FORESIGHT METHOD IN THE SUDEM PROJECT AND FUTURE PROJECTS

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Abstract: *In the implementation of the SUDEM project of the EU Erasmus+ program, the Foresight method was used to determine the promising technologies used. At the same time, it was reported that the method works statically and slowly, and this publication proposes to modernize it for its updating and rapid forecasting.*

FORESIGHT МЕТОД ЗА ПРОЕКТ SUDEM И БЪДЕЩИ ПРОЕКТИ

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Резюме: *При изпълнението на проекта SUDEM по програма „Еразъм+“ на ЕС беше използван Foresight метод за определяне на перспективни технологии. Същевременно беше отчетено, че този метод функционира статично и бавно, поради което в настоящата публикация се предлага неговата модернизация с цел актуализиране и осигуряване на възможност за бързо предвиждане.*

Introduction

In the implementation of project KA220-HED-2EF8D879 SUstainable Disaster and Emergency Management processes digitization (SUDEM) of the EU Erasmus+ program, the Foresight method was used to determine the promising technologies used. At the same time, it was reported that the method works statically and slowly, and this publication proposes to modernize it for its updating and rapid forecasting.

The project creates and validates an innovative interdisciplinary model for knowledge transfer in the field of higher education, with a focus on the digitalization of the entire life cycle of disaster and emergency management.

The international team integrates principles of practice and education from all relevant fields, including risk and disaster monitoring and management, decision-making support, disaster response management, artificial intelligence, Internet of Things (IoT), data science, remote sensing (satellites and drones), data aggregation and data management. SUDEM aims to equip students with the skills needed to effectively manage relevant extreme events and the consequences of disasters, as well as to improve emergency processes. The overall goal for Europe is to create a group of disaster management experts with a strong enough focus on digital tools through which the loss of human life and infrastructure caused by disasters will be significantly reduced in the long term.

The project brings together a consortium of leading European organisations in the field of higher education and research, using international cooperation to align academic programmes with

the requirements for optimal disaster management, including decision-making support. SUDEM focuses on the creation of adaptable and accessible educational modules that can be implemented in different higher education and lifelong learning organizations. A key component of SUDEM is the developed Foresight study, a key element of the project's methodology, which presents the identified requirements, challenges and solutions. It allows for the elaboration and delivery of an appropriate system architecture and an optimal scenario for future development, including a higher education framework on disaster management processes, policy recommendations and, finally, a unique package of knowledge and training – all as key results of the SUDEM project.

Methods and materials

Foresight is a systematic method of investigating possible future developments, technological trends, risks and opportunities in order to make better decisions in the present. Unlike ordinary forecasting, Foresight does not necessarily look for one exact future, but explores several possible scenarios.

Milestones:

1. Horizon Scanning – Detect emerging technologies and early signals of change.
2. Trend Analysis — analysis of technological, economic and societal trends.
3. Drivers and Uncertainties — identifying the factors driving change and the main unknowns.
4. Scenario Development – development of possible scenarios for the future.
5. Expert Delphi — systematic collection and analysis of expert assessments through several rounds.
6. Impact Assessment – assessment of potential consequences and risks.
7. Strategic Recommendations – formulation of recommendations and action plans.

The Foresight process may include:

- Identification of AI, UAV, satellite surveillance and Digital Twins as technological areas;
- analysis of their maturity and limitations;
- Delphi research among experts;
- Development of scenarios for future development;
- Setting priorities for research and training.

Foresight does not predict the future with certainty, but helps us prepare for various possible future developments.

Modernizing the Foresight method

When using the Foresight method in the SUDEM project, it was reported that it is static – applied at the beginning of the project, the results obtained from it do not change until its completion, while in dynamic processes significant changes will occur. Obtaining and processing expert opinions requires considerable time, which is not always available. Therefore, in the recommendations for future activities, it was recommended to explore opportunities for its modernization.

Static vs. Dynamic Foresight

The main difference is that static Foresight explores the future within a particular study, while dynamic Foresight continuously updates estimates and scenarios as new significant information emerges [1]. Other differences are given in Table 1.

Table 1

Criterion	Static Foresight	Dynamic Foresight
Approach	One-time or periodic examination	Continuous process
Data	Data at a certain point in time	Constantly incoming data
Analysis	Pre-planned	Adaptive
Scenarios	They are developed within the framework of the study	Updated when conditions change
Expert assessments	One or more pre-planned rounds	Repeated assessments in new circumstances
Role of AI	Analyzes available data	Keeps track of changes and supports updates
Result	Strategic report or roadmap	Updated forecast and recommendations

For the implementation of dynamic Foresight research, a system is needed that periodically analyzes new scientific publications, technological developments, data and up-to-date expert assessments. The Foresight Horizon Scanning AI agent was developed, which constantly monitors and signals the occurrence of verified significant information related to the research carried out. If necessary, the research manager takes actions to update the forecasts and scenarios. The result is an adaptive system for strategic forecasting. This allows to significantly improve the volume of horizon scanning and reduce the duration of project implementation [2].

Dynamic Foresight + AI Architecture:

- data collection
- horizon scanning
- ai analysis
- trend change detection
- foresight scenarios
- expert delphi review
- updated forecast
- strategic recommendations
- cycle repetition

The AI agent can:

- discovers new trends;
- identify forward-looking statements that need to be reviewed;
- prepares new questionnaires;
- compares the assessments between the different rounds;
- calculates changes in consensus.

The cycle can be run monthly, quarterly, or when a significant event occurs. The frequency depends on the area and the data available.

It is possible to develop **Dynamic Delphi**, where expert assessments are updated periodically or as new evidence becomes available.

It is important to preserve the independence of experts, anonymity and the history of assessments. Not every new information imposes a new Delphi round.

According to the authors of the article, a hybrid model is suitable for future projects: Static Foresight + Dynamic Foresight:

- First stage: conducting basic Delphi research and developing scenarios.
- Second stage: building an AI agent to monitor technology trends.
- Third stage: periodic update of forecasts through expert assessment.
- Stage four: tracking changes in risks and strategic priorities.

Thus, the basic research provides a stable methodological basis, and the dynamic component allows adaptation to the new conditions.

Conclusion

Static Foresight creates a strategic starting point. and dynamic Foresight keeps that strategy up to date.

The integration of Dynamic Foresight, AI, and periodic Delphi analysis is a promising research concept that can be verified through a pilot system and measurable quality criteria.

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