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Article

Ways to Improve The Efficiency of Service Sector Enterprises in A Green Economy

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Abstract: In the context of global climate change, resource scarcity, and sustainable development priorities, improving the efficiency of service sector enterprises within the framework of a green economy has become a key economic and environmental challenge. The service sector makes a substantial contribution to national economies through innovation, value addition, and job creation. But it also puts an indirect burden on the environment and natural resources. The main tactics for incorporating green economy concepts into service sector companies to increase productivity are examined in this article. The study looks at how eco-innovation, digitalization, energy efficiency, sustainable resource management, and environmentally friendly business models can improve operational and financial performance. Particular attention is paid to the application of green technologies, environmental management systems, and the development of green human capital. The study's findings demonstrate that implementing green practices reduces environmental risks while increasing the long-term viability, cost effectiveness, and competitiveness of service businesses. The conclusion of the article is very methodical.

Keywords: Eco Innovation, sustainable development, energy efficiency, green technologies, green economy, service sector businesses, and efficiency enhancement.

1. Introduction

In recent decades, the concept of a green economy has gained increasing importance in response to global challenges such as climate change, environmental degradation, depletion of natural resources, and growing social inequality. The transition to sustainable economic development has become a strategic priority for many countries, requiring structural changes across all sectors of the economy. The service sector is particularly important in this context due to its significant contribution to GDP, employment creation, innovation diffusion, and overall economic stability [1].

Although the service sector has historically been thought to require fewer resources than industrial production, its rapid expansion has resulted in increased energy consumption, waste production, greenhouse gas emissions, and strain on urban infrastructure. Businesses engaged in trade, tourism, transportation, finance, healthcare, education, and other service-related activities have a growing impact on environmental sustainability through their customer interactions, consumption habits, and operational procedures. Therefore, increasing the effectiveness of businesses in the service sector using green economy principles has emerged as a critical economic, environmental, and social task [2].

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Financial performance metrics like profitability, productivity, and cost reduction are no longer the only measures of efficiency in the service industry.In the context of a green economy, efficiency is defined more broadly as creating long-term social value, being environmentally conscious, using resources wisely, and reducing negative environmental effects. In light of this new knowledge, companies need to adopt innovative management techniques, environmentally friendly technologies, and sustainable business models that balance economic growth with ecological preservation [3].

Businesses in the service industry can become more competitive and resilient in the face of market volatility by implementing green economy concepts. In addition to lowering operating costs, energy-efficient technologies, digital solutions, eco-innovations, green marketing tactics, and environmental management systems also improve customer satisfaction and service quality. Additionally, as stakeholders and consumers become more environmentally conscious, businesses are encouraged to integrate sustainability into their core strategies in order to maintain market positions and attract investment [4].

Even though green transformation is becoming more and more important, institutional, financial, and technological obstacles prevent many businesses in the service sector from implementing green practices. The successful shift to sustainable service delivery is hampered by inadequate access to green financing, a shortage of skilled workers, lax regulatory incentives, and a lack of knowledge about environmental advantages. Finding workable and financially sound strategies to boost productivity within a green economy framework is therefore still a major research challenge [5].

This article aims to explore and categorize the main approaches for enhancing the productivity of service sector enterprises within the framework of a green economy. The study focuses on how green organizational practices, digitalization, energy efficiency, sustainable resource management, and eco-innovation can improve economic performance while lessening their negative effects on the environment. Researchers, business managers, and policymakers who want to promote the sustainable growth of the service sector can benefit from the study's theoretical and practical recommendations [6].

