

“Wiki communities’ management tools in conditions of digitization”

Lyudmila Kalinichenko 

Leonid Melnyk 



Oleksandr Kubatko 

Iryna Burlakova

Kostiantyn Babych 

Tatiana Pasko 

AUTHORS

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Lyudmila Kalinichenko, D.Sc. in Economics, Professor, Department of Economics and Management, V.N. Karazin Kharkiv National University, Ukraine. (Corresponding author)

Leonid Melnyk, D.Sc. in Economics, Professor, Department of Economics, Entrepreneurship and Business, Administration, Sumy State University, Ukraine.

Oleksandr Kubatko, D.Sc. in Economics, Professor, Department of Economics, Entrepreneurship and Business Administration, Sumy State University, Ukraine.

Iryna Burlakova, Ph.D. in Economics, Assistant Professor, Department of Economics, Entrepreneurship and Business Administration, Sumy State University, Ukraine.

Kostiantyn Babych, Postgraduate Student in Economics, Department of Business Economics and Administration, Sumy State Pedagogical University named after A. S. Makarenko, Ukraine.

Tatiana Pasko, Ph.D. in Economy, Assistant Professor, Department of Organization and Management, Wrocław University of Science and Technology, Poland.



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Lyudmila Kalinichenko (Ukraine), Leonid Melnyk (Ukraine),
Oleksandr Kubatko (Ukraine), Iryna Burlakova (Ukraine),
Kostiantyn Babych (Ukraine), Tatiana Pasko (Poland)

WIKI COMMUNITIES' MANAGEMENT TOOLS IN CONDITIONS OF DIGITIZATION

Abstract

The rise of local and global challenges (such as COVID-19, wars, natural disasters, etc.) requires advanced communication and information technologies to support economic development. The study aims to form a theoretical basis and practical tools for creating and functioning of wiki communities. Wiki communities are a new form of social association based on Internet communications of socio-economic subjects (individuals and organizations), in which each participant has equal rights to receive information, exchange opinions, and generate solutions. The theoretical basis involves substantiating the key principles on which wiki communities are formed, e.g., decentralization, openness, peering, sharing, and mass nature of activity. Wiki communities are represented by a set of specific types, such as professional, academic and research, custom, creative, public and non-commercial communities. The specific managing activities of wiki communities are described by several classification levels, such as operational activities, ensuring security, quality assurance, and motivation. The wiki community management toolkit includes a goal-setting algorithm, decision-making procedures, communications, rules of operation, typical tasks, areas of application, the operation and development cycle, and functional capabilities. It allows effective transfer of information, communication in real-time, and mutually enriching each other in forming knowledge and innovation.

Keywords

openness, wikinomics, collective intelligence, decentralization, wiki platform, communications, innovation, responsibility, virtualization

JEL Classification

D83, M15, O32

INTRODUCTION

In the conditions of digital transformation, socio-economic systems face challenges that question traditional approaches to management and cooperation. This necessitates the mobilization of collective efforts that are fundamentally new both in terms of form and content. The contradictory nature of the connections between the achievement of social, economic, and environmental goals causes the emergence of confrontational knots, which can be resolved only through the compromise of communities. In connection with this, there is an objective need to combine the information potential (knowledge, data, and institutions) to identify the cause-and-effect relationships that determine the occurrence and solution of problems. Processes of a cross-cultural nature aggravate the problems of interaction between different social groups, which can be solved only by using virtual communications and a consistent step-by-step search for common solutions. In addition, the processes of globalization of human development exacerbate the problems of finding a compromise between the need to preserve the inclusiveness of social societies and the need to achieve unification in international communications. This is impossible without the coordination of community interests at different levels of social organization. The importance of working together and sharing

knowledge becomes even more significant. The speed of reaction and flexibility become crucial, and optimizing management tools requires developing and implementing new forms of social organization. Wiki communities, as one of the key tools in the digital environment, play an important role in promoting innovation, sharing knowledge, and developing new approaches to implementing effective ways of cooperation that contribute to sustainable development.

However, to effectively use wiki communities in modern conditions, it is necessary to describe its features, basic principles of operation and specific instruments and methods to their management, ensuring the effectiveness of the socio-economic systems in the digital era. The research of this issue is relevant and promising in the search for optimal ways of adapting modern business processes to changes in the digital environment.

The purpose of the study is to form theoretical basis and practical tools for creating and functioning of wiki communities to increase the efficiency of socio-economic systems.

