



Article

# Improving Methodological Approaches to Assessing The Effectiveness of E-Commerce in The Service Sector

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**Abstract:** This article explores the improvement of methodological approaches to assessing the effectiveness of e-commerce in the service sector, with a focus on optimizing business processes, enhancing competitiveness, and supporting strategic decision-making. It highlights the importance of evaluating e-commerce effectiveness to improve resource management, increase service quality, assess return on investment (ROI), enhance customer satisfaction, and mitigate risks. The study identifies key challenges in existing methodologies, including their narrow focus on financial and marketing metrics, insufficient consideration of small and medium-sized enterprises (SMEs), and limited integration of technological advancements such as artificial intelligence and blockchain. A comprehensive classification of assessment methods is proposed, including financial, marketing, operational, customer-oriented, big data analytics, technological, and integrated approaches. The article emphasizes the integration of the innovative development model and PESTEL analysis as a robust framework for assessing e-commerce effectiveness in Uzbekistan's service sector. This combined approach accounts for technological, economic, political, social, environmental, and legal factors, enabling strategic planning, risk reduction, and enhanced competitiveness. The proposed methodology provides a systematic framework for evaluating e-commerce performance, fostering innovation, and aligning with global and local market demands.

**Keywords:** e-commerce, service sector, effectiveness assessment, methodological approaches, digital economy, business process optimization, competitiveness, return on investment (ROI), customer satisfaction, risk management, innovation, PESTEL analysis, innovative development model, digital payments, artificial intelligence, blockchain, customer experience, strategic planning, Uzbekistan, global integration

**Citation:** Ubaydullo ugli, M. L. Improving Methodological Approaches To Assessing The Effectiveness of E-Commerce In The Service Sector. Central Asian Journal of Innovations on Tourism Management and Finance 2025, 6(3), 990-1000.

Received: 15<sup>th</sup> Dec 2024

Revised: 29<sup>th</sup> Dec 2024

Accepted: 11<sup>th</sup> Jan 2025

Published: 31<sup>th</sup> Jan 2025



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## 1. Introduction

E-commerce performance assessment in the service sector is necessary to optimize business processes, make informed decisions, increase competitiveness, assess return on investment (ROI), improve customer satisfaction, and identify risks. First, such an assessment allows you to more effectively manage resources and improve service quality by identifying problems and areas for improvement [1]. Second, performance information allows the board of directors to make informed decisions on investments, strategies, and tactics, and facilitates strategic planning aimed at increasing market share and competitiveness. The third important aspect is competitiveness: performance analysis helps to compare your performance with competitors, identify opportunities for improvement, and adapt to changing market conditions [2], [3]. Fourth, assessing the profitability of investments allows e-commerce to determine how justified investments are

and which areas bring the most profit, which in turn helps to effectively manage the budget. The fifth aspect is related to customer satisfaction: evaluating their experience of interacting with online services helps to improve the user experience and increase loyalty, as well as quickly resolve emerging problems. Finally, regular performance evaluation supports risk management, which allows for early detection of potential threats and the implementation of corrective measures that help reduce costs and prevent negative consequences [4]. These aspects make e-commerce performance evaluation in the services sector a key tool for maintaining and improving business performance.

## 2. Materials and Methods

Research on the topic of assessing the effectiveness of e-commerce has been carried out by many scientists. Among the world's scientists, Michael Porter is one of the world's leading experts on competitive strategy, and his scientific research entitled "Porter's Five Forces" helps to understand how to assess the effectiveness of various business models, including e-commerce. Andrew T. Stephen, a professor of marketing at the University of Oxford, has conducted in-depth scientific research on assessing the effectiveness of digital marketing and e-commerce.

Among the scientists from the CIS countries, Russian professor Mikhail Kotlyar conducts research in the field of e-commerce and conducts scientific research on assessing its effectiveness in various sectors of the economy, including the service sector. Belarusian scientist Vladimir Tkachenko specializes in the management of economics and e-commerce, studying the methodological aspects of assessing effectiveness. Aidar Minkin is a professor from Kazakhstan, who has studied the development of e-commerce and the digital economy, paying special attention to issues of assessment methodology.

