



Article

Application of a Complex-Structural System of Indicators in Assessing the Management Efficiency of Hotel Enterprises

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Abstract: This article examines the application of a complex-structural system of indicators for assessing the management efficiency of hotel enterprises under conditions of economic transformation. Traditional approaches based on single financial or occupancy indicators fail to reflect the true efficiency of a hotel enterprise. To address this limitation, the study applies a multidimensional assessment system comprising seven structural components and twenty-two individual indicators, integrated into a single efficiency index (HMI). The system draws on the theoretical concepts of leading scholars (P. Drucker, A. Parasuraman, T. Ohno, R. Kaplan and D. Norton) and incorporates the Lean management waste indicator (cost intensity) as a distinctive feature. The methodology was tested on two hotel enterprises in the Andijan region for the period 2019-2025. The results demonstrate that the proposed system enables objective measurement, comparison, and classification of hotel management efficiency, revealing specific structural weaknesses that conventional methods overlook.

Keywords: hotel enterprise, management efficiency, complex-structural indicators, integral assessment, Lean management, efficiency index, economic transformation

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1. Introduction

Under conditions of economic transformation, the service sector has come to occupy a leading position in the structural changes of national economies. In developed countries, the service sector accounts for 60-70% of gross domestic product, with the hotel industry representing one of its key components. In Uzbekistan, consistent state policy aimed at developing tourism has led to a significant increase in the number of hotel enterprises, an expansion of service volumes, and an intensified inflow of private investment into the sector. However, the quantitative growth in the number of hotel enterprises and the increase in their revenue have not always been proportional to improvements in management efficiency. Practice shows that in many hotel enterprises, profit margins and profitability decline even as revenue grows, which makes the improvement of management efficiency a pressing scientific problem.

The relevance of applying a systematic approach to efficiency assessment is explained primarily by the limitations of conventional evaluation practices. Traditionally, enterprise efficiency is measured through isolated indicators such as revenue volume or occupancy rate. However, such a one-dimensional approach fails to reflect the enterprise's true efficiency — its financial stability, the level of waste in operational

processes, personnel capacity, and service quality. In modern economic conditions, a hotel enterprise constitutes a complex socio-economic system whose efficiency requires a comprehensive approach that integrates several dimensions.

The problem of assessing hotel efficiency has been widely studied in world economic science. In foreign research, this issue has predominantly been approached through Data Envelopment Analysis (DEA), a non-parametric frontier technique originally developed to evaluate the relative efficiency of decision-making units with multiple inputs and outputs [1]. Barros and colleagues, using the example of Portuguese hotels, justified the use of the book value of property, operational costs, and the number of employees as input variables, and sales volume and the number of guests as output variables [2], building on earlier DEA-based work that established similar input-output frameworks for benchmarking hotel-sector efficiency [3]. Ben Aissa and Goaid classified the factors influencing hotel efficiency into internal and external groups, identifying international attractiveness and market competition as external factors, and hotel age, type, location, management type, and the education and experience of management as internal factors [4]. More recent applications of DEA to national hotel industries confirm that cost, revenue, and asset data drawn directly from financial statements remain sufficient to benchmark managerial efficiency without requiring specialized operational data-collection systems [5]. The general conclusion of these studies is that assessing hotel efficiency requires a multidimensional system integrating financial and non-financial indicators as well as internal and external factors.

At the same time, several research gaps remain. First, most methodologies for assessing hotel efficiency emphasize financial indicators while insufficiently accounting for the factor of waste in operational processes (the “muda” concept in Lean theory), a concept originally developed within the Toyota Production System [6] and later systematized into the five core principles of Lean thinking [7]. Applications of Lean methods to the hotel sector remain comparatively recent and fragmented, spanning supply-chain and inventory management [8], broader operational redesign [9], and reviews noting persistent barriers to adoption such as insufficient management commitment [10–11]; the argument that Lean logic developed for manufacturing can be productively transferred to service operations more generally reinforces the relevance of this concept to hotel management [12]. Second, existing approaches lack a coherent methodology for integrating the various dimensions of efficiency into a single integral indicator. Third, this issue has not been sufficiently examined from the perspective of economic transformation — that is, in the context of deepening market relations, digital changes, and structural reforms. These gaps determine the theoretical and practical relevance of the topic.

