



RAIL TRANSPORT IN E-COMMERCE: AN OVERVIEW OF THE OPPORTUNITIES

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ABSTRACT

Pasar *e-commerce* terus berkembang dan menarik pihak-pihak baru, namun beberapa tren perkembangan menimbulkan kontroversi. Studi ini menyajikan hasil analisis perbandingan strategi pengembangan logistik di pasar *e-commerce* di Federasi Rusia dan Republik Indonesia. Analisis menunjukkan bahwa meskipun solusi teknologis bersifat umum dan dapat disebarluaskan sebagai praktik terbaik, struktur transportasi bergantung pada karakteristik lokal. Di Rusia, transportasi kereta api memiliki peran penting dalam total volume transportasi, tetapi untuk terintegrasi ke dalam pasar *e-commerce*, perusahaan kereta api harus mengubah logistik yang sudah ada secara signifikan. Studi ini menyajikan analisis dokumen strategis, meneliti prospek Russian Railways untuk memasuki pasar *e-commerce* dan tantangan yang dihadapi. Logistik kereta api merupakan industri yang cukup konservatif, tetapi saat ini siap untuk merangkul teknologi baru, solusi berbasis *cloud*, dan layanan seperti sensor jalur dan gerbong, analitika video cerdas, dan sebagainya. Di Indonesia, sebagai negara kepulauan, transportasi kereta api tidak begitu penting. Negara ini menghadapi tantangan untuk mengembangkan transportasi darat dengan berbagai mode transportasi. Artikel ini tidak hanya mengidentifikasi tren umum dalam penggunaan alat logistik untuk pengiriman skala kecil tetapi juga mengungkapkan hambatan dan cara untuk meningkatkan logistik. Beberapa rekomendasi diajukan, seperti pembaharuan komunikasi pada sistem logistik *e-commerce*, transparansi dalam rantai pasokan, peningkatan kepuasan pelanggan, optimasi distribusi dan logistik, pengurangan biaya, peningkatan efisiensi, dan pengiriman tepat waktu. Industri transportasi darat sangat penting untuk pertumbuhan konektivitas nasional dan memberikan kontribusi signifikan pada pembangunan nasional.

The e-commerce market is constantly growing and attracting new entrants, but some developing trends are controversial. The study presents the results of a comparative analysis of logistics development strategies in the e-commerce market in the Russian Federation and the Republic of Indonesia. The analysis shows that while technological solutions are more general and they can be disseminated as best practices, the structure of transportation depends on local characteristics. In Russia rail transport has an important place in the overall transport volume, but in order to be integrated into the e-commerce market, railway companies have to change their existing logistics significantly. This study presents an analysis of strategic documents, examining the prospects for Russian Railways to enter the e-commerce market and the challenges encountered along the way. Rail logistics is a rather conservative industry but nowadays it ready to embrace new technologies, cloud-based solutions and services, such as track and wagon sensors, intelligent video analytics and so on. In Indonesia, as an island nation, rail transport is not that important. The country faces the challenge of developing land transportation by different modes of transport. The article not only identifies general trends in the use of logistic instruments for small-scale shipments but reveals possible obstacles and ways to improve logistics. Some recommendations are made, as E-commerce logistics systems seek improved communication, transparency in the supply chain, improved customer satisfaction, distribution and logistics optimization, cost reduction, improvement in efficiency and on-time delivery. The land transportation industry is crucial for the growth of national connectivity and contributes significantly to national development.

1. INTRODUCTION

1.1. Development under contradictory trends

In the contemporary world, there are multidirectional trends. On the one hand, the market for goods and services is becoming global, and international trade and customs cooperation is developing. On the other hand, different decisions driven by the motives of various pressure groups are leading to instability in the development of the economic process, the disruption of supply chains and the need to look for new solutions. At the same time, it is very important to take into account trends in global markets and to conduct strategic research and implement advanced developments.

With the increasing contribution of the digital aspect to the economy, a new era of globalization has begun. The convenience and speed offered in a digital-based economy has facilitated, accelerated, and changed the supply and demand patterns of economic actors from various sides, such as marketing, purchasing, product distribution, payment systems, and so on. Increasingly sophisticated technology and infrastructure. E-commerce refers to the ability to buy and sell things via an electronic network from the palm of one's hand. E-commerce not only contributes to changing consumption patterns and people's lifestyles by liberalizing export-import markets, but it also creates new economic opportunities for individuals to become entrepreneurs, who are expected to increase employment opportunities in the future. The purpose of this study is to benchmark Russia's and Indonesia's experience in improving logistics in the global e-commerce market.

