

THE DEVELOPMENT OF THE E-COMMERCE MARKET AS A CHALLENGE FOR MARITIME TRANSPORT AND SHIPPING

Leszek KAZMIERCZAK-PIWKO^{1*}, Arkadiusz ZAGAJEWSKI², Tomasz ŁAGUTKO³,
Marcin SIKORA⁴

¹ Department of Environmental Management and Public Economy, Faculty of Economics and Management, University of Zielona Góra; L.Kazmierczak@wez.uz.zgora.pl, ORCID: 0000-0003-4460-7018

² Department of Management Engineering and Logistics Systems, Faculty of Economics and Management, University of Zielona Góra; a.zagajewski@wez.uz.zgora.pl, ORCID: 0000-0002-1532-3043

³ Department of Enterprise Management, Faculty of Economics and Management, University of Zielona Góra; t.lagutko@wez.uz.zgora.pl, ORCID: 0000-0002-9648-7292

⁴ Student research group of Eco-Management, University of Zielona Góra; marcinsikora4@o2.pl

* Correspondence author

Purpose: The article deals with the development of the e-commerce market as a challenge for international maritime transport and shipping. The aim of the study is to analyze the current, post-andemic factors in the development of the e-commerce market and its impact on the functioning of the maritime transport and shipping market, with an indication of the synthetic implications for changes that should be introduced to improve the functioning of maritime transport, goods responding to the demand expressed on the global e-commerce market.

Design/methodology/approach: The article uses the method of analyzing the literature and the method of analyzing data from public statistics on the development and functioning of the e-commerce market as well as shipping and sea transport in 2012-2020.

Findings: The main factors of development and problems resulting from the development of the e-commerce market before and after the Covid 19 pandemic were identified as challenges for the transport and shipping of goods by sea.

Practical implications: Organization of the supply chain in the area of targeting the development of transport services and international freight forwarding based on maritime transport and shipping.

Originality/value: The value and originality of the articles results from a thorough review of the current literature on the subject and statistical data on the functioning of enterprises from the e-commerce market as well as transport and sea freight. The recipients of the results of this work may be managers and persons shaping the rules of functioning on the maritime transport and shipping market.

Keywords: organization of the shipping transport and maritime logistics market, development of e-commerce market, post-pandemic problems of international exchange, market development factors.

Category of the paper: Research paper/General review.

1. Introduction

The dynamic development of e-commerce, stimulated above all by the development of modern ICT technologies and the recent crisis of traditional forms of trade, caused by the global COVID-19 pandemic, have posed challenges for logistics and international shipping. The key issue has become to increase the efficiency of the flow of goods internationally and to search for ways to minimize the costs of the functioning of distribution channels in the conditions of the increasing volume of orders from the e-commerce market, inflationary pressure caused by the tense international situation and the temporary, pandemic suspension of demand and production processes that preceded them. At present, in the search for the most cost-effective solutions for the transport and forwarding of goods offered on the e-commerce market, the role of maritime transport, the most economical and environmentally friendly modes of transporting products, is even more revealed. Therefore, this article deals with the development of the e-commerce market as a challenge for this form of maritime shipping and transport in the international exchange system. information in the form of Acknowledgments (they should be placed before References).

2. E-commerce market: origins and development

When considering the origins and development of the e-commerce market, it is worth defining the concept of e-commerce itself, which is its synonym. As C. Żurak-Owczarek (2013) notes, the concept of electronic commerce (e-commerce) “concerns the process of selling and buying goods and services with the use of electronic means, usually conducted via the Internet. Electronic commerce refers to the external processes involved in how an enterprise interacts with its customers, suppliers, and business partners. These processes include sales, marketing, orders, customer service, supplies and payments” (Żurak-Owczarek, 2013). Today, e-commerce is closely related to the Internet. Nevertheless, the use of electrical equipment (telephone, fax, modems transmitting data over the telephone network) in generally understood trade began much earlier. Modems allowed for the construction of the first solutions for e-commerce as early as the 1960s (Konopielko, Wołoszyn, Wytrębowski, 2016). Before the Internet was massively used in e-commerce, X.25 networks (from the mid-1970s), Frame Relay networks (from the late 1980s) and ATM networks (from the mid-1990s) were used for data transmission. Also at present, operators have the network infrastructure used in the last century, but it is mainly used to transfer internet data (Konopielko, Wołoszyn, Wytrębowski, 2016). Initially, electronic data interchange was mainly carried out by means of Electronic Data Interchange (EDI). It was mainly exploited by large enterprises (e.g. banks, airlines, automotive