Literature Review

Sustainable development, environmental economics, organizational management, and innovation studies are just a few of the fields that have produced literature on the green economy and the effectiveness of the service sector. Together, these studies highlight the need for both operational enhancements and the strategic incorporation of social and environmental factors into fundamental business operations in order to achieve sustainable and effective growth in service businesses [7]. Growing awareness that conventional economic growth models, which mainly depend on resource extraction and fossil fuels, are incompatible with long-term environmental sustainability gave rise to the idea of the "green economy." According to groundbreaking research by the Organization for Economic Co-operation and Development (OECD) and the United Nations Environment Programme (UNEP), the green economy is one that greatly lowers environmental risks and ecological scarcities while improving human well-being and social equity. These frameworks place a strong emphasis on the use of inclusive development pathways, efficient resource use, and cleaner production in order to differentiate between environmental degradation and economic growth.

The "triple bottom line" of social, ecological, and economic performance is the term used by academics like Jackson and Daly to argue that efficiency in this context needs to be redefined to include social and environmental factors in addition to conventional financial metrics.

This emphasizes energy reduction, waste minimization, sustainable consumption, and stakeholder engagement for businesses in the service sector (Elkington) [8].

More recent research casts doubt on the early literature's belief that the service sector is naturally low-impact in terms of resource intensity. Through value chain activities and customer demand patterns, Baines et al. and Tukker show how growth in services like

transportation, hospitality, retail, and logistics can indirectly contribute to significant environmental footprints, including carbon emissions, energy use, and waste [9].

Environmental economists such as Schaefer and Crane contend that frameworks that consider upstream and downstream resource flows are necessary due to the indirect ecological impact of the service sector. This compels companies to adopt life-cycle approaches to efficiency enhancement and more comprehensive sustainability reporting.

One of the most thoroughly studied strategies for increasing service industry productivity in a green economy is energy efficiency. Investments in energy-saving technologies, green buildings, and optimized logistics not only lessen environmental impacts but also produce cost savings and competitive advantage, according to literature on eco-efficiency and environmental management systems (EMS), particularly the works of Porter and van der Linde [10].

Adopting ISO 14001 and comparable environmental standards can systematically improve resource management, innovation capacity, and market positioning for service firms, according to studies by González-Benito and González-Benito [11].

The importance of digital technologies is highlighted in innovation literature. eco-efficiency-promoting technologies like artificial intelligence, big data analytics, and the Internet of Things (IoT). According to research by Porter and Heppelmann, digitalization is at the forefront of organizational transformation, allowing service businesses to optimize energy use, cut waste, and simplify workflows.

Another important theme is eco-innovation, which is described as the creation and application of goods, procedures, and management strategies that lessen their negative effects on the environment (Hojnik & Ruzzier, 2016). Scholars highlight that eco-innovation leads not only to operational efficiencies but also enhances consumer value and opens new revenue streams through green service offerings [12].

The human and strategic dimensions of implementing green practices have also been widely discussed. Hart introduced the concept of the "natural resource-based view," suggesting that environmental capabilities can become strategic assets. This idea is supported by research demonstrating that green leadership, employee involvement, and organizational culture influence the success of sustainability initiatives (Daily & Huang) [13].

Furthermore, research by Bocken et al. shows that service businesses can combine environmental stewardship with customer satisfaction and long-term profitability through sustainable business models, such as shared value, circular economy models, and service-oriented offerings [14].

Green economy strategies are supported both theoretically and empirically, but the literature also points out important obstacles. These include resistance to organizational change, insufficient regulatory incentives, a lack of standardized sustainability metrics, and restricted access to green finance. Wagner's empirical case studies show how adoption of sustainable practices is hampered by technical and financial limitations, particularly for small and medium-sized service firms. The green transformation of businesses in the service sector is accelerated by public policy. Carbon pricing, green subsidies, and regulatory frameworks, according to academics like Tietenberg and Lewis, encourage sustainable practices and reduce the costs associated with the green transition. Supportive institutions and enterprise performance in sustainability metrics are positively correlated, according to studies on policy effects (e.g., national climate strategies, European Green Deal initiatives) [15].