Over the last decade Russia has been in a state of economic uncertainty, leading to a significant need to development of new transport corridors to ensure a constant flow of goods into and out of the country.

Online shopping has established a toehold in Russia's retail sector and is poised to turn its small market share into a significant share heading into the new decade. In 2017, the share of e-commerce in retail sales was 3.47%, in 2018 - 4.07% (Russia Freight & Logistics Market, 2022).

Simultaneously, CAGR (Compound annual growth rate) for the Russian economy is projected to decline by 5 per cent by 2026 (Russia Freight & Logistics Market, 2022).

Until recently the Russia freight and logistics market were moderately fragmented with the presence of major domestic's players and the growing presence of international players. Russia was trying to improve its trade relations with South Asian countries and boost its trade with European countries. These conditions presented more logistics players to enter the countries logistics market and gain advantage of the development. With the growth of e-commerce players providing e-commerce fulfillment services this would lead to a rise.

While road, sea and air transport are the priority for the development of logistics in the e-commerce market, rail transport companies have the

same goals as other companies that want to operate in this market. These objectives are outlined in existing studies: «for companies, the overall goal of e-commerce includes (Yang, 2012): to help companies develop global sales network and logistics infrastructure which support efficient online order fulfillment; to provide enterprises with information and data of various business activities (i.e. online order documentation), production and sales information to solve the difficult problem of collection; to reduce market entry link that help companies open up the market to minimize the circulation of goods; to reduce business cost of sales and minimize the transaction costs of goods; to facilitate negotiations both for trading and online commodity trading; to support online purchasing including secure online payment system; to provide the most reliable quality assurance; to provide customers the most convenient means for retrieval» (Kayikci, 2019, p. 5367).

The impact of increased e-commerce on rail logistics in Russia is related to several advancements: the digitalization of the industry, the achievement of the necessary level of interoperability, the creation of transport marketplaces or freight exchanges. Some possible ways to optimize transport logistics, in particular, rail transport logistics, and to identify obstacles that hinder the transport of consolidated cargo are considered in the article. In Russia, the development of rail transport in the e-commerce market is critical, as the country has a well-developed railway network. The common and specific problems will be highlighted by a comparative analysis of the experiences of different countries in improving logistics.

2. LITERATURE REVIEW

In the Republic of Indonesia (Indonesia) the government has issued several regulations related to e-commerce as a result of the digital economy's high potential, including the XIV Economic Policy Package, which regulates the electronic-based economy, Presidential Regulation (Perpres) No. 74 of 2017 concerning the National Electronic-Based Trading System Roadmap or SPNBE, Government Regulation (PP) Number 80 of 2019 concerning Trading Through Electronic Systems (PMSE), and Minister of Trade Regulation (MTR) No. 50 of 2020 concerning Provision for Business Licensing, Advertising, Guidance, Supervision of Business Actor in Trading (Ministry of Finance, National Logistic Ecosystem Upaya Indonesia Perbaiki daya Saing Logistik, 2023). Through the government perceives the need for more accurate data availability and it may map the development of e-commerce in Indonesia with the issuing of these regulations, as evidence-based policymaking (Statistics E-Commerce, 2021).

Russian Railways' Digital Transformation Strategy is in line with the Strategic Direction for Digital Transformation of the Transport Industry of the

Russian Federation until 2030, adopted by the Russian Government, was analyzed (Decree of the Government of the Russian Federation, 2021).

3. RESEARCH METHODOLOGY

The starting point of the study was to collect data on documents regulating e-commerce in Indonesia and Russia. Trends in the development of e-commerce in the global market were studied and a comparative analysis of governmental measures and fundamental documents was carried out. Quantitative data were analyzed to study the dynamics of e-commerce development in railway transport.