1. THEORETICAL BASIS

The study of the impact of digital technologies on communication became an active area of research in the 20th and 21st centuries. One of the pioneers is McLuhan (1964), who studied the results of the impact of technology on ways of perceiving the world, changes in social structures, and interactions in society. Postman (1990, 1993) studied the interaction between people and technology, particularly in the modern digital environment. Islam and Khan (2024) and Turkle (2011) analyzed social processes and provided evidence that due to digital technologies, new communication tools make possible previously impossible forms of group action and financial technologies.

Wikinomics and wiki communities become a new aspect of interaction and cooperation. The first theoretical foundations of wikinomics were initiated by Tapscott and Williams (2010), who defined the concept's essence and highlighted its main mechanisms. The study of wiki communities involves interdisciplinary research, and scholars contribute to understanding collective platforms. Co-founder of Wikipedia, D. Wales, made a significant contribution to the knowledge of wiki communities. His research is focused on studying the influence of social networks on people, businesses, and society (Wales & Weckerle, 2008, 2009).

The very concept of a wiki originated in 1994 thanks to the American programmer Howard Cunningham, who created the first website that allowed users to edit its content actively. This

project, WikiWikiWeb, was born to facilitate the exchange of ideas among the programming community.

The main idea of this project was to create a web platform where users could make changes, edit, and improve the content of pages in cooperation with other participants. One of the project's key features was its openness and the possibility of editing by any user without the need for authorization. This stimulated collective work and enabled various experts and users to improve and update information continuously. The WikiWikiWeb project became a prototype for many other wiki platforms. The term "wiki" was taken by H. Cunningham from the Hawaiian language, where "wiki wiki" is translated as "quickly" or "moving very quickly." This term has become an important part of information technology (Cunningham, 2008).

The concept of collective intelligence has been used in various contexts since the early 1990s. In English, it is used in two phases: collective intelligence and swarm intelligence. The last phrase comes from the word swarm (for example, bee swarm). The latter term was first established by Beni and Wang (1993) in the context of a cellular robot system. The concept of collective intelligence involves the information activity of systems consisting of a set of agents that interact with each other and with the environment to generate new information (Njegovanović, 2023). Each of these agents has limited intellectual capabilities. Still, interacting, they can demonstrate much more complex mechanisms of information activity,

which is conventionally called swarm (i.e., joint, collective) intelligence (Videira, 2023). Examples in nature are a colony of ants, a swarm of bees, a flock of birds, a shoal of fish, and even communities of microorganisms. What has been said makes it possible to better understand the concept of collective intelligence in a narrower context related to human activity (Mahato & Gaurav, 2023).

Swarm intelligence is widely used in fantasy literature. In particular, in Stanislaus Lem's novel "Invincible," a man finds a spaceship that exhibits intelligent behavior through small particles that come together for self-defense. In the scientific literature, the key principles on which wiki communities are formed include:

- decentralization (Berners-Lee, 2000) provides for the organization of system management, in which there is no authoritative hierarchical subordination of lower-level links to higher ones; all links of the system act independently of each other within the limits of legality criteria and the provisions of contracts concluded between subjects of different levels; the upper levels of the organization are limited to the functions of setting goals, coordinating the efforts of individual co-executives, analyzing the obtained results and their implementation;
- openness (Wales & Weckerle, 2009); the principle involves many facets, which, in particular, include the transfer of source information to partners and disclosure of its sources; a precise formulation of the final goal toward which the joint activity is directed; possible ways of using the obtained results; transparency of connections and powers of co-executors; openness of vital financial factors of the project;
- peering (Ayers et al., 2008); the principle means close cooperative cooperation on the basis of self-organization between project partners, including the willingness of partners to share tools for obtaining results (software, experience, licenses, etc.) with each other and if necessary, with clients;
- sharing (Tapscott & Williams, 2010) provides the opportunity for participants to jointly use

the assets of project partners (sources of information, data, physical tools, connections, rights) and the results obtained;

- mass nature of activity (Lessig, 2001) projects have an intercultural character and tend to create international creative collectives, including multinational ones.

Based on the mentioned principles, it is possible to define wiki technology as a set of methods and tools for researching while observing the principles on which wiki communities operate (decentralization, openness, peering, sharing, and massiveness).

