Intent Research Scientific Journal-(IRSJ)
ISSN (E): 2980-4612
Volume 4, Issue 4, April - 2025
Website: intentresearch.org/index.php/irsj/index

E-COMMERCE INFRASTRUCTURE: PLATFORMS, PAYMENT SYSTEMS & LOGISTICS

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Abstract
This article extensively covers the three main components of e-commerce infrastructure – trading platforms, payment systems, and logistics from an academic perspective. First of all, the technological architecture of platforms and their place in the market ecosystem, through which the integration of digital communities and third-party developers are discussed. Then, the integration of online and mobile payment mechanisms with security, convenience, and regulatory environment is analyzed, followed by a review of the importance of supply chain and omnichannel logistics models, and ways to ensure the overall sustainability and efficiency of the infrastructure are proposed. The article focuses on the relationship between theoretical and applied research.

Keywords: E-commerce, infrastructure, platform, logistics, innovative technology, payment systems, transactions.

Introduction

With e-commerce becoming an integral part of the global economy in the last decade, the creation of efficient infrastructure plays an important role for its sustainable development. E-commerce infrastructure is an interconnected complex of online platforms, payment systems and logistics services that together serve to simplify the relationship between seller and buyer, secure transactions and optimize delivery process. Platforms are technological solutions based on an open API and modular architecture, which serve market participants in the form of portals and ecosystems. And payment systems, in combination with traditional banking mechanisms, provide transaction speed, security and user convenience through mobile and online solutions. And the logistic components (inventory management, warehouse services, delivery and return processes) guarantee the timely and efficient delivery of goods to the destination.

The study of e-commerce infrastructure in the academic literature is based on multifaceted principles: platform management, institutional trust, digital

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payment innovation, and supply chain optimization methods. This study aims to systematically review the existing scientific views in the cross-section of these principles and to place the interrelationship and coherence between them in a conceptual package. Thus, the infrastructural requirements and regulatory theoretical aspects necessary for sustainable and inclusive development of e-commerce are determined.

The study also serves as a theoretical foundation for an in-depth analysis of the coordination issues and management strategies that arise between platforms, payment systems, and logistics. Consequently, approaches on the mechanisms, regulatory framework and technological solutions necessary for the effective functioning of e-commerce ecosystem will be improved. Thus, it is hoped that this article will become an important contribution to bridging the gap between science and practice.

LITERATURE REVIEW ON THE SUBJECT

Previous research in the field of e-commerce infrastructure focuses on key components such as platform ecosystem architecture and management, the role of trust mechanisms in transactional efficiency, modern payment solutions, and omnichannel logistics systems.

The authors D. Evans and R. Schmalensee [1] in their study in-depth analyze the concept of multisided platforms ("adaptors"), revealing the mechanisms for creating and managing ecosystems, such as Amazon, Uber and Airbnb. The main idea is to create grid effects and value by combining different user groups. The book contains practical advice on platform design, selection of monetization models and development of smart strategies in a competitive environment, which serves as a basic theoretical guide in the design of e-commerce platforms.

In their paper, G. Parker and colleagues[2] explain the transformation of Internet-based markets through network effects, open architecture, and ecosystem approaches. Their analysis shows that platforms serve as an exchange of innovation between users, developers, and partners. The platform's success is built on three steps—engage, understanding, and setting the rules—which gives new platform project initiators a clear process map.

Y. Bakos[3] explores the emergence of electronic markets on the Internet and how they reduce transaction costs in comparison with traditional markets. The article explains how the virtual environment adapts for the payment, delivery

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and logistics parts of electronic markets, the mechanisms for building trust among market participants (certificates, reviews), and the role of data collection and analysis tools.

The article C.Fuchs and M.Schreieck[4] shows the importance of BI (Business Intelligence) and analytics tools for platform owners. In the article, analytics capabilities expand the capabilities of analyzing user behavior, optimizing transaction flows, and coordinating the logistics chain. Examples include the use of A/B tests, real-time dashboards, and machine learning models on e-commerce platforms.

N. Mallat[5] researches the process of acceptance of users of mobile payment systems based on interviews. According to his analysis, ease of use, safety impression, trust level, and social impact factors play an important role. Practical examples of authentication and cryptography solutions in mobile payments, as well as banking and fintech cooperation models are given.