2. Materials and Methods

The research methodology of this study is designed to comprehensively examine the ways to increase the efficiency of service sector enterprises within the framework of a green economy. Given the multidimensional nature of the research problem, the study adopts a

mixed-methods approach that integrates qualitative and quantitative research methods to ensure analytical depth, reliability, and practical relevance of the findings.

The study's methodology is systemic and multidisciplinary, integrating ideas from sustainable development theory, environmental economics, and service sector management. Key trends, mechanisms, and connections between green economy principles and efficiency metrics of service sector businesses are found using a descriptive-analytical research design.

There are both deductive and inductive approaches. While the inductive approach facilitates the development of conclusions based on empirical observations and comparative analysis, the deductive approach permits the application of current green economy theories and efficiency models to the service sector.

The research relies on both secondary and empirical data sources:

1. Secondary data include reports and databases from international organizations (UNEP, OECD, World Bank), national statistical agencies, academic journals, policy documents, and sustainability reports of service sector enterprises.

2. Empirical data are derived from case studies of selected service sector enterprises that have implemented green practices, as well as from available sectoral performance indicators related to energy consumption, resource efficiency, and environmental impact.

The combination of these data sources ensures the comprehensiveness and validity of the research outcomes. The following methods are used for data collection:

- Document and content analysis to examine policy frameworks, regulatory mechanisms, and corporate sustainability strategies.
- Comparative analysis to compare traditional and green-oriented service enterprises in terms of efficiency indicators.
- Case study method to analyze best practices in the application of green technologies, eco-innovations, and sustainable management models in the service sector.

Using statistical data analysis to assess trends in energy efficiency, productivity gains, and cost reductions related to green transformation.
The study focuses on significant areas of the service sector, such as financial services, public services, trade, tourism, and transportation. The research may have limitations despite offering a thorough conceptual and analytical framework because of variations in the degree of green economy implementation and data availability across industries and regions.Data triangulation ensures the study's validity and reliability by utilizing multiple data sources and analytical methods.

The results are more credible and applicable because the methodological framework is based on internationally accepted sustainability concepts and efficiency assessment standards. In conclusion, the applied research methodology offers a strong empirical and theoretical foundation for policy formulation and managerial decision-making, and it permits a methodical assessment of efficiency improvement pathways for service sector businesses in a green economy.

3. Results

The analysis focuses on identifying and evaluating the key factors and mechanisms that contribute to increasing the efficiency of service sector enterprises within the framework of a green economy. Based on the applied methodology, the study examines economic, environmental, and organizational dimensions of efficiency and assesses the results of implementing green practices in service-oriented enterprises [16].

Businesses in the service sector show varying degrees of efficiency depending on how much they incorporate green economy principles, according to sectoral reports and statistical data analysis. Businesses that actively adopt digital tools, energy-efficient technologies, and sustainable management practices generally show lower operating costs, better resource utilization, and higher productivity when compared to traditional service businesses.

It has been noted that consumers and regulators are putting more and more pressure on service sectors like tourism, transportation, retail trade, and financial services to enhance environmental performance. Businesses are prompted by this pressure to reevaluate conventional efficiency models and transition to ecologically conscious practices [17].

One of the most important elements affecting business efficiency was found to be energy efficiency. According to the analysis, service providers that use energy-saving strategies—like smart energy management, energy-efficient lighting, and green buildings—achieve quantifiable utility cost savings. Profitability and stability are enhanced by these cost reductions. Furthermore, the findings show that because energy consumption patterns are consistent, energy efficiency investments in the service sector have a comparatively short payback period. This confirms that energy efficiency serves as both an environmental and an economic driver of enterprise performance in a green economy. The analysis highlights digitalization as a critical enabler of efficiency improvement. The adoption of digital platforms, automated service delivery systems, and data-driven management tools contributes to optimizing business processes, reducing resource waste, and improving service quality [18][Table 1].