4. RESULTS AND FINDINGS

4.1. Findings

According to Ken Research's report "Indonesian Logistics and Warehousing by Sector (freight forwarding, warehousing, VAS) by Domestic and International Services – Outlook 2021", the Compound Annual Growth Rate (CAGR) in the Indonesian logistics market was expected to reach 7.9% in the next 5 years until 2021. With a projected CAGR of 9.2%, freight forwarding was the fastest growing sector (Central Bureau of Statistics. Statistics E-Commerce, 2021).

E-commerce business has grown fast on a global scale. This is evidenced by the value of e-commerce or online retailers, which was expected to increase by 230 percent in 2021 to US\$ 4.48 trillion, or Rp. 60,467 trillion. The information is represented in the graphic below (Figure 1).

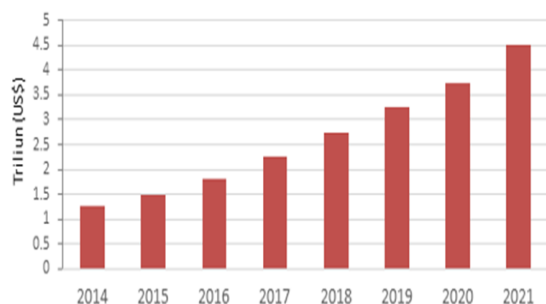


Fig. 1. Global E-Commerce Growth, Year 2014-2021 (source: Katadata.Co.id in Technology.id)

In Russia rail transport is covered in detail in the study, as rail transport in the B2C sector requires innovative solutions. An analysis of the scientific literature shows a lack of fragmented coverage of the problem under study. According to analytical reports Russian Railways is the second largest player in the logistics market (Figure 2).

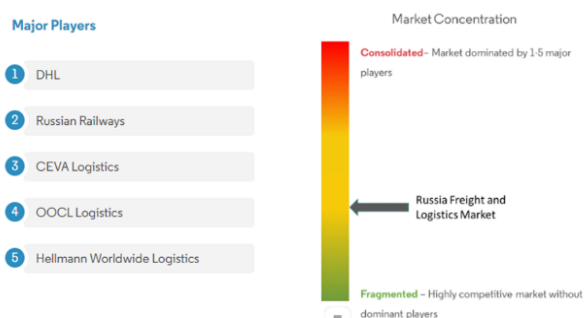


Fig. 2. The structure of the logistics market in Russia (Russia Freight & Logistics Market, 2022).

The e-commerce market is specific because it involves the movement and delivery of large quantities of small postal items.

RZD Logistic (RZD Logistic, 2022) offers delivery of the following types of goods: bulk cargo, general cargo, temperature-sensitive cargo, oversized and heavy cargo, containerized cargo, small and groupage shipments. For the delivery of small and groupage shipments RZD Express offers solutions for cargo weighing 20 kg or more to any location in Russia and the CIS (Commonwealth of Independent States). The company offers a convenient service with a following range of additional options: over 150 cities in Russia and the CIS; packing, storage, insurance and tracking of cargo; door-to-door delivery; delivery by freight, postal-baggage and container trains. Also, RZD Logistics (Russian Railways' electronic trading platform, 2023) provides warehousing services with a full range of warehousing solutions: racking, floor and shelf storage; cross-docking; packing, repackaging, marking, warehouse reporting; IT infrastructure (Pokrovskaya & Fedorenko, 2020).

Meanwhile, the rail freight market is very conservative and needs innovation. RZD's Digital Transformation Strategy to 2025 (Russian Railways' Digital Transformation Strategy, 2019), presented in 2019, envisages development along the following areas: practical mastering of new digital technologies; transition to electronic document management with all federal executive authorities and contractors (including foreign ones); cooperation with national railway transport operators within the EAEU etc.; technological leadership in the transport industry of the Russian Federation; development and promotion of Russian Railways' high-tech products on international markets. The Strategy envisages the development and implementation of a number of digital end-to-end platforms. Taking into account the development of the e-commerce market, it is envisaged to develop the platforms "Logistics e-commerce operator", "Multimodal freight transport", "Transport and logistics hubs", "Transport process management" (Russian Railways' Digital Transformation Strategy, 2019).