Personnel capacity is one of the important structural components of management efficiency in hotel enterprises. In the service sector, enterprise efficiency depends directly on the qualification level and professional competence of employees and on the system of their continuous development. Educational diagnostics play a significant role in ensuring the professional development of employees, since the regular assessment of personnel knowledge and skills is a fundamental condition for improving their qualifications and ensuring service quality [13]. This approach may also be applied in assessing personnel capacity in hotel enterprises, since service quality depends directly on the level of staff preparedness.

The aim of this study is to develop and apply a complex-structural system of indicators for assessing the management efficiency of hotel enterprises and to test it empirically. To achieve this aim, the following tasks were set: first, to substantiate the system of multidimensional assessment indicators based on the theoretical views of leading scholars; second, to develop a method of aggregating the indicators into a single

integral efficiency index; third, to apply the proposed methodology to real hotel enterprises and interpret the results.

2. Materials and Methods

The study employed the following scientific methods: theoretical analysis of scholarly literature, a systems approach, economic-statistical analysis, and the integral assessment method. The assessment system is based on the theoretical concepts of leading scholars. P. Drucker substantiated efficiency assessment through the degree of goal attainment [14], A. Parasuraman through service quality (SERVQUAL) [15], T. Ohno through the reduction of waste (Lean) [6], and R. Kaplan and D. Norton through the balance of financial and non-financial indicators (Balanced Scorecard) [16]. Building on these foundations, the management capacity of a hotel enterprise was divided into seven structural components: financial, material-operational, personnel, technological, service quality, organizational-managerial, and locational capacities. For each component, individual indicators were defined (twenty-two in total). The indicators were divided into two types — quantitative indicators (calculated by formula) and qualitative indicators (assessed through a point-based scale and expert survey).

Each indicator is scaled to the [0-1] interval. Every structural component is calculated as the average value of its indicators. The overall management efficiency index (HMI) is determined by the following formula:

$$HMI = (Fc + Mo + Pc + Tc + Sq + Om + Lc) / 7$$

where Fc-financial, Mo-material-operational, Pc-personnel, Tc-technological, Sq-service quality, Om-organizational-managerial, and Lc-locational capacity. The resulting value lies within the [0-1] interval and is interpreted across four levels: optimal, standard, satisfactory, and unsatisfactory.

The data of two enterprises in the Andijan region — “Plaza Palace” LLC and “AGROTOUR Technovation” LLC — for the period 2019-2025 were used as the object of the study.

3. Results

Based on the developed methodology, the management efficiency of the study objects was assessed. Analysis of financial indicators showed that in “Plaza Palace” LLC the profit margin rose from 12.2% in 2019 to 52.4% in 2022, but then fell sharply to 2.2% by 2025. This indicates the presence of a “margin erosion” problem in the enterprise. In “AGROTOUR Technovation” LLC, the cost-efficiency coefficient (K_s) amounted to 0.044 — meaning that nearly 95 tiyin of every soum of revenue is consumed by cost. This is a manifestation of the “wasteful system” phenomenon in Lean theory, where the enterprise generates large turnover but almost no profit.

The preliminary integral indicators calculated on the basis of the two enterprises' data showed that in both enterprises the management capacity — particularly the material-operational component — is at a low level. The application of the complex-structural system thus made it possible to identify not only the overall efficiency level but also the specific structural component in which the deficiency is concentrated.

4. Discussion

The results of the study confirm that a single indicator or a one-dimensional approach is insufficient for assessing the management efficiency of hotel enterprises. As demonstrated by the study objects, the sharp decline in profit margin in “Plaza Palace” LLC despite stable revenue, and the extremely low profitability in “AGROTOUR Technovation” LLC despite rapid revenue growth, show that efficiency cannot be

assessed through quantitative indicators alone and must be examined through a multidimensional system.

