DOI https://doi.org/10.30525/978-9934-26-597-6-99

MAINTENANCE ENGINEERING SYSTEM TO SYSTEM DESIGN

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Abstract
The study is devoted to ensuring the sustainability of the organization's functioning at all stages of its development. In this regard, a system of advanced advancement of the key assessment parameters' exit beyond pre-established standards is used. Timely response allows not only to find weak technological elements of the system, but also, taking into account the developed measures, to increase the reliability of software procedures.

Keywords: organization, transformation, restoration, growth, trials, decline, functioning

1 Introduction

This research outlines a maintenance engineering system designed to enhance organizational sustainability and efficiency, ensuring alignment with Return on Investment (ROI) metrics and leveraging intangible assets for competitive advantage. Frequent software changes lead to system developers easily changing the input data set for the sake of a successful result. Based on this, the choice of concept is reduced to three points:

- Effective concept selection requires ensuring that feedback mechanisms are in place to confirm the validity of the chosen approach.
- Positive feedback serves as an indicator that the concept aligns well with the intended goals and system requirements.
- Conflicts in expert opinions often highlight gaps in the input data, underscoring the need for comprehensive data collection.

During the development of the concept, the following problem was identified: “It is impossible to ensure the effectiveness of an organization without means of identifying the weak link in the system”. Knowledge of the problem made it possible to determine methodological provisions, which are summarized in the form of a table (See Tabl.1).

Table 1

Study Methodological Basis Description

Basis	Content
Problem	Addressing weak system links is crucial for organizational effectiveness.
Object	A top-down engineering system design ensuring physical and logical data independence.
Subject	Software tools tracking violations in emergent system properties
Purpose	Implement the superposition principle under physical and logical data independence.
Tasks	Include optimizing ROI within defined ranges and debugging procedures for reliability and scalability.
Results	Data Independence Drives System Flexibility: Both physical and logical data independence enable systems to evolve seamlessly, supporting adaptability while preserving core functionality Efficient ROI Evaluation Requires Comprehensive Data Handling: Consistent data management, automation, and strategic updates are essential to maintaining stable ROI while preserving system performance and stability.
Novelty	Resilience is Key to Managing Modifications: Complex system modifications must be approached with resilience strategies, ensuring that updates don't compromise system integrity or ROI.

Before proceeding to formulate the goal and objectives, it is necessary to indicate the difference in the independence of the components included in the principle used [1]:

– *Logical Data Independence:* Refers to the ability to change the logical schema without altering the external schema or application programs

– *Physical Data Independence:* Refers to the ability to change the physical schema (storage) without altering the logical schema or application programs.

The aim of the study is contained in the formulation: «Develop a procedure to ensure that new proposals are superimposed on the model of the existing system». Based on it, the following four tasks are set.

1. Conduct an assessment of the state of the organization under superposition conditions, in which the emergence property is tested.
2. Choose the option of identifying the weak link in the system when forced to change assets, including intangibles.
3. Development of a medium-term scenario for improving the system.
4. Design of long-term instructions for the maintenance of the system.

The solution of the listed tasks should ensure the system support throughout the entire life cycle of the organization. The following section provides a detailed scheme for solving the tasks.

2 Detailing of tasks

The tasks set required the implementation of certain steps.

Thus, during the solution of the first task, a comparison of different approaches to measuring efficiency for compliance with the efficiency property took place. ROI technology was used as an efficiency indicator [2]. Table 2 shows the results of the comparison.

Table 2

Evaluation of the performance measurement tools

Version	**Procedure status**	**Input (n1)**	**Technology (n2)**	**Output (n3)**	**System (N)**	**Verification of the emergence property**
Base	Benchmark	11	10	3	24	Yes
No1	Application area	13	19	3	35	No
No2	System	13	21	3	37	No
No3	Finance	15	22	3	40	No
No4	Control	17	23	3	43	Yes

The work shows that as the evaluation mechanism becomes more complex, the number of parameters increases. In the fourth version, it was possible to achieve compliance with the emergence property. At the same time, 43 indicators fall under the control of efficiency [3-5]. The most important step of the study is the solution of the second problem. Fig. 1 shows the scheme for solving the second problem.

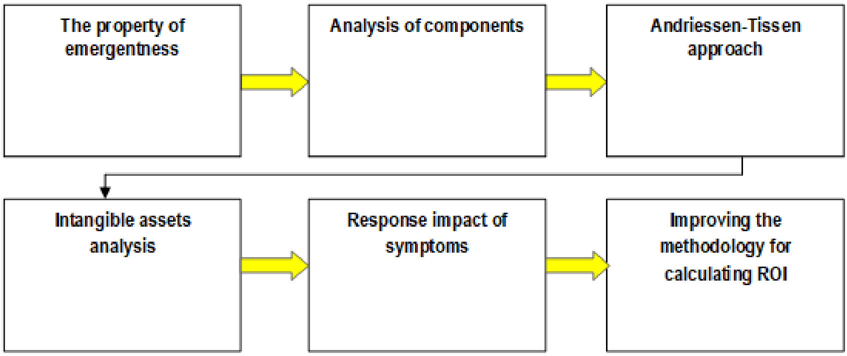

Figure 1. ROI Improvement Methodology Diagram

The new version of the procedure ensures accurate and reliable ROI calculations. Addressing system weaknesses enhances scalability and efficiency. Integration of intangible asset analysis drives sustainable growth.

3 Conclusion

In relation to the highlighted aspects, the following was achieved:

1. Emergence Principle: The system satisfies emergent properties and ensures physical-logical independence, focusing on identifying and correcting system bottlenecks.

2. Intangible Asset Analysis: First-Class Intangible Assets (e.g., brand, intellectual capacity) require long recovery times. Second-Class Intangible Assets (e.g., moral values, technology) drive adaptability and resilience.

3. ROI Optimization: Computational procedures assess and adjust critical metrics like ROI, FRV, and Cap_Ratio, automating intangible asset management for sustainable growth.

4. Scientific Contributions: Novel inclusion of intangible asset parameters within computational models, enhancing system scalability and reliability through innovative swarm technologies.

Improvement of computational procedures is achieved by identifying bottlenecks in the system and, through their correction, increasing the reliability of diagnostic conclusions^

1. Improved decision-making via enhanced computational procedures.
2. Accurate ROI calculations integrated with intangible asset evaluations.
3. System weaknesses identified and corrected, enabling scalability.
4. Sustainability principles drive long-term growth and competitiveness.

The following points should be highlighted as recommendations:

1. Automate intangible asset management processes.
1. Develop robust ROI assessment methodologies inclusive of NMAs.
2. Foster intellectual capital through learning and innovation initiatives.

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