

VIABLE SYSTEMS APPROACH FOR SUSTAINABLE INNOVATION MANAGEMENT IN MOTOR TRANSPORT ENTERPRISES

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INTRODUCTION

Introduction (Including the problem of the research) In the realm of motor transport enterprises, sustainable development has emerged as a pressing priority. Confronted with environmental challenges, regulatory mandates, and evolving consumer expectations, transportation businesses must innovate not solely for financial gain but also to uphold ecological and social obligations. Integrating sustainable principles into innovation strategies is thus essential for ensuring enduring viability amid industry dynamics. The ongoing military conflict in Ukraine has catalyzed a multifaceted crisis, spanning ecological, social, and economic realms, with far-reaching repercussions. Infrastructure vital to transportation, industrial complexes, and transport enterprises has suffered significant damage, alongside residential areas, commercial activities, and industrial sectors. The displacement of a sizable portion of the Ukrainian population underscores the scale of the disruption and the ensuing humanitarian crisis.

The aim of research The aim of this research is to develop a sustainable innovation management system for motor transport enterprises utilizing the Viable Systems Approach (VSA).

Objectives The main objective of this research is to develop a sustainable innovation management system for motor transport enterprises based on the Viable Systems Approach (VSA). It involves analyzing global practices of sustainable innovation management, justifying the methodological applicability of the VSA, designing a conceptual Viable System Model (VSM) that integrates innovation processes into all levels of management, identifying key subsystems and their interactions to ensure adaptability and resilience, and proposing mechanisms for feedback, internal audit, and continuous improvement to support sustainability and innovative growth in the motor transport sector.

The methods of the research The methodological basis of the study combines systemic and cybernetic approaches within the Viable Systems Approach (VSA) framework. The research employs system and comparative analyses to examine the structure and efficiency of enterprise subsystems, modeling and cybernetic simulation to construct a Viable System Model, structural-functional analysis to define the roles of management levels, and expert evaluation to validate the model's practical applicability. This integrated methodology ensures a comprehensive and adaptive framework for managing sustainable innovations in dynamic environments of motor transport enterprises.

Theoretical background

The theoretical foundation of this research is based on the principles of systems theory, cybernetics, and sustainable development concepts integrated within the Viable Systems Approach (VSA). The VSA, developed by Stafford Beer, views an organization as a dynamic and self-regulating system capable of maintaining viability through adaptability and continuous feedback. In the context of motor transport enterprises, this approach enables the alignment of innovation management with sustainability goals by ensuring coherence between operational, tactical, and strategic subsystems. Theoretical insights from sustainable innovation management emphasize the importance of balancing economic efficiency, environmental responsibility, and social value creation. Integrating these concepts within the VSA framework allows for designing a holistic management model that enhances the long-term resilience and competitiveness of motor transport enterprises in changing external environments.