Wiki communities are a new digital social organization model based on Internet communications of socio-economic subjects (individuals and organizations), in which each subject has equal rights to receive information, exchange opinions, and generate solutions. Wiki communities are built to solve pressing social, economic, and environmental problems. This new form of social organization provides a unique opportunity for people of different nationalities, languages, and traditions to effectively transfer information, communicate in real-time, conduct collective work on projects regardless of geographical location, and mutually enrich each other with cultural knowledge.

Wiki communities can focus on various topics, including science, technology, culture, education, etc. Each type of wiki community has its own specific characteristics and role in forming knowledge and innovation, which is systematized in Table 1.

Focusing on platforms such as Wikipedia, Brailas et al. (2015) and Ruhi (2017) consider the dynamics, management, and cultural aspects of wiki communities. Virtual communities and their impact on professional development and cooperation, formed around common interests and goals, attracted the attention of Keown (2009) and Alier et al. (2010). Dixon (2017), Tenorio-Fornés et al. (2022), and Loh and Kretschmer (2023) studied the contribution of virtual communities to innovation. They reveal methods of cooperation to create new, free, fast, autonomous, reasoned, and egalitarian evolutionary cultures that differ from those that prevailed in the industrial era.

Table 1. Types of Wiki communities and their features

Types of wiki communities	Features of wiki communities	The role of wiki communities in the formation of knowledge and innovation	Examples of wiki communities
Professional wiki communities	Groups of specialists who share common professional interests, experience, and knowledge.	They allow experts from different fields to be brought together, exchange best practices, and develop new solutions and innovations in their fields.	Stack Overflow; DevOps Wiki
Academic and research wiki communities	Groups of scientists, students, and researchers who cooperate in conducting scientific research and sharing knowledge.	Contribute to the increase of scientific potential, the exchange of research, the integration of knowledge from various disciplines, and the development of new scientific theories and practices.	Wikiversity; Citizendium
Custom wiki communities	Groups of people who use and discuss specific companies or platforms' products, services, or technologies.	They help companies understand the needs of their customers, identify problems and wishes, and contribute to finding ways to improve their products and services.	Fandom (formerly Wikia); WikiHow
Creative wiki communities	Groups of people who pool their creativity and ideas to create new works of art, media content, literary works, etc.	They create new ideas, express diverse views, stimulating innovation and the development of art, culture and technology.	Wikipedia; Commons; DeviantArt
Public and non-commercial wiki communities	Groups of people who use and discuss specific companies or platforms' products, services, or technologies.	Contribute to introducing new approaches to solving social problems, as well as the dissemination of information and education, which contributes to the development of society and the improvement of the quality of life.	OpenStreetMap; Appropedia

Modern enterprises actively use wiki technologies. On the competitive basis of crowdsourcing, well-known global companies involve leading specialists and enterprises in developing strategic projects. They are widely involved in implementing important projects (Peer-to-Patent, eBird, NASA Clickworkers) and volunteer with their computer and information potential. Paris coworking LaRuche selects projects in the field of social entrepreneurship. There is coworking in Nairobi iHub, which brings together technology projects aimed at solving Africa's problems.

Scientific studies indicate the importance of the formation and development of wiki communities. However, to fully understand the impact of wiki communities on economic systems, it is necessary to expand the research and focus on forming tools for managing these communities in the activity of economic systems. Analysis of the interaction of digital communities with modern economic realities can reveal new opportunities for developing innovative approaches and support for sustainable economic growth.

2. RESULTS AND DISCUSSION

This study systematized the wiki community management toolkit, which involves determining the content and forms of key tools for creating and

implementing wiki community activities. The key components of the wiki community management toolkit are the toolkit for starting wiki communities, principles of organization, goal-setting algorithm, decision-making procedures, communications, rules of operation, functions, typical tasks, areas of application, characteristics of the dynamics of the cycle of operation and development, functional capabilities and risks, development prospects.

There are specific types of activity that systematize the general properties of wiki communities:

- Common interests and topics. Wiki communities bring together people who are interested and have common interests in a particular topic area, activity, or project (Oe & Yamaoka, 2023). They can be specialists from the same field, researchers, students, or people who want to exchange knowledge about a topic.
- Collaboration and sharing of assets. The primary purpose of wiki communities is collaboration and sharing of assets between members. They provide a platform for discussion, publication, and collaborative problem-solving and share production tools that promote mutual learning and professional development.
- Mutual help and support. Wiki communities create a conducive environment for mutual

help and support. Participants can ask questions, get answers and consult with colleagues, which helps increase participants' potential, solve problems and improve professional skills.