companies) (Konopielko, Wołoszyn, Wytrębowski, 2016). The first common solution used in B2B and B2C relations was Minitel. This solution consisted in direct connection to telephone lines of simple alphanumeric terminals, which connected with service servers via the telephone network. The popularity of Minitel started to decline in the mid-1990s, when the same services began to be available on the Internet using web browsers (Konopielko, Wołoszyn, Wytrębowski, 2016). The moment that completely revolutionized electronic commerce worldwide was building web services accessible through web browsers. Their main advantage was simplicity, which made them easy to use by any PC user (Konopielko, Wołoszyn, Wytrębowski, 2016). The Internet plays a vital role in the lives of more and more people. The Internet is becoming more and more popular as people are looking for tools that will make their daily life easier. The increasing number of companies is using e-commerce as their primary source of access to customers. The Internet makes it possible to reach with its offers where people use the Internet, which means ensuring business all over the world (Błońska, Konieczek, Konieczek, 2015).

The first country to allow the use of the Internet for commercial purposes (1992), including trade via the Internet, was the United States. From that moment on, companies could not only post information about their products on the Internet, but also accept orders that previously could only be placed by telephone. The first online store was the Amazon.com bookstore, which was launched in 1995. In Poland, however, the first online store was established by Terent in 1997 (Błońska, Konieczek, Konieczek, 2015). The dynamics of the development of online stores is high. Increasingly, customers choose online stores instead of traditional, stationary stores. This way of shopping is cheaper and more convenient for both the customer and the seller. E-stores do not incur costs related to renting premises and hiring sellers, and the ordered products are delivered directly from the warehouse to the address indicated by the customer. As a result, products ordered online often offer more competitive prices than those in stationary stores. Ordering products online is also time-saving and convenient for customers – they can place an order at any time, from any place with Internet access. The customer also has the opportunity to read the opinions of other customers who have purchased the same or a similar product (Błońska, Konieczek, Konieczek, 2015).

The e-commerce market has grown rapidly in recent years. Both buying and selling have never been so easy. With the growing interest of customers in this form of shopping, the number of online stores also began to grow. In addition to the increased interest of customers, their expectations, needs and requirements for online stores are also growing, which affects the continuous development, improvement and innovation in this field. It should be remembered that innovation in e-commerce is understood here as the implementation of solutions specific to the process and related e-commerce business. Such improvements or solutions, whether product, process, organization or marketing – need creating specific value propositions for potential buyers. It is also becoming more and more important for entrepreneurs to create a community around their brand. Members of such a community express a common interest

(or even fascination) with a particular brand, which leads to the creation of a parallel reality (a subculture with its own myths, values, rituals, vocabulary and hierarchy (Borodo, Dębicka, Gutowski, 2019)).

