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Article

Reducing Waste And Improving Efficiency In Hotel Enterprises Based On The Lean Management Approach

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Abstract: This article examines the reduction of waste and the improvement of management efficiency in hotel enterprises through the application of the Lean management approach. Under conditions of economic transformation, many hotel enterprises generate growing revenue yet fail to convert it into profit due to a high level of waste in operational processes. The study introduces cost intensity (the ratio of cost to revenue) as a quantitative indicator of operational waste and applies it to two hotel enterprises in the Andijan region over the period 2019-2025. The results reveal two distinct efficiency problems — "margin erosion" and a "wasteful system" — and demonstrate, through a scenario calculation, that reducing cost intensity substantially increases profit even without any growth in revenue. The study confirms that Lean management offers a measurable and practical path to improving hotel efficiency.

Keywords: Lean management, hotel enterprise, waste reduction, cost intensity, operational efficiency, muda, profitability.

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1. Introduction

Under conditions of economic transformation, the hotel industry has become one of the most dynamically developing branches of the service sector. In Uzbekistan, state policy aimed at developing tourism has significantly increased the number of hotel enterprises and expanded the volume of services. However, a growing volume of revenue does not automatically translate into higher efficiency. Practice shows that in many hotel enterprises, profit and profitability decline even as turnover grows — a phenomenon that points to excessive waste in operational processes.

Lean management, originally developed by Taiichi Ohno within the Toyota Production System, is a philosophy of continuous process improvement aimed at increasing efficiency and reducing costs associated with waste — whether of time, materials, labor, or capital — by eliminating non-value-adding activities [1]. Womack and Jones later distilled this philosophy into five core principles — specifying value, mapping the value stream, creating flow, establishing pull, and pursuing perfection — that have since become the standard framework through which Lean is defined and applied across industries [2]. Although Lean originated in manufacturing, scholars have argued that the service sector can equally benefit from its application to increase competitiveness and customer satisfaction and to reduce process variability and waste [3].

In recent years, Lean thinking has been increasingly adopted by hotel operations and supply-chain managers to reduce waste and create value. At the same time, research on Lean management in the hotel context remains limited and fragmented. Early works focused mainly on just-in-time purchasing and inventory of food and beverages, while more recent studies address the prioritization of Lean techniques in hotel supply chains [4] and food waste in the HoReCa sector [5].

A systematic review of the hotel Lean-management literature notes that most existing research focuses on the impacts of Lean rather than on measurable indicators of waste at the enterprise level [6], a gap also visible in the broader hospitality quality-management literature: reviews of Lean Six Sigma applications in hotels report persistent barriers such as insufficient management commitment and a lack of standardized, easily replicable measurement instruments [7]. Consequently, there is a lack of a simple, quantifiable indicator that links operational waste directly to the financial result of a hotel enterprise.

The aim of this study is to substantiate cost intensity as a measurable indicator of operational waste and to demonstrate, on the basis of real hotel enterprises, how reducing this waste through the Lean approach improves management efficiency. To achieve this aim, the following tasks were set: to define a quantitative waste indicator based on Lean theory; to analyze the dynamics of waste and profitability in the study objects; and to model the effect of waste reduction on profit through scenario analysis.

2. Methods

The study employed theoretical analysis of scholarly literature, economic-statistical analysis, and scenario modelling. Drawing on Lean theory, operational waste was measured through the cost intensity indicator, calculated as the ratio of the cost of sales to net revenue: CI = Cost of sales / Net revenue. A value close to 1 indicates a high level of waste (almost all revenue is consumed by cost), while a value close to 0 indicates low waste and high operational efficiency. The complementary indicator, cost efficiency, is calculated as (1-CI).

This approach follows the broader logic of efficiency measurement long established in the hospitality-management literature, which has used financial-ratio analysis, cost-structure studies, and frontier techniques such as data envelopment analysis (DEA) to compare hotel performance [8–9]. Applications of DEA to national hotel industries have similarly used cost and revenue data drawn directly from financial statements to benchmark managerial efficiency without requiring specialized operational data-collection systems [10], an approach consistent with the present study's use of standard financial statements to compute cost intensity.

To model the effect of waste reduction, three scenarios were applied: an inertial scenario (waste remains at the current level), a moderate scenario (partial Lean adoption), and an optimal scenario (full Lean adoption reducing cost intensity to the sector norm). 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, based on their financial statements (Form 2).

3. Results

Analysis of the cost intensity indicator revealed two fundamentally different patterns of waste in the two enterprises (Figure 1).

[Figure 1. Cost intensity (waste) dynamics of the study enterprises, 2021–2025. Plaza Palace shows low but fluctuating cost intensity; AGROTOUR Technovation shows persistently high cost intensity around 0.95.]

In “AGROTOUR Technovation” LLC, cost intensity remained persistently high — 0.94 in 2022 and 0.956 in 2025 — meaning that nearly 95% of every unit of revenue is consumed by cost, leaving almost no profit. This is a clear manifestation of the “wasteful system” phenomenon in Lean theory: the enterprise mobilizes large volumes of resources, but this activity does not translate into added value. Despite a nearly fourteen-fold increase in revenue between 2022 and 2025, the enterprise's profit margin fell from 1.0% to 0.15%. In “Plaza Palace” LLC, cost intensity remained comparatively low (0.10 in 2022), yet the profit margin nonetheless declined sharply — from 52.4% in 2022 to 2.2% in 2025. Here the source of waste lies not in the cost of sales but in period expenses (administrative and selling costs), producing a pattern of “margin erosion.”