- Exchange of knowledge, research, and experience. Wiki communities can be a platform for the publication of research, articles, and reviews, promoting knowledge dissemination and stimulating innovation.
- Interactivity and activity of participants. Members of wiki communities actively communicate, interact, and share their experiences through various means of communication, such as discussion pages, forums, chats, or notification systems.
- Innovations. Wiki communities stimulate innovation by facilitating the exchange of new ideas, data, and methods. This can become the basis for developing new products, services, and technologies.

Wiki communities provide a favorable environment for changes in society and economic systems. This creates prerequisites for solving problems and achieving set goals. Creative development in various spheres of life is stimulated. Such properties determine the functional possibilities of communication of wiki communities on wiki platforms. First, users can contribute by adding, changing, or correcting existing content. Communication takes place through discussions of articles, comments on edits, or special pages for communication. Second, the tools, methods, and technologies that can be used on wiki platforms to convey information, exchange messages, and establish communication between communication participants allow users to discuss ideas, share opinions, agree on edits, and resolve contentious issues regardless of distance or time. Third, due to openness and transparency, any user can contribute his idea and express his reasoning and opinion. At the same time, there is a system of verification and moderation to ensure the quality and reliability of information. Fourth, wiki platforms also allow the performance of organizational and coordination functions, particularly related to the role of an administrator, moderator, or editor. They implement

the functions of content management and quality control. This facilitates organized and controlled communication and development of the user community. Fifth, wiki platforms make it possible to keep documentation of all edits, allowing one to track the history of changes. This allows users to view, compare, and restore previous versions of posts. Sixth, users can leave comments, feedback, or corrections for their partners. This allows one to make adjustments, improve content, and communicate based on interactions. Finally, wiki platforms create an opportunity to reach consensus and find compromises. Users jointly discuss different points of view, offer arguments, and agree on the final version of the content.

The key areas of application of collective intelligence where wiki technologies can be used are:

- business and management (decision-making, generation of innovations, market research);
- science and research (formation of cooperation networks, international projects, forecasting);
- social systems and management (e-democracy, collective bargaining, adoption of strategic regional development projects, response to crises);
- environmental protection and public health (ways to preserve natural objects, initiatives in the field of environment and public health);
- cloud technologies and big data (data analysis, human-artificial intelligence interaction).

These perspectives can contribute to the further development of wiki communities and strengthen their role to increase knowledge and joint cooperation in a single European world.

The communication functionalities on wiki platforms contribute to the activation of collective intelligence and create prerequisites for the reproduction of new information, knowledge exchange, generation of innovations, and development of the wiki community. The specified methods in the work are systematized according to four key groups (Figure 1).