Russian Railways' Digital Transformation Strategy is in line with the Strategic Direction for Digital Transformation of the Transport Industry of the

Russian Federation until 2030, adopted by the Russian Government (Decree of the Government of the Russian Federation, 2021). Among the priorities of the national Strategy are the digitalization of freight transport, the digitalization of the lifecycle of infrastructure and vehicles, the digitalization of transport management. In accordance with the tasks set, the “Seamless Freight Logistics” project is to be implemented, which includes completing the implementation of a freight tracking system using electronic navigation seals, developing a digital platform for the transport complex of the Russian Federation, forming a system of end-to-end exchange of electronic transport documents (including at the interstate level), the creation of a national digital logistics circuit as part of the implementation of the Eurasian Economic Union’s digital transport corridor ecosystem, as well as the implementation of conditions for the development of electronic freight ordering platforms, logistics services and e-commerce services (FaaS) and the creation of intelligent border crossing points across the Russian Federation. Another project – “Digital Management of the Transport System of the Russian Federation” – envisages the creation of a unified transport complex management center, situation centers, as well as the development of a traffic flow modelling system using artificial intelligence technologies (Pokrovskaya, 2020).

The analysis of documents shows that Russian Railways is acting in line with general trends, in other countries railway companies are also entering the e-commerce market. For example, at the height of the pandemic (April 2020) the Indian Railways is reaching out to e-commerce companies, local industries, among other organizations for providing on-demand parcel train services in a bid to ensure unhindered supply of essential commodities through the country. Local industries, e-commerce companies, any interested groups, organizations, individuals and prospective loaders can also contact Railway officials at regional level (Polikarpov & others, 2021). The Railways has reached out to e-commerce companies, local industries and other organizations to provide on-demand parcel train services in a bid to ensure the unhindered supply of essential commodities throughout the country (Saluja, 2023; Kayikci, 2020).

Russian Railways provides integrated transportation and logistics services by integrating all services of the Russian Railways Holding and third-party suppliers into a single supply chain on the multimodal transportation market. The company is developing the use of tags, improving security systems and standardization. The company has started to develop electronic trading platform (Figure 3).

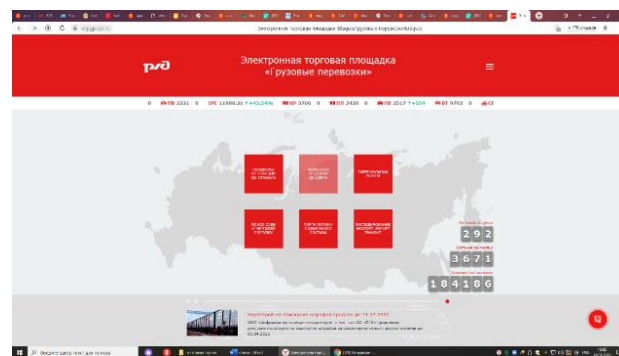


Fig. 3. Russian Railways' electronic trading platform (Russian Railways' electronic trading platform, 2023)

It is clear that the development of the e-commerce market is associated with similar challenges, in logistics among others. However, while technological solutions may be similar, the priority use of transport modes will differ, so there is no one-size-fits-all solution that is optimal for different countries. This should be taken into account when developing national strategic documents.

4.2. Discussion

The following some of the challenges to e-commerce, according to the supervisor of the e-commerce, are outlined (Situs Belanja, 2022; Lindawati & Maslova, 2022).

- 1) Payment instruments aren't related to bank accounts. Payment instruments in every e-commerce generally use transfer payment methods such as credit cards, debit cards, mobile banking, and others. However, many Indonesians still lack access to banking services (Figure 4).

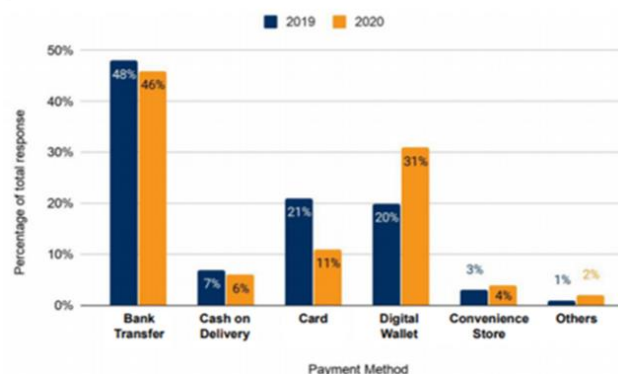


Fig. 4. Payment Method Preference of Indonesian E-Commerce Customers, n=2987 (Source: SIRCLO'S Survey (2019-2020))

- 2) The internet connection is slow. Indonesia's internet connection is quite slow when compared to other countries. Particularly in certain remote areas of Indonesia, where there is sometimes no access to the internet at all. The availability of this internet network is critical for Indonesia's e-commerce development.