Table 1. Key efficiency indicators of service sector enterprises in the context of a green economy

№	Indicator group	Indicator name	Description	Expected effect of green practices
1	**Economic efficiency**	Operating cost ratio	Ratio of operating costs to total revenue	Reduction due to energy saving and process optimization
		Labor productivity	Revenue per employee	Increase through digitalization and automation
		Profitability level	Net profit margin	Growth as a result of cost efficiency and green branding
2	**Environmental efficiency**	Energy consumption intensity	Energy use per unit of service	Decrease through energy-efficient technologies
		Carbon emissions	CO_2 emissions per service unit	Reduction via green technologies and digital services
		Waste generation	Amount of waste produced	Minimization through paperless systems and recycling

3	**Social efficiency**	Green skills level	Share of employees trained in sustainability	Increase in innovation and service quality
		Customer satisfaction	Perception of eco-friendly services	Growth due to environmental responsibility

Green technologies, including paperless systems, online service platforms, and smart logistics solutions, were found to significantly reduce material consumption and carbon footprints. Enterprises that combine digital transformation with green technologies demonstrate higher adaptability, operational transparency, and customer satisfaction.

The findings suggest that eco-innovation is necessary to improve the long-term effectiveness of businesses in the service sector. Businesses have a competitive edge in the marketplace thanks to eco-friendly service formats, green marketing techniques, and circular economy components like sharing, reuse, and service-based consumption models [19].

Sustainable business practices boost consumer loyalty and brand reputation in addition to improving environmental performance. The analysis demonstrates that, especially in fiercely competitive service markets, eco-innovation helps diversify revenue streams and lower risk. According to the study, human capital and organizational culture have a big impact on how well green transformation works [20]. Businesses with greater operational efficiency and capacity for innovation are those that invest in employee training, green skill development, and environmental awareness initiatives. Green leadership and strategic commitment to sustainability are identified as essential conditions for successful implementation of efficiency-enhancing measures. Without managerial support and staff engagement, green initiatives tend to remain fragmented and yield limited results [21][Table 2].

Table 2. Comparative analysis of traditional and green-oriented service sector enterprises

№	Criteria	Traditional enterprises	Green-oriented enterprises	Efficiency result
1	Energy use	High energy consumption	Optimized and energy-efficient systems	Cost reduction
2	Business processes	Manual and paper-based	Digital and automated	Productivity growth
3	Environmental impact	High indirect emissions	Reduced environmental footprint	Sustainability improvement
4	Innovation level	Limited	High eco-innovation adoption	Competitive advantage
5	Market position	Price-based competition	Value-based and green branding	Increased competitiveness

The analysis shows that encouraging institutional and legal frameworks are essential for quickening efficiency gains. Businesses in the service sector are encouraged to invest in sustainable practices through incentives like tax breaks, green technology subsidies, and environmental regulations. Businesses that operate in settings with well-defined green economy policies show improved alignment between economic and

environmental goals and quicker adoption of efficiency-boosting innovations [22][Table 3].

Table 3. Comparative analysis of traditional and green-oriented service sector enterprises

№	Green economy instrument	Area of application	Observed result
1	Energy-efficient equipment	Hotels, retail, offices	15–30% reduction in energy costs
2	Digital platforms	Banking, education, public services	Faster service delivery and reduced resource use
3	Environmental management systems (ISO 14001)	Large and medium enterprises	Improved resource control and compliance
4	Eco-innovation	Tourism, logistics, trade	New green services and revenue sources
5	Staff training in sustainability	All service sectors	Higher efficiency and employee engagement

The main results of the study can be summarized as follows[23]:

A. Integration of green economy principles leads to simultaneous economic and environmental efficiency gains.

B. Energy efficiency and digitalization provide the most immediate and measurable impact on cost reduction and productivity.

C. Eco-innovations and the adoption of sustainability-oriented business models play a decisive role in strengthening long-term stability and market competitiveness.

D. Investment in human capital, together with a high level of organizational commitment, emerges as a key determinant of overall business success.