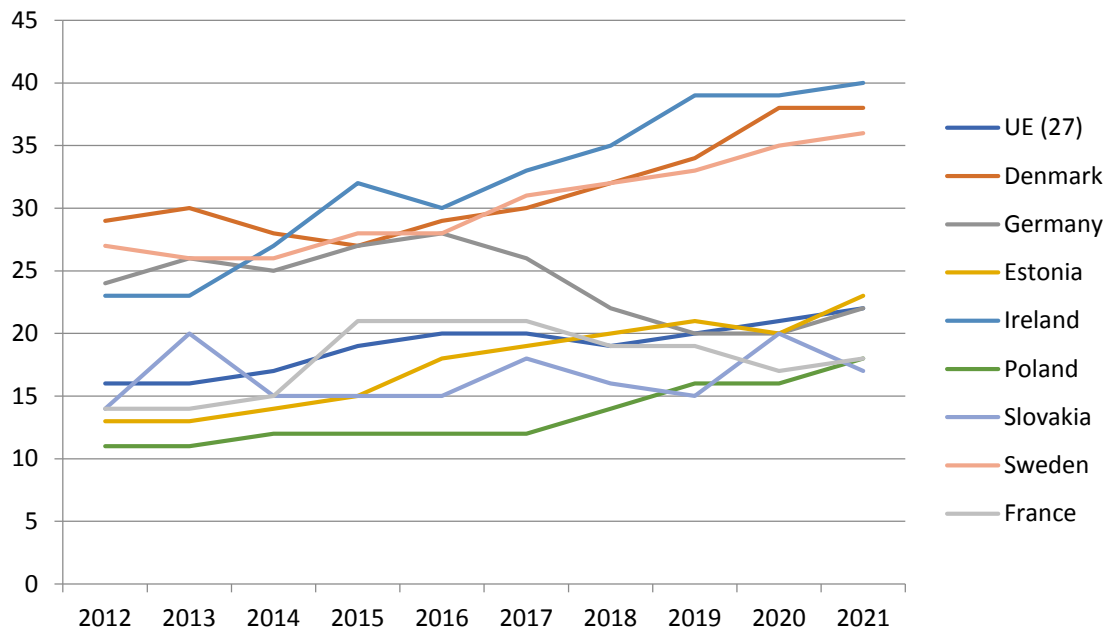


Figure 1. The percentage of enterprises conducting e-sales in selected countries (%). Source: own study based on Eurostat data <https://ec.europa.eu/Eurostat>.

The breakthrough period for the world economy is 2020, when the infectious disease SARS-COV-2 appeared. Due to numerous restrictions caused by the virus, many entrepreneurs moved their activities to the Internet. It gave an opportunity for the dynamic development of e-commerce.

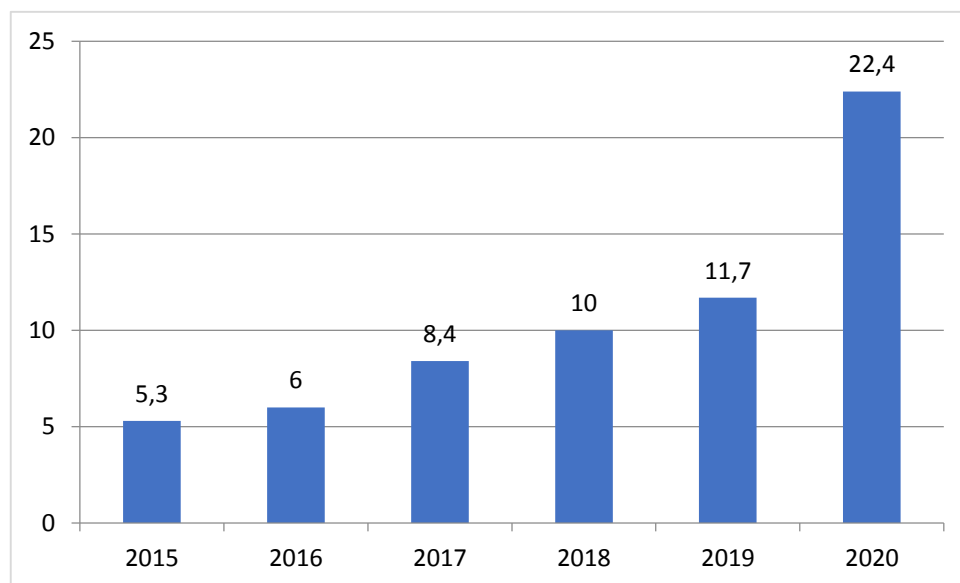


Figure 2. Internet sales in Poland in 2015-2020 (billion euro). Source: Tarasiuk, Dłużniewska, 2021.