- 3) In the e-commerce sector, shipping logistics should be standardized. Consumers are frequently disadvantaged as a result of different issues relating to the delivery of goods/e-commerce, such as delivery delays, damaged items, and even goods that are not in line with the order. This occurs because the logistics standard, which covers the time of delivery of goods as well as the delivery of goods, is insufficient.

The analysis showed that the main strategic documents place great emphasis on the development of civil logistics, in particular the development of logistics in the e-commerce market. It should be noted that these objectives have to be realized with limited resources. Since railways have both civilian and military applications, it should be taken into account that the requirements for developing civilian logistics are different from those for developing military logistics (Biernikowicz, 2021). While little research has been done on the subject, a number of possible difficulties in realizing the strategic objectives can be highlighted.

The government and the company have developed specific measures to digitize the industry and develop rail transport in the e-commerce market. But there are a number of objective problems that stand in the way of achieving the targets stated in the strategies that do not allow the logistics field to be fully automated. Not all technologies are applicable in railway conditions. This is due to the long length of the railway tracks, weather conditions in Russia and other peculiarities. Offline sensors (RFID) are inexpensive, but their scope of application is very narrow – a wagon with an offline sensor cannot be tracked in real time. An online tracker is more efficient, but much more expensive. There are also the following problems in its use: Russia has a very long railway network, and not all of its territory is covered by communications – it is impossible to keep a wagon constantly online.

In addition, the wagons often go across the border, and equipment that radiates into the air cannot be taken out into the territory of some countries – there are licenses, permits and other issues involved. Optimally, a single sensor should be placed, which remains on the wagon throughout its journey.

Another problem is the data security problem associated with the development of the internet of things, which exists not only in the logistics or railway industry. At the moment, there are no unified data transfer protocols, standards for data protection. The problem of data security is linked to the problem of interoperability. The digitalization of rail transport promises great benefits for global transport connectivity. However, modern railway information content is characterized less by 'big data' and more by a large number of insular groups of data. This is a sub-optimal environment for data management

technologies that should stimulate innovations in data representation.

The next unresolved issue is the lack of universal documents for multimodal and international transport. There is no single document that combines maritime, aviation, railway and road transport, so multimodality and continuous, seamless cargo tracking does not work yet.

Transport exchanges, also called aggregators, are a freight and carrier matching service that allows transport and logistics businesses to operate with maximum efficiency. Nowadays, there are freight exchanges (Webcomtrans, 2022) where you can book transport by any mode of transport, but rail transport is more relevant for bulky goods. Logistics marketplaces for rail transport are expected to be popular soon, but technology does not yet allow for fully automated assessment of complex cargoes (Provotorov & others, 2021).

Indonesian strategies to address e-commerce challenges are following: the country should integrate e-commerce and "fintech" payments and financial services in terms of technology and services.

Also, Indonesia implemented five actions to accelerate digital transformation in order to overcome slow internet. The following are the five steps:

- a) accelerating the expansion of access and enhancement of digital infrastructure in 12,500 villages or sub-districts, as well as the provision of internet services at public service points.
- b) creating a digital transformation strategy for government, public services, social assistance, education, health, trade, industry, and broadcasting in strategic sectors.
- c) increasing the speed to which national data centers are integrated.
- d) preparing for the need for digital skills human resources to carry out the objective.
- e) preparing regulations for funding schemes and digital transformation financing.

As well as, the Indonesian government has implemented a variety of corrective steps to mitigate logistical issues in e-commerce.

The Indonesian government is designing the National Logistics Ecosystem by Presidential Instruction No. 5 of 2020. The National Logistics Ecosystem (NLE) is a logistics ecosystem that integrates the movement of commodities and international documentation from the places of entry to the warehouse. Starting with the process of completing sea or air transportation documents, customs clearance, licensing, completion of port issuance documents (SP2), as well as searching for transportation equipment, through warehouse availability, all business operations are cooperated on one platform. NLE encompasses the entire process chain, from start to finish (Nara Galuh & Apa Itu, 2020).