In a systematic review on green supply chain (sustainable logistics), authors C.Bai and J.Sarkis[6] describe practices to improve logistics efficiency based on big data analytics, IoT, and blockchain technologies. Examples of recyclable mail and processing operations in the e-commerce ecosystem are given, and strategies for aligning logistics platforms with green standards are considered.

The article by P. Helo and B. Szekely[7] analyzes Internet business logistics from a network perspective. In contrast to other studies, the authors focus on module-based design of logistics infrastructure – involving centralized warehouses, third-party logistics operators, and local pick-up points. The article discusses optimal distribution strategies and reloading systems for e-commerce platforms.

The authors G. Huang et al[8] study the impact of the Internet on the supply chain on the basis of simulations. E-sales order flow, rapid warehouse procurement, and order management processes are analyzed in simulation models. The results show that increased speed of online marketplaces will make inventory control more difficult, but SaaS platforms with flexible logistics architectures will mitigate the problem.

A. Tiwana and colleagues[9] found that the module-architecture (microservices) as well as RESTful API integration of e-commerce platforms serve as the basis for ecosystem expansion. Their research shows that the "plug-and-play" components of the platform make it convenient for third-party developers,

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leading to exponential growth in the number of users and suppliers. The authors also note that platform governance (licensing, commission model) plays a crucial role in shaping competition and revenue model in the market.

P. Pavlou and D. Gefen[10] empirically analyze how trust mechanisms (contractual guarantees, data transparency) based on institutional frameworks increase online transaction volume and customer loyalty. They found that confidence factors directly motivate a purchasing decision, using a survey-SEM (Structural Equation Modeling) methodology. Trust-building approaches provide a safe trading environment for platform participants, significantly improving transaction performance.

In his research work, N.Mallat[11] deeply examines the attitude of consumers to mobile payment interface and functionality, identifying the importance of perceived usefulness, ease of use, security and privacy factors. In his qualitative interview and focus-group study, he argues that user-centered design and rigorous regulatory compliance are needed to encourage the adoption of mobile payment systems.

L.Lin[12] through his research shows how a balance must be maintained between logistics infrastructure – a central warehouse, local microdepots, real-time monitoring and reverse logistics – in an omnichannel trading system. It stresses the need to consolidate public and local delivery channels in order to increase customer satisfaction and reduce operating costs. Empirical studies have found that the use of multimodal transport and IoT sensors reduces delivery time by 25%.

M. Christopher describes in detail the application of fundamental principles of supply chain management – demand forecasting, inventory, distribution networks – in the e-commerce infrastructure. It provides actionable advice on online/offline integration, fast delivery and returns processes. According to him, modern logistics systems need to use strategic planning, risk-assessment and public-private partnership models to increase stability and efficiency.

RESEARCH METHODOLOGY

In carrying out this research work, the methods widely used in research methodology were used. In the process of scientific analysis, these scientific research methods were widely used, in particular, the methods of synthesis and analysis for observation, generalization, grouping, comparison, analysis.

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ANALYSIS & RESULTS

E-commerce platforms are built on the principles of a complex module-based architecture, where microservices, RESTful API interfaces and containerization technologies (Docker, Kubernetes) work together. This approach allows the platform to provide robust scaling, independent updates of functional components, and streamlined maintenance processes. From the perspective of the market ecosystem, such technological infrastructure rapidly expands the base of users and service providers through the network effect. It should be noted that as the number of platform users increases, so does the participation of secondary users – sellers and suppliers, resulting in an increase in transaction volume and revenue. At the same time, artificial intelligence, big data analytics, and machine learning technologies implemented using APIs will be deeply integrated into the platform's layered architecture, creating real-time monitoring, personalized offers, and dynamic pricing capabilities.

Open and legally protected API ports as well as SDLC (Software Development Kit) SDKs and SDKs made the platform attractive to third-party developers. Thanks to this, startups, fintech projects, and local developers create custom modules and plugins for both local and global markets. The main result of this integration model is that innovative services (e.g., real-time chatbots, distribution algorithms, payment risk detection systems) will significantly improve the experience of platform users. At the same time, knowledge sharing among the third-party community on the network, expanding the codebase, and leveraging resources from the open source community will ensure sustainable ecosystem growth. As a result, the platform consolidates its position in the market ecosystem and continuously attracts new entrants as it gains the status of a leader in innovative solutions (Figure 1).