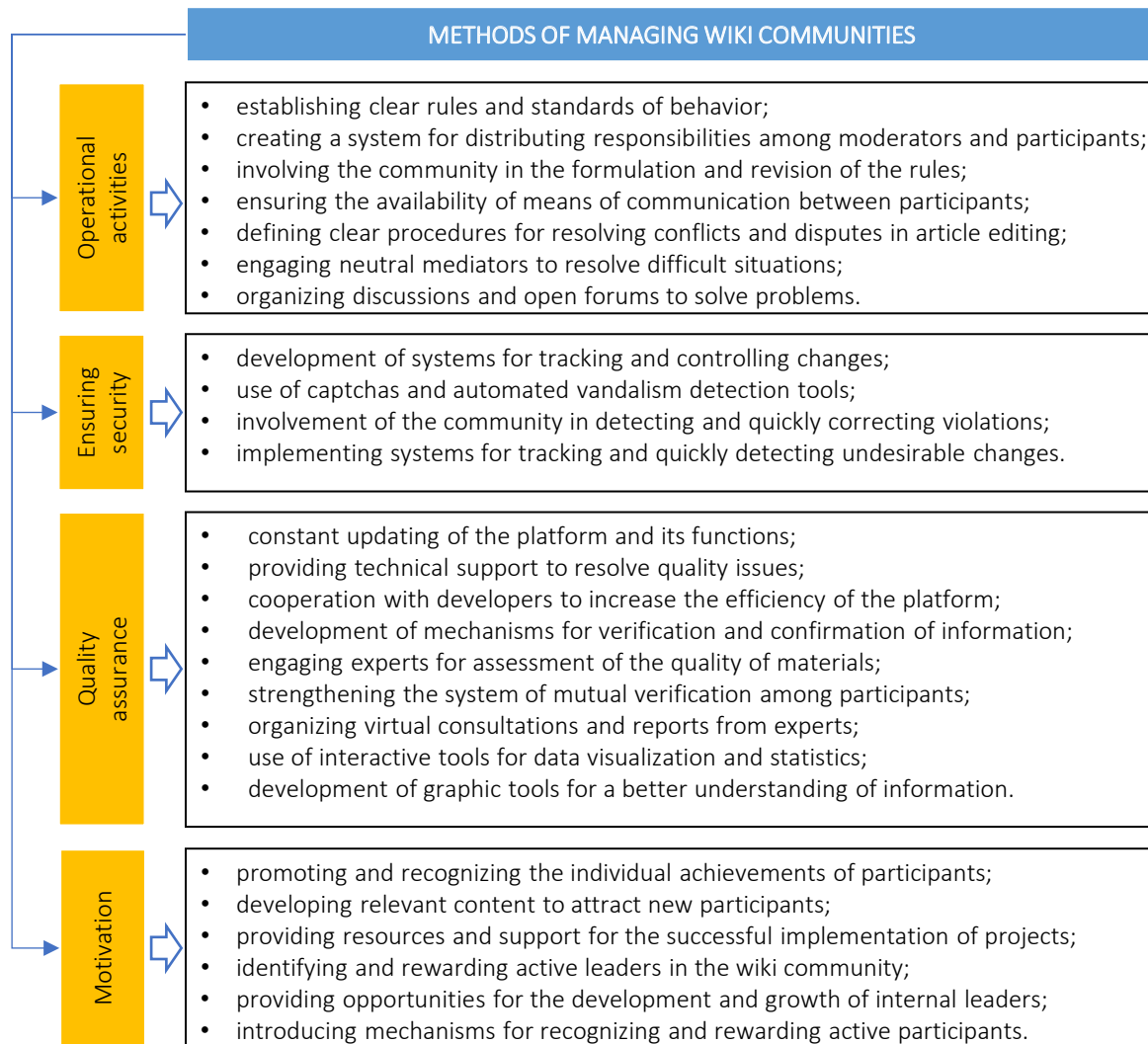


Figure 1. Methods of managing the activities of wiki communities

Wiki community participants can be determined by several criteria that consider various motivational factors that stimulate wiki community participants and influence their activity. The defining component of wikinomics is responsible entrepreneurship, which means activities taking into account social, ecological, and ethical aspects and not focusing only on financial indicators. This approach prioritizes the responsibility of enterprises to society and the environment. Businesses must take into account the impact of their activities on consumers, employees, the community, the environment, and other stakeholders. Responsible entrepreneurship within the framework of the wikinomics approach is designed to change the way businesses operate and ensure a balance between profitability, social values, and environmental sustainability. This

ensures a fairer and more sustainable economic system that contributes to the well-being of society and the environment.

Implementing a wikinomics approach may require abandoning traditional methods, as resistance to change, stereotypes, and internal system resistance can become barriers to innovation. Innovations associated with risks and uncertainties, unforeseen problems, technological nature, changes in the market, and competition can negatively affect the success of pilot projects using the wikeconomic approach. In addition, innovations may face legal constraints and regulatory requirements, including intellectual property, copyright, compliance, and regulatory requirements, which may affect the development of pilot projects. A successful transition to innovation in wiki plat-

forms requires the maximum involvement of the collective intelligence of the community, the creation of an enabling environment, the building of trust, the explanation of benefits, and the disclosure of possible benefits to all parties, as well as the presence of an appropriate technological infrastructure, training and support of users, and systematic monitoring of results.

The emergence of wiki communities allows for the activation of collective intelligence to be discussed. The concept of collective intelligence in a narrower context can be defined as a form of mental activity that is manifested as a result of cooperation, collective efforts, and competition of many individual subjects with equal rights to participate in decision-making processes. Similar definitions are also found in scientific literature (Chikersal et al., 2017). Wikinomics technologies are becoming one of the most effective tools for realizing the potential of collective intelligence and responsible entrepreneurship. One of the most promising areas is developing digital ecosystems. In modern conditions, this is one of the most dynamic partner cooperation systems on a decentralized basis. A digital ecosystem is a complex project that unites many participants, information services, and business processes based on the principles of mutually beneficial relations (“win-win”). Today, the most common areas in which digital ecosystems work are e-commerce, fintech, and chatbots (Melnyk et al., 2024).

