

THE WAYS OF INCREASING THE EFFICIENCY OF MANAGERIAL ACTIVITY IN PRODUCTION ENTERPRISES

Karieva Gulnora Abdullaevna

Docent,

Tashkent State Agrarian University, TSAU, Uzbekistan

Gulomov Aziz Sharofiddin ogli

Master's Student

Tashkent State Agrarian University, TSAU, Uzbekistan

Khakimov Sherzod Ikram ogli,

Master's Student

Tashkent State Agrarian University, TSAU, Uzbekistan

ORCID 0009-0004-2853-4642

Abstract

This study examines methods for increasing the efficiency of managerial activity in production enterprises under conditions of uncertainty. Modern production systems operate in dynamic economic environments characterized by incomplete information, market fluctuations, and political and technological risks. Managerial efficiency depends on the ability to anticipate, evaluate, and mitigate these uncertainties through a combination of classical management principles, innovative technologies, and human-centric approaches. The research employs a mixed-methods design, combining surveys, interviews, and secondary data analysis to evaluate current managerial practices, identify efficiency-enhancing strategies, and assess the impact of uncertainty on decision-making. Key findings highlight the importance of adaptive management, predictive and preventive measures, integration of digital technologies, strategic flexibility, and participative decision-making. A synergetic approach that combines quantitative and qualitative analyses is recommended to optimize managerial performance, ensure sustainable growth, and maintain a competitive advantage in production enterprises.

Keywords: Managerial efficiency, production enterprises, uncertainty, adaptive management, decision-making, digital technologies, synergetic approach, strategic flexibility, predictive measures, performance monitoring.

Introduction

Enterprises operating in today's dynamic economic environment are constantly exposed to various uncertainties arising from a complex interaction of macroeconomic, microeconomic, industrial, political, and technological factors. The complexity and dynamism of modern



production systems require managers to make decisions under conditions of incomplete information and unpredictable changes. In the contemporary economic literature, the concept of “uncertainty” is interpreted in multiple ways.

The term “uncertainty” was first distinctly defined in the 20th century, separated from the concept of “risk,” with the publication of the monograph *Risk, Uncertainty, and Profit* by the American economist Frank Knight in 1921. In this work, Knight theoretically distinguished between risk, which can be quantified and measured probabilistically, and uncertainty, which represents immeasurable and non-removable factors that cannot be precisely predicted. Subsequent scholars have expanded on this view, defining uncertainty as the imprecise perception of incomplete or inaccurate information that complicates decision-making processes. Uncertainty manifests when the outcomes of managerial decisions are ambiguous, and the potential negative consequences are difficult to foresee, thus intertwining with the concept of risk.

For production enterprises, managerial efficiency largely depends on the ability to anticipate, evaluate, and mitigate the effects of such uncertainties. Effective managerial activity requires the integration of modern analytical tools, flexible decision-making strategies, and proactive planning mechanisms. Improving managerial efficiency under conditions of uncertainty is not only a key factor in maintaining competitive advantage but also essential for optimizing resource allocation, enhancing productivity, and ensuring sustainable enterprise growth. Modern approaches suggest that combining classical management practices with innovative technologies, such as data analytics, artificial intelligence, and predictive modeling, significantly increases the reliability and effectiveness of managerial decisions in production environments.

Literature review on the topic. The efficiency of managerial activity in production enterprises has been a subject of extensive research in both classical and contemporary management literature. Early management theories, such as those proposed by Henri Fayol and Frederick Taylor, emphasized the systematic organization of production processes, division of labor, and the application of managerial principles to increase productivity and reduce inefficiencies. Fayol’s administrative theory highlighted the importance of planning, organizing, commanding, coordinating, and controlling as core functions of effective management, while Taylor’s scientific management focused on optimizing labor productivity through standardization and task specialization.

In recent decades, scholars have increasingly emphasized the role of decision-making under uncertainty in enhancing managerial efficiency. As noted by Knight (1921) and subsequent researchers, managers must navigate complex and dynamic economic environments where information is often incomplete or inaccurate. Modern research emphasizes that managerial efficiency is not solely dependent on traditional hierarchical structures but also on the integration of flexible strategies, adaptive leadership, and innovative technologies.