Along with the development of e-commerce, maritime e-commerce also emerged. They can be defined as making (via the Internet) transactions of purchase and sale of goods and services related to the broadly understood maritime sector (Szyda, 2014). E-commerce emerged in the maritime sector around 2000, especially in B2B relations. In 1999, the Maritime e-Commerce Association (MeCA) was established in Great Britain, bringing together maritime business entrepreneurs and technical experts. MeCA in cooperation with IPMA and ISSA committed to accelerate economic operations related to the maritime sector thanks to the development of applications that meet interoperability standards. Since 2006, the concept of maritime e-commerce has also been indirectly granted by the European Union (Szyda, 2014). By 2018, the EU set out to introduce interoperability standards for ICT systems, improve port operations and integrate logistics chains. Also, initiatives such as e-freight (the introduction of electronic documents at the expense of paper documents) and e-custom (the introduction of an electronic customs office) are perceived favourably for the development of e-business in the maritime economy. Increasing the use of information technologies in the maritime transport sector and improving interoperability contributed to the creation of an infrastructure base for online trade in this sector of the economy (Szyda, 2014).

3. Importance of maritime transport and shipping in modern economies

When considering the importance of sea transport and forwarding in modern economies, it is worth first classifying sea transport according to the type of units transporting goods by sea. As Windeck (2012) notes "Within maritime transportation, ocean going ships can be mainly classified into bulk carrier which transport dry bulk products, tankers, carrying for example liquefied gas or crude oil, container ships, general cargo transporting ships and passenger ships" (Windeck, 2012).

Maritime transport and logistics have always been strategic areas that have had a key impact on the economies of many countries, determining their economic and social development. The growth trends of maritime transport were correlated with the growth of world economies over the centuries, but the longest period of growth was experienced by the world economy after World War II (Stanilewicz, 2015). At that time, there was also a rapid increase in maritime transport, which was also contributed to by the economic interference of countries in maritime transport, which was to give a competitive advantage to the economies of these countries over others in the long run. The 1960s also saw a change in the dominance of cargo – the volume of the value of liquid cargoes exceeded the volume of dry cargo. At the end of the 1950s and the beginning of the 1960s, containerization was born (Szyszko, 2010), which had a lasting impact on the models of supply chains in the global economy, in particular in retail trade. The development of maritime transport was so dynamic that at the beginning of the 1970s, the increase in maritime trade was greater than the increase in global GDP (Grzelakowski, 2012).

At the time when container transport was initiated, there was no electronic commerce, but if it were not for container ships, world trade, and in particular e-commerce, would be very limited. Therefore, since the 1990s, the share of container loads in the total maritime trade has been growing, and it has tripled between the year (Grzelakowski, 2012). Along with the increase in container loads, unprecedented problems appeared, which at the beginning of 2021 manifested themselves in the “container crisis”, which reflected in congestion in maritime transport and large disruptions in supply chains. It is mainly related to the Chinese container production market, dominated by 3 entities responsible for 80% of global container production (Burdzik, 2021). The example of the crisis also shows the fundamental difference between maritime container transport, or maritime transport in general, and land transport. While the land part of goods logistics may take place in a different relationship between entities – B2B, B2C, C2B etc., modern maritime transport is carried out only in a B2B relationship (Tepe, Arabelen, 2022), which is associated with the emergence of a tendency to concentrate capital in the maritime logistics industry (Stefaniak, 2022).

Another factor exacerbating the container crisis is the impact of the COVID-19 pandemic and its effects on global production, supply chains and warehousing. The sustained increase in both the average capacity of sea-going vessels, including in particular container ships, as well as the growing complexity of global supply chains have forced supply chain planning strategies to specifically address the risk of their disruption (Marzantowicz, Nowicka, 2021). These disturbances were particularly noticeable in the first, most intense phase of the COVID-19 epidemic (Dąbrowska, Dołżyńska, Hryniewicka, 2020), but not only. Shortening supply chains may be a way to maintain sales volumes in specific situations (Brdulak, 2021), but there will still be a large part of global trade requiring maritime transport. As Oyenuga (2022) notes after the COVID-19 pandemic “consolidation in global supply chains may be one of several strategies adopted by MTS actors to mitigate heightened risks or to shore-up compressed margins through cost reductions and scale efficiency gains” (Oyenuga, 2021).