Uzbek scientists are also conducting scientific research in this area. Aziz Nabiullayev, Professor of the Department of Economics at Tashkent State University of Economics, conducts scientific research on e-commerce issues and methodologies for assessing its effectiveness. Gulnara Sayfutdinova conducted scientific research on the effectiveness of e-commerce, in particular, in the service sector. These scientists have made a significant contribution to the development of a methodology for assessing the effectiveness of e-commerce and its application in the service sector, both internationally and in the CIS countries and Uzbekistan.

Evaluating the effectiveness of e-commerce in the service sector is a complex process and requires the use of various methodological approaches. The choice of a particular method depends on the research objectives, the specific characteristics of the service provided, and the available data.

## 3. Results

For the further development of e-commerce in the service sector, it is important to systematically implement strategic planning through a combined approach of the innovative development model and PESTEL analysis.

Effective use of the combination of the innovative development model and PESTEL analysis is based on the following principles:

A comprehensive approach - a deep analysis of the relationship between innovative development and external factors.

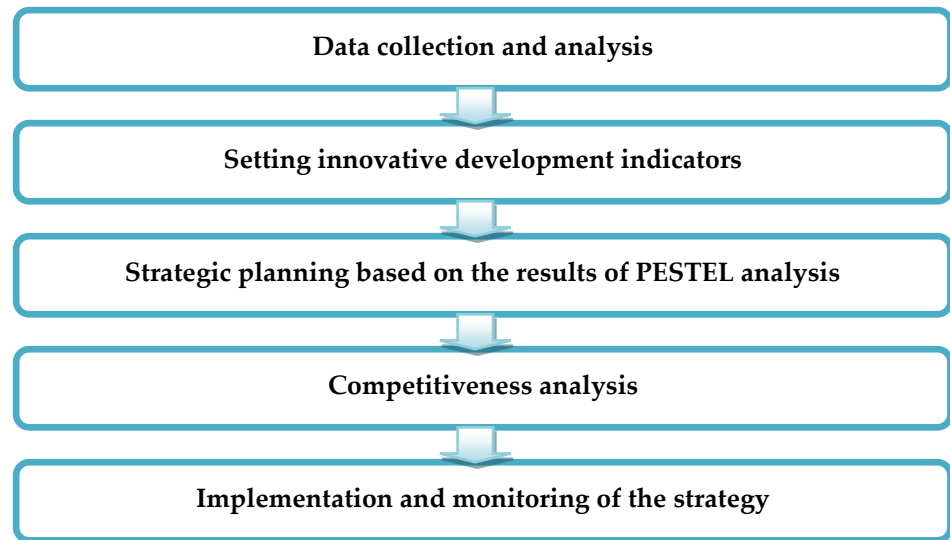
Flexibility - rapid response to market changes and adaptation of innovative strategies [5], [6], [7].

Public-private partnership - improving the legal and infrastructure conditions for the development of e-commerce.

Technological integration - increasing efficiency by connecting artificial intelligence, blockchain and automated systems with PESTEL factors.

Customer-oriented strategy - innovative technologies and macroeconomic factors should be combined with customer needs.

Sustainability and social responsibility - organizing business processes taking into account environmental and social factors, see Figure 1.



**Figure 1.** Mechanism for the joint use of the innovative development model and PESTEL analysis

The process of using the innovative development model and PESTEL analysis is carried out in the following sequence:

1. Data collection and analysis:
  - Collection of data on internal and external factors affecting e-commerce;
  - Analysis of the current situation in terms of PESTEL factors (political, economic, social, technological, environmental, legal);
  - Study of best practices in innovative development processes.
2. Determination of innovative development indicators:
  - Identification of innovative indicators that are important for the development of e-commerce;
  - Development of criteria for assessing digital technologies, payment systems, logistics and customer experience;
  - Determination of the level of readiness for the adoption of new innovations.
3. Strategic planning based on the results of PESTEL analysis:
  - Assessment of the impact of legislation, economic environment and technological development on e-commerce;
  - Identification of opportunities for the development of e-commerce in the domestic and international markets;
  - Formulation of innovative strategies and their adaptation to macroeconomic factors [8], [9], [10].
4. Competitive analysis and identification of promising areas:
  - Conducting a parallel analysis with Porter's competitive advantage model and SWOT analysis;
  - Identifying the strengths and weaknesses of local e-commerce companies;
  - Identifying the main areas of innovative development.
5. Strategy implementation and monitoring:
  - Phased implementation of innovative projects;
  - Assessing the effectiveness of measures taken based on the results of the PESTEL analysis;

- Developing new approaches to developing the digital economy in cooperation with the public and private sectors;
- Introducing innovations that meet customer needs and market requirements.

Through these processes, innovations and macroeconomic factors in the development of e-commerce are combined, and as a result, efficiency is increased.

The combined use of the innovative development model and PESTEL analysis allows for the formation of a comprehensive approach to assessing the effectiveness of e-commerce in the service sector. On the one hand, the innovative development model serves to determine the adaptability to digital technologies, new business models and market changes. On the other hand, PESTEL analysis allows for a comprehensive study of the state of e-commerce in the macroeconomic environment.

The assessment carried out on the basis of this methodological combination allows for the following results:

- Strategic flexibility - e-commerce companies can act taking into account economic, legal and technological factors when introducing innovative technologies;
- Increasing market stability - the impact of state policy, taxation system and legal regulation on e-commerce is assessed and long-term development strategies are developed;
- Strengthening competitiveness - based on the innovative development model, the level of innovation implementation of companies is determined and their position in the global market is strengthened;
- Risk reduction - as a result of PESTEL analysis, potential threats are identified in advance and measures are developed to minimize them.

Thus, the combined approach of the innovative development model and PESTEL analysis in the development and evaluation of the effectiveness of e-commerce in the service sector creates the basis for achieving systematic and long-term results [11], [12].

#### 4. Discussion

Although there are various methods for assessing the effectiveness of e-commerce in the service sector today, not all of them are equally perfect. The following problems are observed in the current approaches:

Narrow assessment - excessive emphasis is placed on financial and marketing indicators, while customer experience, level of innovation development and ecosystem efficiency are not sufficiently taken into account [13], [14].

Neglect of target segments - traditional approaches are adapted to large companies, and performance assessment is not sufficiently adapted for small and medium-sized businesses (SMEs).

Insufficient reflection of technological development factors - the level of implementation of advanced innovations such as artificial intelligence, big data analytics, blockchain technologies does not have a comprehensive impact on the assessment of performance.

Failure to take into account external factors - based on the PESTEL analysis, an assessment of the extent to which e-commerce is affected by political, economic, social, technological, environmental and legal factors is often avoided [15].

To overcome these problems, a systematic and comprehensive approach to assessment methods is required. Therefore, we consider it appropriate to divide existing methods into main groups in order to facilitate their study, see Table 1.

**Table 1.** Groups of methods for evaluating the effectiveness of e-commerce in the service sector

№	Style group	Approaches
1.	Financial Methods	ROI (return on investment) calculation;

		Cost-benefit analysis; Break-even calculation
2.	Marketing Methods	Conversion analysis; Customer acquisition cost calculation (CAC); User behavior analysis; Net Promoter Score (NPS)
3.	Performance Assessment Methods	Lean and Six Sigma methodology; Process-based management (BPM)
4.	Customer-Focused Methods	Customer satisfaction analysis; Lifetime value calculation (LTV); Purchase frequency and volume analysis
5.	Big Data Analytics and Predictive Analytics	Big data analysis; Predictive analytics
6.	Technological Methods	Analysis of the mobile version of the site; Site usability assessment, innovative development model
7.	Complex Methods	Balanced ScoreCard (BSC) model; SWOT analysis method, PEST and PESTEL analysis

In financial methods, it is used to determine the profitability and payback period of e-commerce investments by comparing the benefits received with the costs, to compare the direct and indirect costs of e-commerce with the benefits received, to determine the sales volume at which all e-commerce costs are covered.