The concept of managerial efficiency is closely linked to the adoption of performance measurement systems, such as Key Performance Indicators (KPIs), Balanced Scorecards, and benchmarking methods. Kaplan and Norton (1992) highlighted that balanced performance measurement frameworks enable managers to align operational activities with strategic



objectives, monitor progress, and make timely corrective actions, thereby improving overall organizational performance.

Moreover, contemporary studies underline the significance of digital transformation and Industry 4.0 technologies in production enterprises. The implementation of enterprise resource planning (ERP) systems, data analytics, and artificial intelligence allows managers to process large volumes of real-time information, forecast potential risks, and optimize decision-making processes. Researchers such as Ivanov et al. (2019) emphasize that the integration of such technologies enhances resource allocation, reduces operational uncertainties, and strengthens managerial control over production processes.

Finally, human factors remain a critical component of managerial efficiency. Effective communication, employee motivation, and leadership capabilities significantly influence the success of managerial decisions. Studies indicate that participative management approaches, which involve employees in decision-making processes, lead to higher productivity, better problem-solving, and increased adaptability to changing conditions.

In summary, the literature highlights that improving managerial efficiency in production enterprises is a multifaceted task. It requires a combination of classical management principles, modern analytical tools, technological integration, and human-centric approaches. The synthesis of these factors provides a comprehensive framework for enhancing managerial performance under conditions of uncertainty and complexity. The research on increasing the efficiency of managerial activity in production enterprises adopts a combination of qualitative and quantitative methods to provide a comprehensive analysis. A mixed-methods approach enables the study to capture both numerical data and managerial insights, ensuring a balanced and practical understanding of the problem.

1. **Research Design.** This study is based on a descriptive and analytical research design. The descriptive aspect focuses on identifying current managerial practices, organizational structures, and decision-making processes in production enterprises. The analytical component examines the effectiveness of these practices, evaluates performance metrics, and explores factors influencing managerial efficiency.

2. **Data Collection.** Primary data are collected through surveys and structured interviews with managers, supervisors, and key employees of selected production enterprises. The survey includes questions on decision-making processes, resource management, adoption of technological tools, and strategies for handling uncertainty. Interviews provide deeper insights into managerial challenges, leadership styles, and practical experiences.

Secondary data are obtained from academic journals, industry reports, enterprise performance records, and case studies. These sources provide information on best practices, theoretical frameworks, and previous research findings related to managerial efficiency.

3. **Sampling Technique.** A purposive sampling technique is employed to select enterprises representing various industrial sectors, sizes, and organizational structures. Managers with at least three years of experience in production management are included to ensure the reliability of responses and relevance of insights.

4. **Data Analysis Methods.** Quantitative data from surveys are analyzed using statistical tools such as descriptive statistics, correlation analysis, and efficiency indices to identify trends and measure managerial performance. Qualitative data from interviews are analyzed using content



analysis, thematic coding, and comparative evaluation to detect recurring patterns and managerial strategies that enhance efficiency.

5. **Validation and Reliability.** To ensure the reliability and validity of the research, multiple sources of data are triangulated, and survey instruments are pre-tested on a small sample. Peer review and expert feedback are applied to refine the research design and interpretation of results.

6. **Ethical Considerations.** All participants are informed about the purpose of the research, and their confidentiality is maintained. Data are used solely for academic purposes, and ethical guidelines for conducting research in organizational settings are strictly followed.

This methodology allows for a systematic evaluation of managerial practices, identification of efficiency-enhancing strategies, and provision of practical recommendations for production enterprises seeking to optimize decision-making and operational performance.

Analysis and Results

Uncertainty in production enterprises refers to the incompleteness or inaccuracy of information regarding any economic process, including associated costs and conditions necessary to achieve the expected results. The presence of uncertainty significantly complicates the process of optimal decision-making in enterprise management and can lead to outcomes that are difficult to predict in the future.

