workplace can be attached several performers depending on the specific virtual community created. **«User direction performer»** responsible for activities related to the participants of the virtual community. **«Informational direction performer»** responsible for activities related to the information content of the virtual community. **«Reputational direction performer»** responsible for activities associated with maintaining the reputation of the virtual community. **«Resource direction performer»** responsible for activities related to technical and technological characteristics of the virtual community.

#### **4.2 Level of performance.**

Level of performance of virtual community life cycle organization responsible for executive components of virtual community life cycle. Performers of component of this level is a manager, analyst and directions performers.

**«Component of functional-network model».** Functional-network model of virtual community life cycle organization based on Petri net. The model corresponds to the functioning of the virtual community [17].

**«Tasks forming component».** Component responsible for structuring the process of forming tasks of virtual community life cycle organization. Manager creates the task and delegate to performers of tasks directions of virtual community life cycle organization.

**«Component of certainty criticality indicators».** For quick and efficient perform the tasks, according to the purpose and objectives of a virtual community, appears necessity to define criticality of tasks indicators of virtual community life cycle organization. To determine the criticality of indicators necessary real and planned indicators of tasks performs of virtual community life cycle organization.

**«Component of forming planned indicator».** Planned indicators are close to ideal indicators and have an important role (especially when there is a critical comparison). Generates planned indicator manager of virtual community. To forming qualitative planned indicator of virtual community life cycle organization necessary to obtained from analyst reference indicator and indicators analysis of the subject area of virtual community.

**«Processing of tasks component».** Responsible for structuring of processing of performs tasks direction of virtual community life cycle organization. For performance of management algorithm processing of tasks



direction of virtual community life cycle organization corresponds direction performer, appointed by the manager of the virtual community.

«**Protection from risks component**». Responsible for protecting the appearance of socially oriented risks, which provides measures with counteraction. Performers of component are direction performers and manager of virtual community life cycle organization.

#### **4.3 Level of databases and information resources.**

Level includes database of tasks indicators and database of reports of virtual community life cycle organization. Also includes information resources.

«**Database of reports**» used as a data source about of virtual community life cycle organization. «Database of reports» including reports about performance of tasks directions of virtual community life cycle organization.

«**Database of indicators**». Information about indicators of tasks directions of virtual community life cycle organization includes the following information: planned indicator, reference indicator, indicators analysis of the subject area of virtual community, real indicator, input indicator, output indicator of virtual community life cycle organization.

«**Information resources**». Includes a set of information environment of WWW, necessary for analysis of the subject area and reference community. Necessary information resources for analysis: virtual community, sites, social networks.

### **5. RESULTS**

Based on software and algorithmic complex developed software tool «Virtual community life cycle organization» (Figure 6).

Potential users of the software «Virtual community life cycle organization» can be: owners and managers of virtual communities; marketers; PR-professionals companies, political parties, famous personalities.



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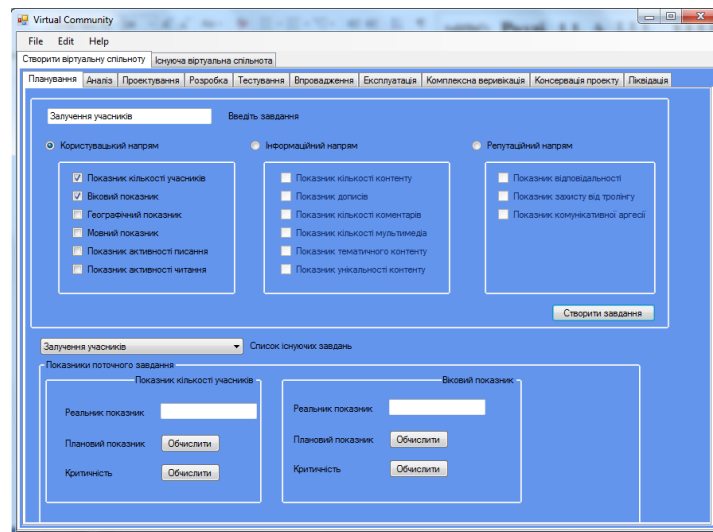


Figure 6. The user interface software.

After completion of the works on stage manager evaluates performance directions to 10-point scale. Graph of job evaluation added to the general documents of virtual community life cycle organization. Figure 7. Evaluation stages of «Department SCIA» presented the example of evaluation stages of virtual community life cycle organization «Department SCIA» in the social network Facebook.

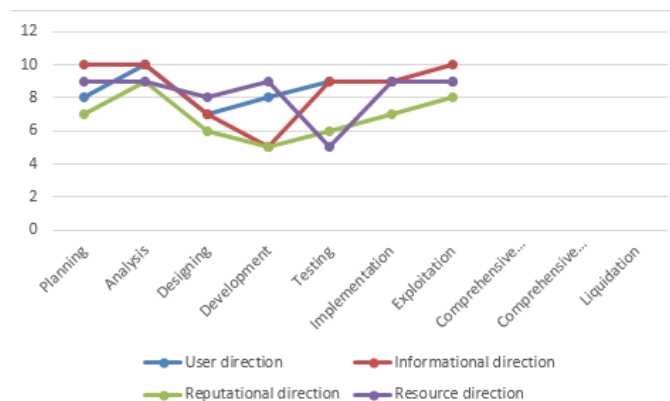


Figure 7. Evaluation stages of «Department SCIA»

## 6. CONCLUSIONS

Complex research on developing mathematical and software of virtual community life cycle organization has provided an opportunity to develop a software tool «Virtual community life cycle organization Complex research provides predictable create a virtual community; predictable sequence of steps and documentation; increases the level of control and the needs of creators and customers of the community.



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