The leading wikinomics technologies of collective intelligence implemented in human society) include the following specific directions (Berigüete et al., 2023; Watson & Levin, 2023; Trichkov, 2022). Outsourcing is the use of an external source and/or resource, in particular, transfer by the organization of certain types of work or functions of activity to other subjects (teams) of economic activity. Coworking brings people with different occupations together to work in a common space (including a virtual one). Crowdsourcing involves a wide range of people solving certain problems in an innovative direction for the use of their creative potential, knowledge, and experience voluntarily, opening information for free use in society.

Wikinomics and wiki community principles are applied in various fields, including business, science, education, and community initiatives

(Ogunleye et al., 2023; Melnyk et al., 2023). It promotes innovation, community development, and implementation of effective ways of cooperation, which contributes to sustainable development. In addition, wiki communities create unique conditions for communication, cooperation, and knowledge exchange, which contribute to the development of society, the generation of innovations, and the improvement of people’s quality of life.

However, these areas of activity require more in-depth research. It is also necessary to take into account the dynamics of social processes. It is important to solve the challenges and problems arising in developing wiki communities to ensure their sustainability and positive impact on the future of the single European space.

Communication on wiki platforms has its characteristics due to the lack of direct contact and physical presence and faces several challenges. They affect the functioning and development of communities. The main ones are systematized in Table 2.

Facing these challenges is an integral part of the functioning of wiki communities. In order to successfully find an answer to these challenges, it is important to develop effective management methods to prevent and manage potential risks in the wiki community and ensure sustainable and productive functioning. The new challenges that arise before humanity require the search for fundamentally new tools for interacting with socio-economic subjects to solve the relevant tasks. Achieving sustainable development goals in the context of Industries 3.0, 4.0, and 5.0 requires solving new problems that humanity has not encountered before. This necessitates mobilizing collective efforts that are fundamentally new in terms of form and content. The transition of humanity to horizontal distributed systems of organization of production and solidarity economy requires the formation of adequate forms of communication of participants in economic processes built on wikinomics principles.

The movement of humanity into the virtual space of social and economic activity reveals new possibilities for intensification of the integral intellectual potential of humanity and individual collectives to solve the current problems of our time (Sour et al., 2023).

Table 2. Challenges in the activity of wiki communities on wiki platforms

Source: Compiled based on data from Shih (2014), Schnall et al. (2012), Spano et al. (2023), Summer and Ruprecht (2023), Kostenko et al. (2024), Owusu et al. (2023), Bellot (2023), Brighenti et al. (2023), Odeleye et al. (2023), and Adams et al. (2018).

Context	Challenges	Solution
Cultural context	People from different cultures, values, norms, and beliefs meet in virtual space, leading to misunderstandings and interpretations of messages, translation errors, and conflicts. This can make collaboration and information sharing difficult.	Respect cultural characteristics, avoid stereotypes, and show tolerance and openness to other cultures. Learn the basics of the etiquette of different cultures.
Linguistic context	Using a common language can be difficult because participants may have different levels of language proficiency or use informal language.	It is important to formulate your thoughts and avoid complex or ambiguous statements clearly.
Informative context	Incorrect or poor-quality information can lead to wrong decisions or insufficiently informed approaches.	Follow clear rules regarding information exchange, fact-checking, information sources, and responsibility for spreading false information.
Technological context	Technical problems such as communication outages, cyber-attacks, and hardware malfunctions can lead to the wiki community's unavailability and cooperation disruption.	Regular audit of the technical infrastructure. Constant improvement and updating of infrastructure and software.
Management context	Wikis may experience unauthorized advertising, abuse, unfriendly behavior, and conflicts between members.	Provide influential moderation wiki community and conflict management to ensure a positive and supportive environment.
Legal context	The use of virtual communities may give rise to legal issues related to copyright, data privacy, user anonymity, and other aspects.	Controlling compliance and information quality can help reduce the spread of fake data.
Ethical context	Inadequate data protection for the personal information of wiki members can lead to a violation of privacy and the use of data for unreliable purposes.	Ethical supervision, moderation, and implementation of positive communication tools. Protection of privacy, verification of the authenticity of information, and support of the psychological well-being of participants.
Emotional context	The lack of physical contact in the virtual space can reduce the sense of responsibility, leading to unmanageable emotions and conflicts.	It is important to manage one's emotions, to be attentive to the tone and manner of communication, and to avoid conflict generators.
Security context	The information may become available to unauthorized persons or be used for spam, phishing, or fraud.	Ensuring a high level of security and protecting the information of members of wiki communities helps to avoid unauthorized access, hacking and data theft.
Context of interactivity	Many registered users may be inactive or passive in the wiki community. This can reduce the effectiveness of knowledge sharing and interactivity in the community.	Ensuring transparency in the activities of the wiki community and information verification processes. This will help increase trust in the wiki community and attract more members who want to share quality information.
Adaptation context	In cross-cultural communication in wikinomics, it is important to be flexible and ready to adapt to different communication styles, negotiations, and decisions.	The ability to quickly respond to cultural differences and find compromises contributes to successful cooperation.
Social context	Social challenges and risks, such as the spread of misinformation, cyberbullying, involvement in harmful ideologies, etc., can accompany the growth of wiki communities.	Develop control and security mechanisms.
Psychological context	Dependence on virtual communities and excessive use of social networks can negatively affect the mental health of users.	Develop policies and tools to support psychological well-being in wiki communities.
Financial context	Ensuring stable financial resources can be a challenge as the content volume increases and the wiki platform's functionality expands.	A combination of such methods as grants, crowdfunding, sponsorship, and commercial partnership, as well as adherence to the principles of independence, transparency and openness in financial management, will help ensure stability and maintain community trust.