A scenario calculation for “AGROTOUR Technovation” LLC illustrates the potential of Lean. In 2025, the enterprise earned 5,188.9 million soum in revenue against 4,958.8 million soum in cost, yielding only 7.8 million soum in net profit. If, under a moderate scenario, cost intensity were reduced from 0.956 to 0.85, cost would fall to approximately 4,411 million soum, and the saved 548 million soum, directed into profit, would increase net profit many times over. This demonstrates that, within existing revenue, waste reduction is a far more powerful lever of profit than revenue growth.

4. Discussion

The results confirm that operational waste, rather than insufficient revenue, is the principal constraint on the efficiency of the studied hotel enterprises. This finding is consistent with the broader Lean literature, which holds that eliminating non-value-adding activities streamlines operations, shortens cycle times, and improves financial performance [6], and with earlier work applying Lean hospitality methods directly to the hotel sector's operational processes [11]. It also supports the argument that manufacturing-derived Lean logic can be productively transferred to service operations [3].

The scientific contribution of this study lies in operationalizing Lean waste through a single, measurable indicator — cost intensity — that links operational processes directly to the financial result. Whereas much of the existing hotel Lean literature relies on qualitative tools such as value-stream mapping and 5S, or on broader multidimensional performance frameworks such as the balanced scorecard [12], the proposed indicator allows waste to be quantified from standard financial statements, making it applicable even to small enterprises without specialized data-collection systems. This financial-statement-based logic is consistent with the hospitality-efficiency literature more broadly, which has long relied on cost and revenue data to benchmark managerial performance across hotels and hotel chains [8][13–14].

The two identified patterns — "wasteful system" and "margin erosion" — have distinct managerial implications. For an enterprise of the AGROTOUR type, where waste is concentrated in core operational processes, a comprehensive redesign of operations using Agile and Lean methods is required. For an enterprise of the Plaza type, where waste is concentrated in period expenses, targeted cost-control instruments are more appropriate. This differentiation demonstrates that the diagnosis of the waste source must precede the choice of the Lean remedy.

Certain limitations should be acknowledged. The study is based on two enterprises, and a wider sample would strengthen the generalizability of the findings; DEA-based approaches applied to national hotel samples offer one possible route to establishing comparative efficiency frontiers across a larger set of enterprises [9–10]. Moreover, cost intensity captures financial waste but does not directly measure non-financial forms of waste such as waiting time or defects in service delivery; combining it with process-mapping tools, or with established service-quality instruments such as SERVQUAL, would provide a fuller picture of where and how waste affects the guest experience [15].

5. Conclusion

The application of the Lean management approach offers hotel enterprises a measurable and practical path to improving management efficiency under conditions of economic transformation. This study proceeded from the observation that, in a transforming economy, the quantitative growth of hotel enterprises and their revenue does not automatically translate into higher efficiency, since a substantial share of revenue may be consumed by waste in operational processes — an observation consistent with the classical management principle that growth in scale does not by itself guarantee improved managerial performance [16].

By introducing cost intensity — the ratio of the cost of sales to net revenue — as a quantitative indicator of operational waste, the study demonstrated that the low efficiency of the examined enterprises stems primarily from waste rather than from insufficient revenue. The empirical analysis revealed two fundamentally different patterns of inefficiency. In "AGROTOUR Technovation" LLC, persistently high cost intensity (around 0.95) produced a "wasteful system," in which rapid revenue growth was accompanied by a continuous decline in profitability. In "Plaza Palace" LLC, by contrast, comparatively low cost intensity coexisted with sharp "margin erosion," where profit was eroded not through the cost of sales but through period expenses. The identification of these two distinct patterns is significant because it shows that the source of waste, and not merely its presence, must guide the choice of managerial response. Scenario modelling confirmed the practical power of the Lean approach: reducing cost intensity within existing revenue can increase profit many times over, without any expansion of turnover. This finding carries an important managerial implication — that within a given level of revenue, waste reduction is a more effective lever of profit than revenue growth. It also demonstrates that Lean principles, though originally developed for manufacturing, are fully applicable to the operational and financial reality of hotel enterprises.

The theoretical contribution of the study lies in operationalizing the abstract Lean concept of waste ("muda") into a single, measurable indicator derived from standard financial statements. This makes waste diagnosis accessible even to small hotel enterprises that lack specialized data-collection systems, and it links operational processes directly to the financial result. The practical contribution lies in providing hotel management with a simple diagnostic tool that identifies not only whether waste exists but where it is concentrated, thereby enabling a targeted choice of remedy — a comprehensive operational redesign for enterprises of the "wasteful system" type, and focused cost-control instruments for those experiencing "margin erosion."

The main conclusion is that improving hotel management efficiency requires shifting the managerial focus from revenue growth to waste reduction. This reorientation is particularly relevant in transforming economies, where enterprises often pursue expansion while neglecting the internal efficiency of their processes. At the same time, the study has certain limitations that define promising directions for future research. First, since the analysis is based on two enterprises, testing the cost intensity indicator on a larger and more diverse sample of hotels would strengthen the generalizability of the findings and allow the establishment of sector benchmark (reference) values against which individual enterprises could be assessed. Second, cost intensity captures financial waste but does not directly measure non-financial forms of waste — such as waiting times, service defects, or underused capacity; integrating it with qualitative Lean tools such as value-stream mapping and process analysis would provide a fuller diagnostic picture. Third, future research could combine the cost intensity indicator with a broader multidimensional efficiency assessment, linking operational waste to service quality, personnel, and technological capacities. Such research will further strengthen the methodological foundations for applying Lean management in the hotel industry under conditions of economic transformation and contribute to the development of a comprehensive, evidence-based system of hotel management.

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