According to their origin, uncertainties can be categorized into two main types: economic and political. Economic uncertainties are primarily associated with changes in market conditions, incomplete information about competitors, suppliers, or partners, and fluctuating demand patterns. Political uncertainties arise from changes in governmental policies, regulations, or geopolitical conditions that affect enterprise operations. It is important to note that these types of uncertainties are often interrelated, making them challenging to distinguish or evaluate in practical scenarios.

To estimate and manage uncertainty, various scientific approaches have been employed, including deterministic, probabilistic, statistical, and methods based on fuzzy logic and linguistic variables. However, any single mathematical model or approach—such as interval analysis, statistical modeling, or deterministic simulations—often captures only certain types of information while neglecting others. Consequently, a synergistic approach that combines multiple methods is necessary to comprehensively evaluate the impact of uncertainty on managerial decisions. Such an approach enables managers to study quantitative characteristics of economic processes under complex and unpredictable conditions.

As macroeconomic processes intensify, enterprises are exposed to new risks due to market, industrial, and political uncertainties. Despite progressive managerial decisions, the dynamic nature of the external environment often necessitates periodic adjustments in enterprise development strategies.

From a probabilistic perspective, event uncertainty can be divided into three categories:

- ✚ Complete uncertainty – events with probabilities close to zero, where outcomes are highly unpredictable.
- ✚ Complete certainty – deterministic events where outcomes are fully predictable.



✚ Fragmentary uncertainty – events with partial predictability, probabilities ranging between zero and one.

Complete uncertainty challenges decision-making, requiring managers to adapt strategies dynamically. Fragmentary uncertainty allows for partial forecasting and probabilistic modeling of development trends, typically with confidence intervals of $z = 0.9-0.99$, while fragmentary uncertainty operates in the full range of $z = 0-1$.

To assess the impact of uncertainty on enterprise development, both qualitative and quantitative methods are employed. Mathematical methods based on probability theory and statistics are considered the most accurate for evaluating alternative managerial actions under uncertain conditions. At present, increasing uncertainty in the socio-economic environment disrupts process control within structural units, introduces variability in external conditions, and complicates the regulation of economic relations.

However, these challenges also encourage innovation in managerial approaches. Rapid changes in the external environment necessitate the adoption of strategic management practices. Strategic planning enables enterprises to adapt to competition, market fluctuations, and technological developments, thereby moving from their current position to a stronger competitive stance. Neglecting external environment analysis may lead to crises, operational chaos, and potential bankruptcy due to hasty decision-making.

In response, a new theoretical paradigm of adaptive management has emerged. This paradigm is grounded in a synergistic approach, fully aligned with the requirements of an innovative economy. It aims to increase managerial flexibility, enhance technological support, allow rapid adjustments in development strategies, and stabilize enterprise performance under conditions of uncertainty.

The analysis identified key ambiguities influencing enterprise management processes, which are summarized in Figure 1. These ambiguities reflect the critical areas where uncertainty impacts decision-making, resource allocation, and strategic planning.