In marketing methods, it is used to assess the effectiveness of marketing campaigns by assessing the percentage of website visitors who complete a targeted action (for example, a purchase, a newsletter subscription), to determine the cost of attracting one new customer, to study user behavior on the site using web analytics to identify problem areas and optimize the user experience, and to assess customer loyalty by measuring their willingness to recommend the company to others.

The method of assessing business performance helps to optimize processes by identifying and eliminating waste in business processes. In e-commerce, this includes improving the supply chain, inventory management, and optimizing logistics. At the same time, this method assesses the efficiency of business processes related to e-commerce and develops methods for optimizing them.

Customer-oriented methods are used to conduct surveys and questionnaires to assess the level of customer satisfaction with the quality of services provided, and to determine the total benefit that the company receives from one customer over the entire period of their relationship, as well as to assess the expected efficiency from one customer by analyzing the frequency of purchases and the average check amount.

Big data analysis and predictive analytics help to more accurately measure the efficiency of e-commerce and identify hidden patterns by analyzing customer behavior, forecasting demand, and optimizing business processes. Predicting future results based on historical data includes forecasting sales, determining the likelihood of customer churn, and assessing other indicators.

Technological methods are used to determine the speed of loading site pages, assessing the usability of the site on mobile devices, and assessing the accessibility of the website for people with disabilities, see Table 2.

Comprehensive methods allow you to assess e-commerce performance taking into account financial, customer, internal process, and innovation indicators, helping to analyze strengths and weaknesses, opportunities, and threats to the business.

**Table 2.** Advantages and disadvantages of methods for assessing the effectiveness of e-commerce in the service sector

№	Methods	Advantages	Disadvantages
1.	Financial Methods	It clearly defines the financial position of a business. It is applicable to any company, regardless of industry. Generally accepted financial statements are a source of information. Financial indicators are easily measured and help to draw objective conclusions. It helps to analyze the profitability of investments and long-term financial stability.	Does not reflect all aspects of a business, such as service quality or customer satisfaction. Financial ratios often reflect the past, not the present. Requires a thorough understanding of financial reporting and analysis. Focusing solely on financial results can miss non-financial aspects of performance. Accounting errors can distort results.
2.	Marketing Methods	Allows you to evaluate the effectiveness of marketing campaigns and their impact on customer behavior. It is possible to adapt to different goals and tasks. Allows you to better understand the needs and preferences of customers. Measuring the effectiveness of marketing campaigns helps to strengthen the brand and its position in the market. Allows you to take into account marketing strategies and market segmentation.	Some metrics can be interpreted differently. The quality of the analysis depends on the quality and completeness of the data. Some metrics, such as brand awareness, are difficult to measure. The results of marketing methods are difficult to quantify. Effective marketing campaigns can require significant financial investments.
3.	Performance Assessment Methods	Allows you to assess the effectiveness of business processes. Helps identify bottlenecks and optimize company operations. Can be used to predict future results. Allows you to improve business processes and reduce costs. Increases labor productivity and resource efficiency.	Only internal processes are assessed, without taking into account external factors. Requires a deep understanding of business processes. The quality of the assessment depends on the accuracy of process data. Implementing optimization changes can be complex and expensive. Access to the data needed to analyze operational efficiency may be limited.
4.	Customer-Focused Methods	Allows you to assess customer satisfaction and loyalty. Can be customized for different customer	Customer ratings can be subjective and depend on many factors. Conducting surveys and analyzing