As well as the logistics of domestic and international goods flow. The NLE is projected to

reduced logistics costs, which presently account for 23.5 percent of GDP, to 17 percent. This 5–6% reduction will primarily be transferred from upstream to downstream processes, particularly in integrating transportation sectors and simplifying processes, minimizing repetition, and increasing convenience for various stakeholders (Ministry of Finance, National Logistic Ecosystem Upaya Indonesia Perbaiki daya Saing Logistik, 2020).

Paying special attention to land transportation, particularly online transportation, which is Indonesia's primary support for e-commerce. Two applicators, Gojek Group and Grab Group, are the most popular online transportation services in Indonesia. The land transportation industry is critical to the growth of national connectivity and contributes significantly to national development. Developments in the land transportation sector will have a multiplier effect on other sectors, resulting in national economic development. Connectivity in all land, sea, and air sectors that are integrated would help in efforts to equalize the national economy for a large country like Indonesia, which consists of more than 17,504 islands. The Indonesian government declared in the 2020-2024 Mid-Term Development Plan are the most popular online transportation services in Indonesia (Rinaldi Mohammad Azka, 2022). The land transportation industry is crucial for the growth of national connectivity and contributes significantly to national development. As stated in the 2020-2024 Mid-Term Development Plan, the Indonesian government is committed to increasing urban transportation as one of the primary drivers in reducing congestion and enhancing environmental quality.

5. CONCLUSIONS

To increase transport volume in the e-commerce market, rail transport must be integrated into supply chains. Large-scale supply chains must manage multiple vehicles and facilities around the world. And while these used to be intractable tasks, today artificial intelligence in supply chain and logistics is making these tasks easier.

E-commerce and the digital revolution have resulted in new business models affecting supply chain configuration. These models make extensive use of technological solutions to improve the retail experience. E-commerce logistics platforms use web-based technology to support the material acquisition, warehousing/consolidation, and transportation. E-commerce logistics systems seek improved communication, transparency in the supply chain, improved customer satisfaction, distribution and logistics optimization, cost reduction, improvement in efficiency and on-time delivery.

On the one hand, this development creates new opportunities such as more alternatives for sourcing freight capacity, more options for improved organization and tracking of shipments and more transparency in terms of freight rates. On the other

hand, rail logistics is a conservative industry that is now ready to embrace new technologies, especially cloud-based solutions and services. One of the most effective technologies in rail logistics is track and wagon sensors and intelligent video analytics. Based on the data collected by sensors and cameras, mathematical models of wagon movements can be built.

6. RECOMMENDATION

Marking goods can help track shipments, speed up logistics processes and can be a business driver as it saves on paperwork and warehousing, and can get goods through customs inspections faster. As well as, it allows for faster grouping/ungrouping of goods, improving storage processes in the warehouse.

The growth of small-scale shipments in an evolving e-commerce market is likely to lead to developing marketplaces as the future of freight transport. The main objective of transport marketplaces or freight exchanges is in providing digital services for ordering services. Thanks to them the logistics industry is likely to split into two mutually independent parts.

One of them can be described as simple transport with minimal margins. The customer can go to the marketplace, select destination and consignment, and choose a list of services. Then he will see at once the cost of carriage, regardless of with whom the cargo will go, whose carriage will be, who will be a freight forwarder and cargo insurer.

The other – project shipments – will be needed when cargo is complex, e.g. oversized, requires an elaboration of routes and methods of securing, special transportation, discharging and unloading. Such a request will never make it to the marketplace because it is difficult to automate. So, it will be a separate branch of project logistics, due to the client is not competent enough to assess the parameters of complex cargo, e.g. choose the right type of container. This sphere can become automatic, but only with the development of artificial intelligence – for now there are no such services and technologies in principle.

While for Russia the development of rail logistics is important, for Indonesia land transport, in general, is important. The land transportation industry is crucial for the growth of national connectivity and contributes significantly to national development. As stated in the 2020-2024 Mid-Term Development Plan, the Indonesian government is committed to increasing urban transportation as one of the primary drivers in reducing congestion and enhancing environmental quality. Connectivity in all integrated land, sea and air sectors will help in efforts to equalize the national economy for an island country like Indonesia, which consists of more than 17,504 islands.

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