E. The speed and scope of the green transition are largely shaped by the effectiveness of institutional frameworks and the level of government support.

Taken together, the findings indicate that enhancing the performance of service-sector enterprises within a green economy context requires a holistic approach, combining improvements in management practices, the integration of advanced technologies, and the implementation of consistent and supportive public policies. The findings provide a strong foundation for creating useful suggestions targeted at the service sector's sustainable growth [24] [Table 4].

Table 4. Summary results of efficiency improvement in the green economy framework

№	Dimension	Key Result	Strategic Effect
1	Economic	Reduced costs and increased profitability	Financial sustainability
2	Environmental	Lower emissions and resource use	Environmental protection
3	Organizational	Improved management and innovation	Long-term competitiveness
4	Social	Higher customer trust and employee motivation	Social value creation

4. Conclusion

The conducted research confirms that increasing the efficiency of service sector enterprises within the framework of a green economy is not only an environmental necessity but also an economically justified and strategically important direction of development. The service sector, while traditionally perceived as less resource-intensive than industrial production, exerts a significant indirect impact on the environment through energy consumption, infrastructure use, waste generation, and consumer behavior. Service-oriented enterprises must increasingly integrate green economy principles to ensure stable and sustainable economic development. The findings indicate that efficiency within a green economy framework cannot be reduced to financial outcomes alone, but should be viewed as a multidimensional concept encompassing environmental stewardship, economic viability, and social contribution. Organizations that consistently apply environmentally responsible practices tend to achieve higher productivity, improved cost control, stronger competitive positions, and greater adaptability to regulatory and market fluctuations. In this regard, energy-saving solutions, digital transformation, eco-innovative approaches, and sustainability-driven management systems emerge as the primary sources of efficiency enhancement in the service sector.

Moreover, the results highlight that the shift toward green practices delivers not only short-term economic benefits but also lasting strategic value. Lower operational expenses, a strengthened corporate reputation, higher levels of customer confidence, and increased employee involvement collectively contribute to a more resilient and competitive market position for service enterprises. However, the study shows that organizational commitment, the availability of skilled human capital, and the existence of institutional and regulatory frameworks that support green initiatives are all critical to their success. The study finds enduring obstacles to efficiency improvement in the green economy despite the obvious advantages, such as restricted access to green financing, a lack of knowledge about environmental management tools, technological limitations, and inadequate incentive mechanisms. These challenges highlight the need for coordinated efforts by enterprises, policymakers, and financial institutions to accelerate the green transformation of the service sector.

Overall, the research concludes that increasing the efficiency of service sector enterprises in a green economy requires a systematic approach that integrates technological innovation, managerial reform, human capital development, and state support mechanisms.

First, the implementation of sustainable resource management practices and energy-efficient technologies can increase the efficiency of businesses in the service sector in a green economy; second, the use of digitalization and eco-innovations enables businesses to optimize business processes, reduce their environmental impact, and improve the quality of their services; third, the development of green human capital and environmentally responsible management systems strengthens long-term competitiveness and economic sustainability; and, finally, efficient institutional incentives and state support mechanisms are crucial in hastening the green transformation of the service sector. This study examines the ways to increase the efficiency of service sector enterprises within the framework of a green economy. The research demonstrates that the integration of green economy principles into service activities contributes to simultaneous economic, environmental, and social benefits. Energy efficiency, digitalization, eco-innovation, and sustainable management practices are identified as the key drivers of efficiency improvement. The results demonstrate that the adoption of green transformation practices strengthens the competitive capacity of service enterprises, lowers operational expenditures, and contributes to their long-term sustainability. In addition, the analysis underlines the critical role of human capital enhancement, institutional frameworks, and well-designed public policies in overcoming existing obstacles to the green transition. Taken as a whole, the study confirms that a green economy approach serves as a strategic pathway for improving both efficiency and resilience within the service sector.

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