Today, 80% of world trade goods are transported by sea, in terms of their volume. Taking into account the criterion of transport performance, it is 90% (Stanielewicz, 2015), so the share of maritime transport is not only significant, but also dominant. Naturally, supply chains, in particular in e-commerce, are generally composed of various types of transport, in particular land, which is mostly used to deliver goods to retail recipients, but the very fact that China produces a large part of the world’s production, in many cases it is almost impossible to shorten supply chains. The disruption of supply chains was particularly evident during the first global lockdown. Deliveries of computers, hardware and electronic components from Asia were disrupted, and at that time the demand for computers increased significantly, which was driven by the obligation or recommendation to work remotely in many industries, in particular education (Stefaniak, 2022). The situation with the container crisis is currently aggravated by another wave of the epidemic. The introduced restrictions resulted in an increase in the number of ships waiting for unloading in Shanghai by over 1/3. The situation is similar also in other

ports in China, which in turn means that the transport of goods from warehouses in China to warehouses in the USA takes more than 70 days longer than before (Rynek Infrastruktury, 2022). Reuters notes that this is consequently leading to a domino effect, as significantly delayed deliveries cause a shortage of available containers in other parts of the world, which translates, for example, into a delay in deliveries from Europe to the eastern shores of North America (Jones, 2022). How much problems in one part of the world translate into all maritime transport can be proved by the fact that when in March 2021 the Ever Green ship blocked the Suez Canal as a result of an accident, for two months 20% of global maritime transport was affected by it (Stefaniak, 2022).

It seems that one of the key elements influencing the development of the maritime transport and forwarding market is the efficiency of container terminals. As Wiśnicki et al. note “The terminal is a complex system, where the interaction between the terminal equipment, containers, and infrastructure is accompanied by uncertainty about the future container market” (Wiśnicki, Chybowski, Czarnecki, 2017).

The container crisis and its consequences perfectly illustrate the importance of maritime transport for the global economy. The increase in costs mainly resulting from this crisis is being translated into global inflation (Carrière-Swallow et al., 2022). This is particularly acute for island or other states whose trade is solely or almost exclusively based on maritime transport. Therefore, preventing the increase in transport costs, primarily by opening and improving the supply chains, in particular by sea, is today a problem not only economic, but also political, because the effects of the current crisis affect not only the economic sphere of countries, but also the social and political ones.

4. Changes in the e-commerce market as a challenge for maritime logistics

After the advent of the Internet, retail has undergone a significant transformation. The progressive digitization of modern life enables consumers from virtually every country to reap the benefits of online transactions. The number of online consumers is increasing every year. In 2020, more than two billion people worldwide bought goods or services online. In the same year, e-commerce sales exceeded 4.2 trillion US dollars (Coppola, 2022). According to data from statistica.com, in 2021 e-commerce retail sales amounted to 4.9 trillion US dollars worldwide. Over the next four years, it forecasts an increase in this value by 50%, and by 2025 it will reach a value of approximately 7.4 trillion dollars (Chevalier, 2022). E-commerce has become a significant part of retail. It is estimated that in 2021, e-commerce accounted for 19.6% of retail sales worldwide. It was an increase of 16.8% compared to the previous year. Forecasts for 2025 estimate that e-commerce will account for a quarter of total global retail sales (Coppola, 2022).

Currently, the country that has the most online buyers is China. They have more than the United States, Great Britain and Australia combined. The rapid expansion of e-commerce has transformed China's foreign trade. There are nationwide free-trade zones (FTZs) and 109 pilot import zones for Cross-Border E-Commerce (CBEC). Based on the FTZ, Hainan Province became the first Free-Trade Port (FTP) in the country. On November 15, 2020, 15 firms joined the Regional Comprehensive Economic Partnership (RCEP). It is the largest Free Trade Agreement (FTA) in Asia, accounting for 30.29% of the world's GDP and 30.52% of the world's population (Li, 2021).

According to the FLOW report, which compares data from 2021 to 2019, 76% of buyers made a purchase from a foreign store. In 2019, it was 69%. Barriers to cross-border shopping were similar to 2019. The high cost of shipping was the biggest problem for 45% of respondents. 38% of respondents prefer shopping at local retailers. Slow order delivery (36%) and concerns about site security (34%), lack of trust in cross-border sellers (26%) and high taxes (25%) also proved to be significant barriers. Half of customers buying abroad indicated high shipping costs (51%) or long delivery times (49%) as the main reason for not buying cross-border. High taxes were a barrier for 34% of respondents. By contrast, preference for local sellers was less important (15%). The level of distrust of cross-border sellers (10%) was also lower (FLOW, 2021).