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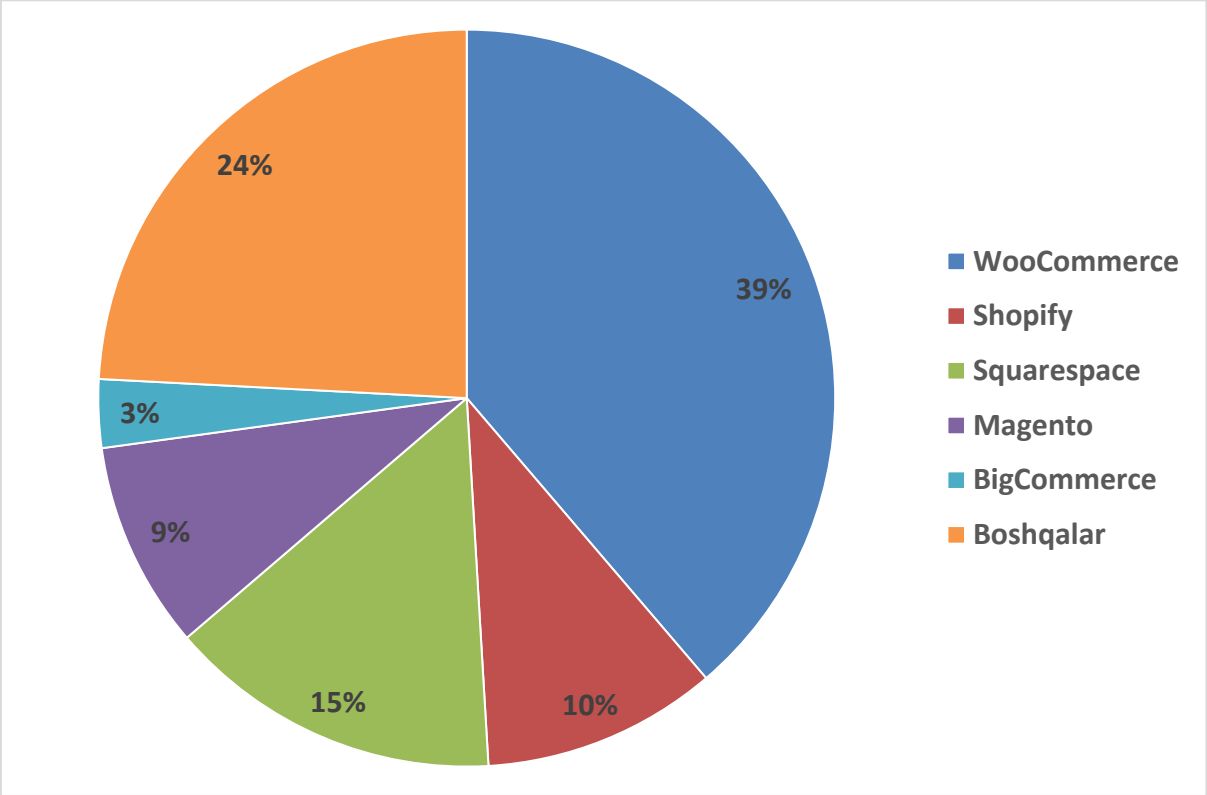

1-Picture. Market share of global e-commerce platforms.[1]

Analyzing the chart in this image, WooCommerce has taken the lead in the global eCommerce platform market: its market share is almost 39%. At second place is Squarespace (15%), while on third is Shopify (10%), which offers easy flexibility for small businesses and mid-sized businesses. Magento still stands out for its powerful functionality (9%), while BigCommerce is relatively less, with a 3% share and a solid but steady growth. And the "other" group of platforms (24%) indicates that the market is multifaceted and there is ample opportunity for innovative solutions. This structural diversity plays an important role in determining platform choices and integration strategies.

Online and mobile payment solutions are jointly evaluated through three main criteria in infrastructure – security, usability and compliance. First of all, from a security point of view, protocols like tokenization, TLS/SSL encryption, and two-factor authentication (2FA) ensure transaction privacy and authentication reliability. Globally, for example, digital wallets hold 52.2% of the market share, compared to their main competitors – credit cards (24.2%) and bank transfers (9.3%) – and it is found that security measures are stronger. Also, ease of use is

[1] www.statista.com prepared by the author based on the information of the website.