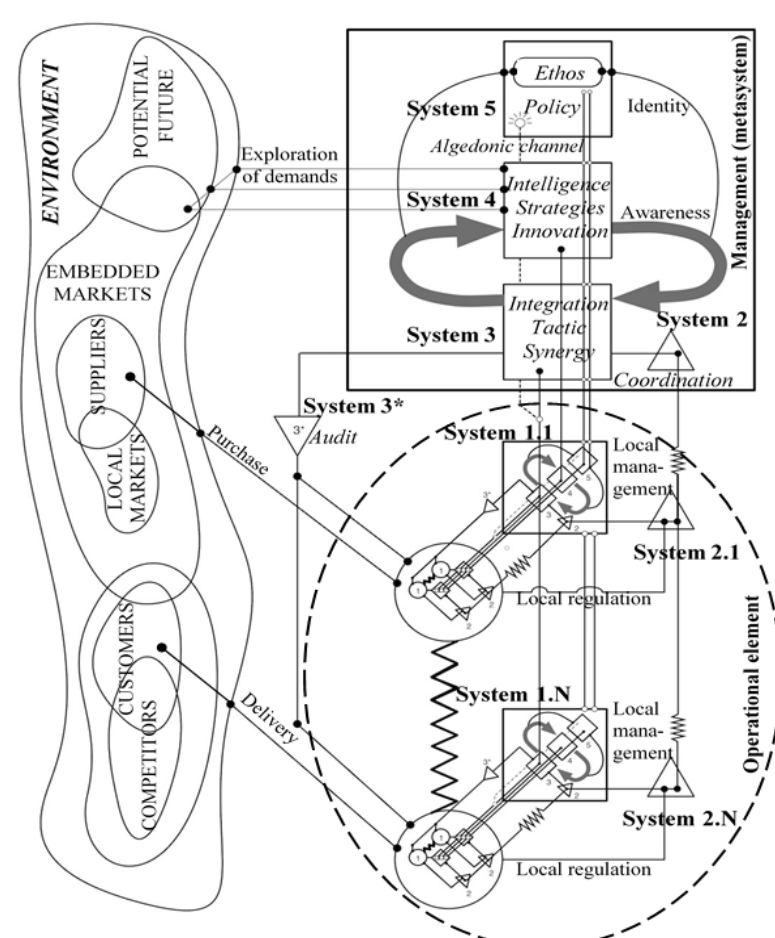


Fig. 1. Model of a viable enterprise system

Main findings

The research substantiates that the Viable Systems Approach (VSA) provides an effective methodological framework for managing sustainable innovations in motor transport enterprises. The developed conceptual Viable System Model (VSM) integrates sustainability principles into all levels of enterprise management — operational, tactical, and strategic — ensuring coherence, adaptability, and resilience of innovation processes. The model identifies five interconnected subsystems responsible for key management functions, feedback loops, and environmental interactions, enabling continuous learning and self-regulation. The findings demonstrate that applying VSA enhances innovation efficiency, optimizes resource utilization, and strengthens the enterprise's ability to adapt to external challenges, particularly in post-crisis and transition economies.

