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ІННОВАЦІЙНІ ПІДХОДИ У ВІДНОВЛЕННІ ТРАНСПОРТНОЇ ІНФРАСТРУКТУРИ В ОСОБЛИВИХ УМОВАХ ВОЄННОГО СТАНУ: ВИКЛИКИ ТА ПЕРСПЕКТИВИ

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JUSTIFICATION FOR THE IMPORTANCE OF CREATING AN INFORMATION SYSTEM FOR POSTING INITIATIVES ON THE RECONSTRUCTION OF FACILITIES AND TERRITORIES

Vadym ZIUZIUN[1], Ph.D., Assoc. prof.

[1] Taras Shevchenko National University (Ukraine)

The project for creating an information system, which will be discussed in this scientific work, is focused on processes related to the reconstruction and recovery of regions affected by the military actions in Ukraine. The relevance of this issue lies in several key aspects, such as the identification of the most severely damaged facilities and territories, engaging the public in the recovery process, and ensuring transparency and efficiency in the use of available resources.

The main task of the project is to accurately identify and visualize the area's most in need of immediate restoration. This requires the development of an interactive map that will allow for real-time assessment of the scale of damage and prioritization of recovery measures based on the level of destruction.

The second aspect involves the active engagement of citizens in the reconstruction process. It is important to create platforms and information systems that not only allow users to monitor the progress of restoration work but also enable them to participate in the development and implementation of projects by submitting their own initiatives or supporting existing ones.

The third critical element is ensuring complete transparency in the use of financial and material resources. The system should include mechanisms for collecting funds from various sources and provide detailed accounting of their allocation and usage. This will allow donors and investors to monitor the process and ensure the efficient spending of resources.

Such a system will be particularly beneficial for the restoration of critical transport infrastructure, such as roads, bridges, railways, and airports, which is essential for ensuring the functioning of the economy and society in the post-conflict period. The creation of a specialized information system to manage these processes is critically important for several reasons [1]:

1. *Coordination and prioritization of reconstruction work*. The information system will enable the rapid collection of data on the level of damage to transport infrastructure, providing a clear determination of priorities for restoration. This is crucial as the recovery of transportation routes is key to restoring logistics, access to affected areas, delivery of humanitarian aid, and economic activity.
2. *Transparency and control over resource utilization*. The implementation of the system will ensure complete transparency in the distribution of financial and material resources, helping to prevent corruption and misappropriation of funds. Donors and investors financing the reconstruction will have the opportunity to monitor the progress of the work, which will increase their trust and encourage further investments.
3. *Timeliness of decision-making*. With the help of the system, public and private entities will be able to respond quickly to new challenges and coordinate their actions more effectively. This is especially important in situations of limited resources and time, where any delay in the recovery process can have significant socio-economic consequences.
4. *Engagement of international support and partnerships*. The information system will serve as a platform for attracting international organizations that can provide not only financial but also technical assistance. It will also allow for the integration of reconstruction projects with international standards and requirements, thereby increasing the chances of obtaining additional resources from international partners.
5. *Assessment and monitoring of the reconstruction process*. The system will provide the capability for continuous monitoring of the condition of facilities, rapid assessment of their readiness, and quality control of the work performed. This will help to prevent further damage due to poor restoration or incorrect design decisions.

An important step in the process of justifying the need to create the aforementioned information system is the analysis of external stakeholders [2] to gain a more detailed understanding of the functional requirements and capabilities that will be provided (Table 1).
It is also important to understand what functional features the proposed information system will have:
– interactive map with photos of affected objects and territories;
– the possibility of adding restoration projects;
– volunteer registration system;
– an interface for architects and engineers to add project options;
– functionality for donations and crowdfunding;
– integration with payment systems;
– communication mechanisms between project participants;
– project progress tracking system.
The choice of technologies for project implementation is an important stage of planning, which determines the future success and efficiency of the information system [3-6]. So, for the implementation of the information system, «Laravel» will be used for the backend, «React.js» for the frontend, «MySQL» for data management, «Apache» for the server infrastructure, and «AWS» for cloud solutions. This combination will ensure stable, scalable and efficient operation of the platform, which will contribute to the successful reconstruction of the affected areas in Ukraine.

Table 1 – External stakeholders

Stakeholders	Influence	Interest
Local government agencies	*High.* Can provide necessary permits and regulatory support.	*High.* Interested in restoring the infrastructure and improving the living conditions of communities.
International organizations	*High.* They can provide financing, technical support and international recognition of the project.	*High.* Interest in maintaining stability and restoring affected regions.
Non-commercial organizations	*Average.* Can contribute to volunteer support and public awareness.	*High.* Interested in solving social and environmental problems.
The local population of the affected areas	*Average.* Influence is limited by the local context, but their feedback and perceptions are critical to success.	*High.* Interested in quick and efficient restoration of their homes and infrastructure.
Media and the public	*Average.* Can significantly influence public opinion and perception of the project.	*Average.* They are interested in sensational and socially significant topics to attract the audience.
Providers of technical resources	*Average.* They provide the necessary materials and technical solutions for the project.	*Average.* Interested in selling their goods and services.
Volunteers and platform users	*Average.* Influence the implementation of specific tasks and projects.	*Average.* Interested in solving social and environmental problems.
Investors and sponsors	*High.* Able to provide financing that affects the scope and capabilities of the project.	*Average.* Interested in return on investment and social impact of the project.

Thus, the creation of an information system for the reconstruction of objects and territories is crucial for effective coordination, transparency and a final decision. By involving citizens and attracting international support, this system can ensure the efficient allocation of resources and contribute to the activation of public trust. Continuous monitoring and evaluation will further enhance the quality of restoration efforts and minimize the risk of future damage.

References

1. V. Ziuziun and D. Nevedrov (2019). As for the Development of Models of Regional Security Programs of Critical Infrastructure of Transport Objects, Visnyk National Transport University, Issue 2 (44), pp. 81-89. DOI: 10.33744/2308-6645-2019-2-44-081-089.

2. L. Kubiavka, V. Zaremba and V. Ziuziun, "Application of Game Theory Methods to Optimize the Stakeholder Management Process," 2024 IEEE 4th International Conference on Smart Information Systems and Technologies (SIST), Astana, Kazakhstan, 2024, pp. 647-651, doi: 10.1109/SIST61555.2024.10629255.
3. Laravel. Documentation. Online. URL: https://laravel.com/ [Accessed 02.10.2024].
4. React.js. Getting Started. Online. URL: https://react.dev/learn [Accessed 03.10.2024].
5. What are AWS? Online. URL: https://aws.amazon.com/what-is-aws/ [Accessed 03.10.2024].
6. Apache vs Nginx: Practical Considerations. Online. URL: https://www.digitalocean.com/community/tutorials/apache-vs-nginx-practical-considerations [Accessed 02.10.2024].