		segments. Focusing on customers can provide a competitive advantage in the market. Allows you to measure service quality.	feedback requires significant resources. Changes in customer satisfaction may not be immediately noticeable.
5.	Big Data Analytics and Predictive Analytics	It is based on real data. It allows you to identify hidden patterns and trends. It helps you predict future events. It allows you to create personalized offers for customers. Automating data analysis saves time and resources.	Requires specialized knowledge and tools. The quality of analysis depends on the quality and completeness of the data. Requires significant investment in infrastructure and expertise. Collecting and using big data requires adherence to security and privacy standards. Can be difficult to interpret.
6.	Technological Methods	Allows you to automate many manual processes. Increases the speed and accuracy of data processing. Provides a competitive advantage. Allows you to provide a high level of service to customers and goods.	Requires large investments. Lack of flexibility in choosing solutions. Technologies quickly become obsolete, requiring constant updating.
7.	Complex Methods	Allows you to assess the business from different angles. Combines the advantages of different methods. Helps develop a long-term development strategy. Helps identify and reduce risks of various levels.	Requires in-depth knowledge and experience. Requires significant resources. Analysis can take a long time. A comprehensive approach requires significant effort and resources to implement. It can take longer to obtain results compared to individual methods.

In the service sector, e-commerce performance assessment has its own characteristics, which are:

- The intangibility of goods, measuring the quality of services and customer satisfaction plays a more important role than in the sale of goods;
- The individual nature of services, the need to take into account the individual needs of each client;
- The influence of the human factor, the quality of service depends on the qualifications of employees;
- The difficulty of measuring some indicators, the difficulty of quantitatively assessing some aspects of service provision.

Determining what exactly needs to be assessed (profitability, effectiveness of marketing campaigns, customer satisfaction, etc.) is the first task of the assessment process. The main tasks of the assessment include the following.

1. Determining the purpose of the assessment;

2. Determining the available data and indicators necessary for assessment;
3. Taking into account the characteristics of a particular service sector;
4. Determining financial, time and human resources for assessment.

Evaluating the development prospects of e-commerce is a complex and multi-factorial process, involving economic, technological and social criteria. In the scientific literature, there are various methodological approaches to assessing the development prospects of industries, each of which has its own advantages and limitations, see Table 3.

**Table 3.** Basic analysis methods and their description

№	Analysis method	Description	Importance for Uzbekistan
1.	Innovative development model	Developed by Schumpeter (1934) and later refined by Freeman (1987) and Lundvall (1992), economic growth is associated with entrepreneurship and technological innovation.	- Can be used to identify the prospects for e-commerce due to the rapid development of digital technologies. - Allows for the evaluation of electronic payment systems, logistics, and artificial intelligence technologies.
2.	Porter's competitive advantage model	Developed by M. Porter (1990). Evaluates the role of market structures, demand, suppliers, and supporting networks.	- Helps analyze the competitiveness of e-commerce companies in the domestic and international market. - As the service sector is developing, it allows you to identify promising areas.
3.	PEST and PESTEL analysis	Developed by A. Aguilar (1967). The PESTEL model was developed by Johnson, Scholes & Whittington (2008). It analyzes political, economic, social, technological, environmental and legal factors.	- Useful in assessing the possibilities of creating a favorable environment for e-commerce, taking into account state policy and legislation. - Provides an in-depth study of the taxation system, legal framework, and state incentive mechanisms.
4.	SWOT and SPACE analysis	SWOT (G. A. Humphrey, 1960s) aims to identify the strengths and weaknesses, opportunities and threats of a business. The SPACE model (Rowe et al., 1994) is a strategic assessment method.	- Helps to assess the strengths and weaknesses of e-commerce entities (UZUM, Asakhiy, OLX, etc.). - Effective in analyzing the competitiveness of local marketplaces and determining their strategies.

In the conditions of Uzbekistan, the integration of the innovative development model and PESTEL analysis is considered the most appropriate method. There are the following reasons for this:

1. The priority of the technological factor - since the development of e-commerce is more associated with technological innovations, the Schumpeter and Lundvall approach can be used as the main criterion for assessing e-commerce.