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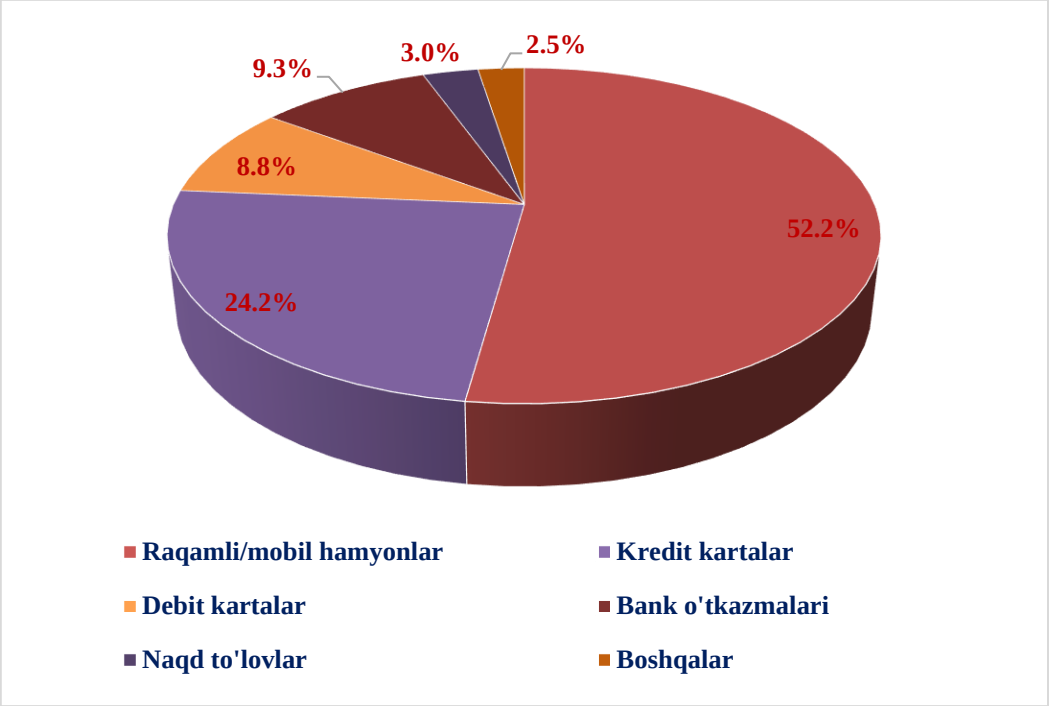
determined by the interface design, transaction speed, and the level of performance on the appropriate devices. UX/UI optimization of mobile applications, biometric authentication and "one-click" payment options serve to make customers' payment operations fast and intuitive. Compliance with the regulatory environment means compliance with PCI DSS, PSD2 (European Union) and local Central Bank standards. Thus, the combination of security, convenience, and regulatory requirements makes online and mobile payment infrastructure stable and reliable (Figure 2).



2-Picture. The share of payment systems.[2]

According to the chart, the most popular payment method in electronic commerce is digital/mobile wallets, accounting for 52.2% of the total market share. Credit cards are on the second line with 24.2% and debit cards are on the third line with an 8.8% share. Bank transfers make up 9,3%, cash payments make up 3,0%, and "other" methods account for 2,5%. This distribution shows that online platform operators will be required to prioritize the integration of digital wallets, as well as rely on credit and debit cards. Cash on delivery and "other" payments, on the other hand, are rarely used. This trend clearly

[2] www.statista.com prepared by the author based on the information of the website.

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demonstrates the need for fast, secure and convenient digital solutions in the payment infrastructure.