The study of relevant processes and the dissemination of information about the factors that ensure, on the one hand, the success of participants in digital ecosystems and, on the other hand,

create challenges for them to facilitate decision-making regarding participation in such ecosystems and the choice of the most effective forms of functioning.

CONCLUSION

The study aimed to form a theoretical basis and practical tools for creating and functioning wiki communities to increase the efficiency of socio-economic systems. It is determined that wiki communities are a special kind of cooperation that is formed in the online environment on wiki platforms around exchanging information, experience, and knowledge. Wiki communities are one example of using collective intelligence in the online environment. They operate based on wiki technologies, where participants have equal rights to access information, exchange opinions, and make decisions. This approach makes it possible to effectively respond to urgent social, economic, and environmental problems, providing broad access to knowledge and collective actions to solve them. The key components of the wiki community management toolkit are the goal-setting algorithm, decision-making procedures, communications, rules of operation, functions, typical tasks, areas of application, characteristics of the dynamics of the cycle of operation and development, functional capabilities and risks, and development prospects.

Wiki communities can focus on various topics, including science, technology, culture, education, and more. Each type of wiki community has its own specific characteristics and role in forming knowledge and innovation. Common properties of wiki communities are defined as common interests and topics, cooperation and sharing of assets, mutual help and support, exchange of knowledge, research, and experience, interactivity and activity of participants, and innovations.

New knowledge and innovations generated on wikinomics basis (ideas, principles, methods, and technologies) are becoming critical factors in the success of socio-economic systems. Wiki communities significantly increase the scientific and technical potential of generating innovations, allowing them to mobilize collective methods of creating new knowledge and ideas.

AUTHOR CONTRIBUTIONS

Conceptualization: Lyudmila Kalinichenko, Leonid Melnyk, Oleksandr Kubatko.

Data curation: Iryna Burlakova, Tatiana Pasko.

Formal analysis: Leonid Melnyk, Tatiana Pasko.

Funding acquisition: Iryna Burlakova, Leonid Melnyk, Tatiana Pasko.

Investigation: Lyudmila Kalinichenko.

Methodology: Lyudmila Kalinichenko, Leonid Melnyk, Kostiantyn Babych.

Project administration: Leonid Melnyk.

Resources: Oleksandr Kubatko, Iryna Burlakova, Kostiantyn Babych.

Software: Oleksandr Kubatko.

Supervision: Leonid Melnyk.

Validation: Lyudmila Kalinichenko, Tatiana Pasko.

Visualization: Iryna Burlakova, Tatiana Pasko.

Writing – original draft: Lyudmila Kalinichenko, Leonid Melnyk, Oleksandr Kubatko, Iryna Burlakova, Kostiantyn Babych, Tatiana Pasko.

Writing – review & editing: Lyudmila Kalinichenko, Leonid Melnyk, Oleksandr Kubatko, Iryna Burlakova, Kostiantyn Babych, Tatiana Pasko.

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