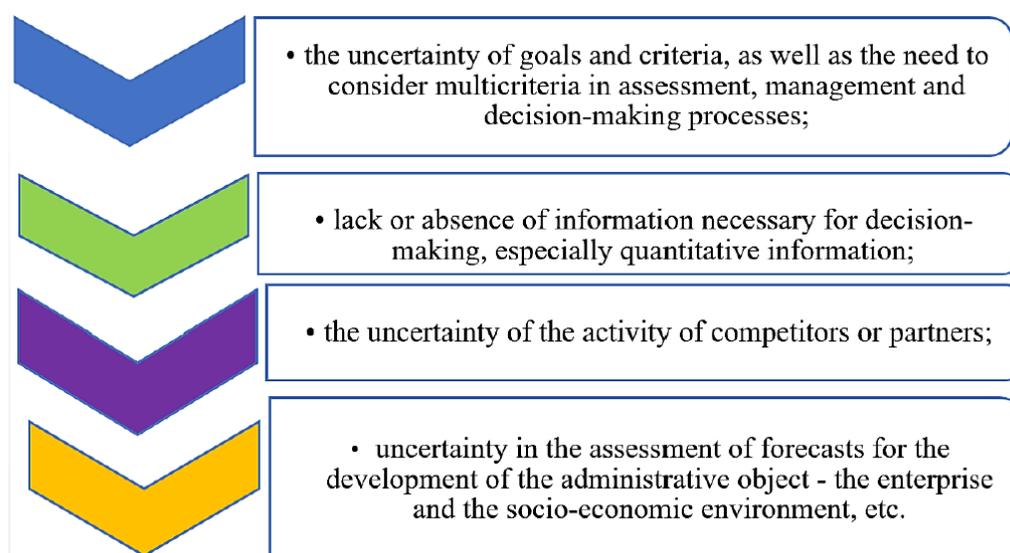


Figure 1. Following ambiguities affecting the registration process of enterprises



It is crucial to account for the aforementioned uncertainties in the managerial process. Failure to do so can lead to severe operational complications, suboptimal decision-making, and, in extreme cases, the bankruptcy of enterprises. Therefore, the proactive identification, assessment, and mitigation of both economic and political uncertainties are essential components of effective managerial practice. By integrating probabilistic analyses, statistical methods, and synergistic approaches, managers can better anticipate risks, optimize resource allocation, and enhance the resilience and adaptability of production enterprises.

This reinforces the importance of adaptive management strategies, which allow enterprises to respond dynamically to changes in both internal and external environments, maintain stability, and achieve sustainable growth even under conditions of uncertainty.

Conclusion

Uncertainties are an inevitable and fundamental aspect of managing production enterprises. They cannot be completely eliminated from decision-making processes; however, their negative impact can be minimized through systematic strategies and methodological approaches. Effective management under uncertainty requires proactive planning, rigorous information analysis, and the application of scientific methods to anticipate potential risks. Key strategies for reducing or partially mitigating uncertainty include:

Defining clear development directions: Establishing the main strategic objectives while minimizing the influence of unpredictable factors on economic activities. **Selecting appropriate evaluation criteria:** Using scientifically validated tools, statistical methods, and data analysis to assess the level and sources of uncertainty.

Developing predictive and preventive measures: Creating mechanisms to forecast potential uncertainties, prevent their adverse effects, and ensure timely managerial interventions. **Integrating scenario planning and risk management:** Employing scenario-based simulations and risk assessment frameworks to guide decision-making under different possible future conditions.

The synergetic approach remains a central element in enterprise management. By combining multiple analytical methods and integrating quantitative and qualitative insights, it allows managers to address complex problems effectively. This approach also facilitates the development and implementation of innovative technologies, enabling enterprises to adapt rapidly to market and technological changes. The synergy of human expertise, advanced analytical tools, and adaptive organizational structures strengthens managerial efficiency and supports sustainable growth.

Adoption of modern technologies: Implement enterprise resource planning (ERP) systems, artificial intelligence, and data analytics to process real-time information and enhance decision accuracy. **Capacity building and employee involvement:** Provide training programs to improve managerial skills, encourage participative decision-making, and leverage the collective intelligence of the workforce.

Strategic flexibility: Develop adaptive management frameworks that allow enterprises to quickly adjust their strategies in response to changes in external and internal environments.

Performance monitoring and continuous improvement: Establish clear performance indicators,



conduct regular reviews of managerial decisions, and implement continuous improvement mechanisms to increase operational efficiency.

Collaboration and knowledge sharing: Foster collaboration across departments and with external partners to reduce information gaps, improve problem-solving capabilities, and strengthen strategic planning. In conclusion, the efficiency of managerial activity in production enterprises is significantly influenced by the ability to understand, anticipate, and manage uncertainty. A combination of classical management principles, synergetic approaches, technological integration, and human-centric strategies provides a robust framework for enhancing managerial performance. By applying these methods, enterprises can ensure resilient operations, sustainable growth, and a competitive advantage in today's rapidly changing economic environment.

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