2. The importance of the regulatory environment - state policy and the legal environment have a significant impact on the development of e-commerce, therefore, assessing the factors of legislation, taxes, infrastructure and international integration through PESTEL analysis is of great importance.
3. Taking into account local economic conditions - in countries where e-commerce infrastructure is developing, a comprehensive study of economic and social factors is required.

It is advisable to use a combination of the innovative development model and PESTEL analysis to analyze e-commerce in Uzbekistan, since these approaches allow for a full coverage of technological, economic and legal aspects and their interaction. In the future, enriching these methods with statistical data and developing analytical forecasts based on artificial intelligence will serve to further improve e-commerce strategies.

The innovative development model was put forward by J.Schumpeter and shows technological innovations and entrepreneurial activity as the basis of economic growth. Later, this model was improved by Freeman and Lundvall, laying the foundation for the concept of a national innovation system (NIS). In e-commerce, this model allows you to assess the following aspects:

- Digital payment systems - increasing the speed and security of transactions in e-commerce;
- Artificial intelligence and analytical tools - studying customer purchasing behavior and offering personalized services;
- Delivery and logistics innovations - the introduction of automated warehouses, drone and robot delivery services.

The innovative development model assesses the effectiveness of e-commerce by the following criteria:

- Market share and sales growth;
- Rapid satisfaction of customer needs;
- Reduction of operating costs;
- Improving the quality and speed of goods and services.

PESTEL analysis is an important tool for assessing macroeconomic factors affecting e-commerce. The following is a review of the impact of each factor on e-commerce:

- Political factors - government policy, legislation regulating e-commerce, customs and tax rates;
- Economic factors - inflation, exchange rates, income and consumer purchasing power;
- Social factors - the level of Internet use, online shopping habits, customer trust in technology;
- Technological factors - the development of new technologies, the integration of artificial intelligence and blockchain technologies;
- Environmental factors - requirements for environmentally friendly delivery systems, packaging and waste reduction;
- Legal factors - protection of personal data, intellectual property rights, consumer rights protection.
- The combination of the innovation development model and PESTEL analysis allows for a joint assessment of external and internal factors of e-commerce. For example:
- Technological development and state policy – determines the availability of state support programs and grants for the development of innovative technologies.
- Economic factors and digital payment systems – determines the relationship between inflation and the stability of payment systems on e-commerce platforms;
- Legal factors and data protection – implies the improvement of the legislative framework to ensure the security of online transactions.

The joint use of the innovative development model and PESTEL analysis in the development of e-commerce in Uzbekistan is of strategic importance. Their combination can be used in the following areas:

- State policy – in improving the adopted strategies and legislative framework for the development of e-commerce;
- Innovative capabilities of local e-commerce platforms – in the introduction of innovative services by platforms such as UZUM, Asakhiy, OLX;
- Changes in logistics and payment systems – in the modernization of the main infrastructure elements in the e-commerce ecosystem.

The combined approach of the innovative development model and PESTEL analysis is of strategic importance in the development and assessment of the effectiveness of e-commerce. The use of this approach allows us to achieve the following results:

- Clearly identify the trends in the innovative development of e-commerce;
- Assess the impact of state policy, economic and technological environment on the development of commerce;
- Make it possible to develop specific recommendations for improving the effectiveness of local e-commerce platforms.

## 5. Conclusion

In conclusion, the evaluation of e-commerce effectiveness in the service sector must move beyond narrow financial and marketing indicators. A comprehensive methodology that integrates the innovative development model with PESTEL analysis allows for a more holistic understanding of performance, taking into account technological, economic, legal, and customer-focused aspects. This approach helps not only in identifying strengths and weaknesses but also in formulating sustainable development strategies. By accounting for both internal innovations and external macroeconomic factors, businesses can enhance strategic planning, risk management, and competitiveness in both local and global markets. Moreover, the model supports dynamic adaptation to technological trends such as artificial intelligence, blockchain, and predictive analytics. This positions Uzbekistan's service sector to better align with international e-commerce standards while fostering innovation and customer satisfaction. Thus, systematic implementation of this dual-methodology is critical for long-term success and digital transformation in the service economy.

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