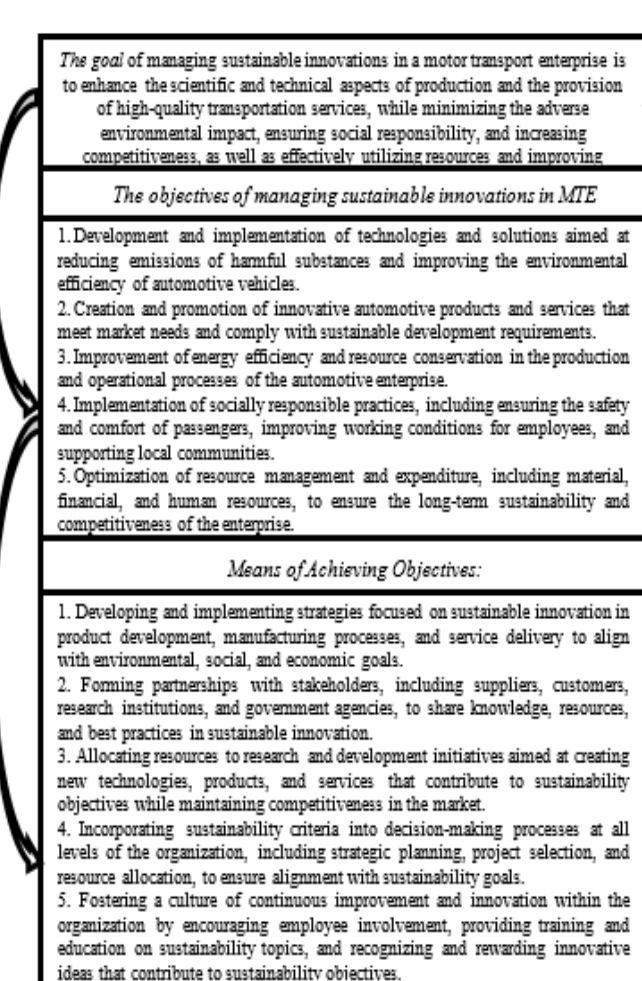


Fig. 2. Goal and objectives of sustainable innovation management in MTE

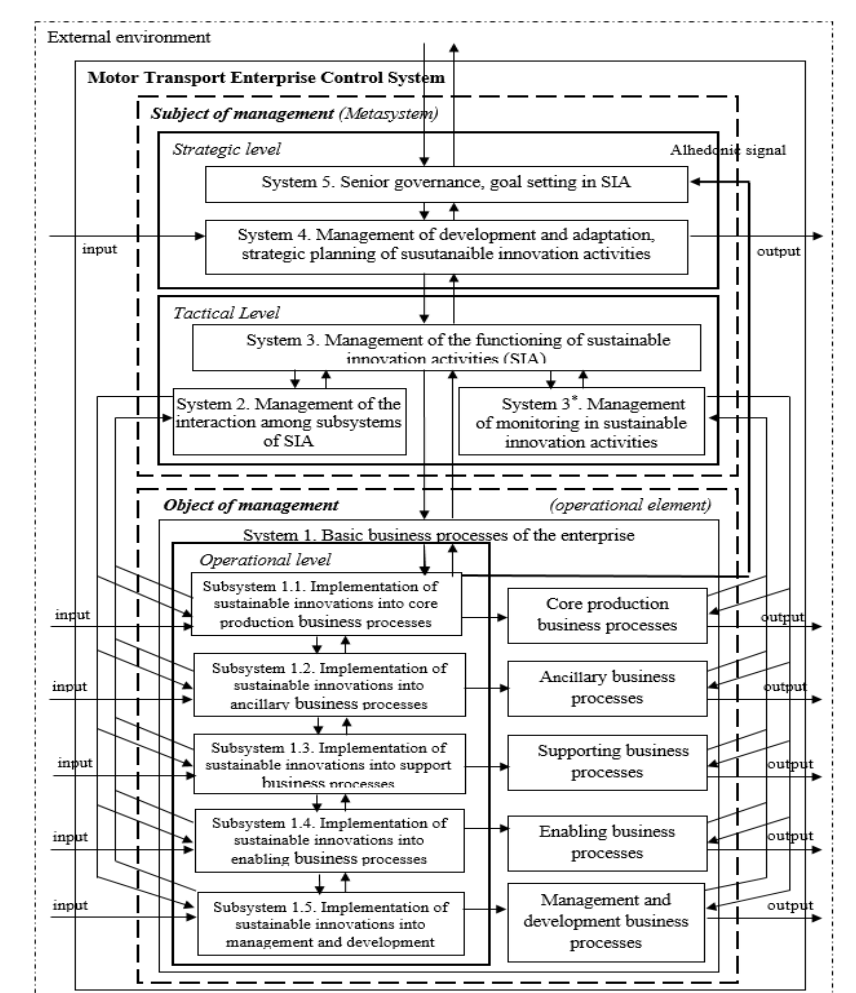


Fig. 3. Viable system model for sustainable innovation management in MTE

MAIN RESULTS AND CONCLUSIONS

The study proves that the Viable Systems Approach (VSA) serves as an effective methodological tool for managing sustainable innovations in motor transport enterprises. The developed conceptual Viable System Model (VSM) ensures the integration of sustainability principles across operational, tactical, and strategic management levels, enhancing coherence, adaptability, and resilience of innovation processes. Five interconnected subsystems have been identified, each responsible for key management functions, feedback formation, and interaction with the external environment, enabling self-regulation and continuous improvement. The application of the VSA contributes to increasing innovation efficiency, optimizing resource utilization, and strengthening the ability of enterprises to adapt to external challenges, particularly under post-war economic recovery conditions.

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