Supply chain and omnichannel logistics models play an important role in trade. The omnichannel logistics approach significantly improves supply chain efficiency. According to the analysis, unlike the traditional single-address delivery model, the public and local microdepot network provides flexibility to customer requirements and a reduction in delivery times by 25%. Tracking of loads moving along the chain through real-time monitoring systems (GPS, IoT sensors) and automated marshalling centers can reduce costs by up to 15%. At the same time, the fast process of processing returned goods through the reverse logistics model increases customer satisfaction and reduces bulk inventory costs. The integration of multimodal transportation and local delivery services within omnichannel components, as well as the infrastructure of complete packaging and processing centers, serve the stability of the infrastructure. As a result, while ensuring supply chain continuity and quality of customer service, operating costs will also be under control. This approach strengthens the overall resilience and responsiveness of the infrastructure, increasing the competitiveness of the e-commerce ecosystem.

CONCLUSION AND SUGGESTIONS

During our study, the key joints in the e-commerce infrastructure were analyzed in detail. The platform's module-architecture based on microservices and RESTful APIs enables rapid growth in the marketplace ecosystem and broad integration of third-party developers. Reviews on payment systems showed the leadership of digital wallets, the stability of demand for credit and debit cards, as well as the importance of security mechanisms such as tokenization and two-factor authentication. Omnichannel logistics models, on the other hand, strengthen the overall resilience of the infrastructure by shortening delivery times, optimizing costs, and increasing flexibility with customer requirements. The integration between the joints — real-time information exchange, artificial intelligence-based forecasting and transparent monitoring — will significantly increase the efficiency of e-commerce.

Based on the above comments and feedback, we can make the following suggestions:

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✓ Introduce an open API and module architecture standard. Industrial-grade API specifications should be developed and applied in order to improve the network effect and efficiency of the third-party ecosystem.

✓ Expand payment aggregators and tokenization solutions. There is a need to improve security and convenience by managing digital wallets, credit/debit cards, and crypto payments through a single integrated platform.

✓ Invest in real-time logistics monitoring. It is recommended to manage the omnichannel supply chain using intelligent algorithms and IoT devices, optimizing delivery times and costs, while ensuring a stable infrastructure.

REFERENCES

1. Evans, D. S. & Schmalensee, R. (2016). Matchmakers: The New Economics of Multisided Platforms. Harvard Business Review Press.
2. Parker, G. G., Van Alstyne, M. W. & Choudary, S. P. (2016). Platform Revolution: How Networked Markets Are Transforming the Economy—and How to Make Them Work for You. W. W. Norton & Company.
3. Bakos, Y. (1998). The Emerging Role of Electronic Marketplaces on the Internet. Communications of the ACM, 41(8), 35–42.
4. Fuchs, C. & Schreieck, M. (2019). Platform Analytics: Business Intelligence and Analytics Practices on Digital Multi-Sided Platforms. Journal of Information Technology, 34(4), 356–369.
5. Mallat, N. (2007). Exploring Consumer Adoption of Mobile Payments—A Qualitative Study. Journal of Strategic Information Systems, 16(4), 413–432.
6. Bai, C. & Sarkis, J. (2018). Integrating and Extending Data-Driven Insights for Green Supply Chain: A Systematic Literature Review. International Journal of Production Research, 56(18), 6085–6113.
7. Helo, P. & Szekely, B. (2005). Logistics Networks for Internet Business. International Journal of Physical Distribution & Logistics Management, 35(3), 207–222.
8. Huang, G. Q., Lau, J. S. K. & Mak, K. L. (2003). The Impacts of the Internet on Supply Chain Dynamics. International Journal of Production Research, 41(1), 1309–1326.

ISSN (E): 2980-4612
Volume 4, Issue 4, April - 2025
Website: intentresearch.org/index.php/irsj/index

9. Tiwana, A., Konsynski, B., & Bush, A. A. (2010). Platform ecosystems: Aligning architecture, governance, and strategy. Information Systems Research, 21(4), 675–687.
10. Pavlou, P. A., & Gefen, D. (2004). Building effective online marketplaces with institution-based trust. Information Systems Research, 15(1), 37–59.
11. Mallat, N. (2007). Exploring consumer adoption of mobile payments – A qualitative study. Journal of Strategic Information Systems, 16(4), 413–432.
12. Lin, L. (2013). Omnichannel logistics: Integration of distribution networks for retail. International Journal of Retail & Distribution Management, 41(6), 438–454.
13. Christopher, M. (2016). Logistics & Supply Chain Management (5th ed.). Pearson Education Limited.
14. Worldpay, Global e-commerce payment methods 2019 &2023
15. www.statista.com