The applied complex-structural system offers several advantages over traditional approaches. First, it integrates financial (profitability, profit margin, financial autonomy) and non-financial (service quality, personnel capacity, technological provision) indicators into a single system, in the spirit of the Balanced Scorecard's integration of financial and non-financial performance measures [16]. Second, it accounts for the factor of waste in operational processes (the “muda” of Lean theory) through a distinct indicator — cost intensity — which is often overlooked in conventional financial analysis [6]. Third, by scaling all indicators to the [0-1] interval and forming a single integral index (HMI), it enables the objective comparison and classification of different enterprises.

The obtained results are consistent with the conclusions of world research. In the works of Barros and colleagues and in the study by Ben Aissa and Goaid, hotel efficiency was likewise assessed through the unity of internal and external factors and financial and operational indicators [2][4]. In particular, foreign studies identify hotel age, location, management type, and the qualification level of management as important factors influencing efficiency; these factors are reflected in the present study through the personnel and locational capacity components. Moreover, the Data Envelopment Analysis (DEA) method widely used in world practice [1][5] is, in its reliance on multi-indicator assessment, methodologically close to the proposed integral index method, which demonstrates the compatibility of the developed system with international scientific practice.

At the same time, the scientific novelty of the study is manifested primarily in the integration of the Lean management waste indicator (cost intensity) into the hotel management assessment system. Whereas existing foreign studies focus mainly on measuring overall efficiency through DEA, the proposed approach incorporates waste as a distinct and measurable indicator, extending applications of Lean thinking in the hotel sector that have so far concentrated on supply-chain and operational redesign rather than integral efficiency indices [8–9][11]. A further novel aspect is the harmonization of the differing theoretical approaches of leading scholars within a single integral assessment system — an approach consistent with calls in the Lean-services literature for manufacturing-derived concepts to be systematically adapted, rather than applied unmodified, to service contexts [10][12].

The practical significance of the study lies in the fact that the proposed methodology enables hotel management to objectively measure efficiency and identify directions for its improvement. The efficiency level determined through the integral index (optimal, standard, satisfactory, or unsatisfactory) allows management to identify which structural capacity is weak and to make appropriate managerial decisions. In particular, the Lean approach may be recommended for enterprises with a high level of waste, and SERVQUAL-based measures for enterprises with low service quality [15]. Personnel-related weaknesses, in turn, may be addressed through structured educational diagnostics of the kind used to guide professional development in other service-oriented fields [13].

Certain limitations of the study should also be acknowledged. First, the methodology was tested on two hotel enterprises, and its application to a wider range of objects would further substantiate the results. Second, since the assessment of qualitative indicators relies on expert surveys, the results may be affected by a degree of subjectivity. Third, the indicators were weighted equally, and the introduction of weighting coefficients reflecting the relative importance of each component is advisable in future research.

5. Conclusion

Assessing the management efficiency of hotel enterprises under conditions of economic transformation requires a multidimensional, complex approach. The study showed that traditional assessment methods based solely on financial indicators or occupancy rates cannot fully reflect the true efficiency of a hotel enterprise, since they overlook the operational, personnel, service-quality, and technological aspects of its activity. In accordance with the tasks set, the following main results were achieved. A system of multidimensional assessment indicators was substantiated on the basis of the theoretical views of leading scholars. A method of aggregating twenty-two indicators across seven structural components into a single integral index (HMI) was developed, together with a methodology for interpreting efficiency across four levels. The methodology was applied to hotel enterprises in the Andijan region, demonstrating its practical applicability and its capacity to reveal specific structural weaknesses.

The theoretical significance of the study lies in the development of a coherent methodological basis for assessing hotel management efficiency and in the harmonization of different scholarly approaches within a single system. Its scientific novelty lies in the integration of the Lean management waste indicator into the assessment system. Its practical significance lies in enabling hotel management to objectively assess efficiency, identify weak structural capacities, and determine directions for their development.

In future research, it is advisable to test this methodology across a wider range of objects — hotels of different categories and regions — and to develop weighting coefficients and industry benchmark indicators. Such research will further refine the scientific and methodological foundations for improving the management efficiency of the hotel industry under conditions of economic transformation.

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