The pandemic influenced purchasing decisions. Most buyers reckoned with the extension of the waiting time for delivery in the post-pandemic period. The exceptions were China and Japan. "Overall, respondents in 5 out of 8 markets stated they shopped more often online as a direct result of the pandemic. In fact, 3 out of 4 shoppers in the UK, China, Canada, Germany, and US agreed with this statement (78%, 77%, 75%, 74%, 74%). Conversely, only half of Japanese shoppers saw the pandemic impacting their shopping online (54%)" (FLOW, 2021).

Online trade has an impact on the efficiency of logistics processes, including transport. The influence of e-commerce on transport services is presented in various ways in the literature. Some authors claim that the development of e-commerce will increase freight transport, while others note that it may contribute to an increase in consumption (Milewski, 2019, p. 147). The involvement of large logistics operators can make e-commerce distribution more profitable. Thanks to the economies of scale, they are able to deliver goods to customers at lower costs without reducing the level of customer service. It may also reduce the negative impact on the natural environment (Milewski, 2019, p. 153). This should be done in accordance with the paradigm of sustainable development, which in a broader sense is understood as a balance between economy, society and the environment (Milewska, 2019).

The supply chain is going through a crisis, driven, among other things, by an increase in e-commerce sales. "The disruptions we are witnessing today in the form of blockades, port congestion, lack of goods, equipment and labour, and most of all global inflation and soaring freight rates, is just a textbook case of Keynesian over-demand against an aggregate supply that has declined for over more than one year" (Kent, Haralambides, 2022). These problems may

have been caused by an imperfect supply chain based on the Just-In-Time (JIT) paradigm. JIT and lean logistics practices encourage logistics service providers to continuously reduce costs. Logistics that relies on minimizing inventory costs depends on efficient transport systems. In the face of stiff competition, lead time can be an effective tool. Customers expect faster and faster deliveries of what they ordered. Due to the long waiting time to call at the port, the delivery time for orders by sea is significantly extended. The reasons for long queues in ports are primarily the inability to efficiently handle containers. This leads to a shortage of terminal capacity. There is talk of a global crisis related to the shortage of containers. The crisis is disrupting international trade with knock-on effects in the global supply chain. The main reasons for the shortage of containers include: reduction in the number of available containers, port congestion, decrease in the number of ships, increase in consumption (Burdzik, 2021). In the Los Angeles metropolitan region, the problem is the evacuation of containers. Their excess is stored outside the warehouse yards. Supply chain disruptions need to be addressed holistically, including through the development of supply chain emergency response plans (Kent, Haralambides, 2022). The implementation of blockchain-based technology may help in achieving higher volumes with the same asset base (Kuś, 2021).

Moreover, what is very important in the reality of the post-pandemic crisis, it is worth paying attention to the indications of the report of the UN Economic Commission for Europe (ECE), the Handbook for National Masterplans for Freight Transport and Logistics, which contains guidelines for governments on how transport and logistics services can contribute to economic recovery and economic growth during the post -pandemic period. Logistic operators, thanks to intermodal operations of Intelligent Transport Systems (ITA) and telematics, should be able to smoothly move cargo between different modes of transport and logistics networks (UNCTAD, 2021).

5. Conclusion

The COVID-19 pandemic, in addition to the currently observed global inflationary pressure, made consumers look for safe ways to meet their needs. This resulted in a sudden increase in e-commerce sales. As this article has shown, this increase, unfortunately, coincided with the deteriorating functioning of global logistics and maritime shipping channels caused, among other things, by inability to efficiently handle containers, their lack, port congestion, limited terminal capacity. The greater number of orders, combined with the expectation of quick delivery, created the need for better logistics facilities. Investment decisions and planning will be increasingly influenced by the port surroundings, in the vicinity of warehouse or distribution facilities and their end markets. There should be space for modern logistics in the ports. Port investments are related to technologies for monitoring supply chains, detecting potential

disruptions and tracking shipments to their destinations. To facilitate e-commerce logistics operations, port operators need to be able to process data efficiently. Logistics in ports should increasingly rely on digitization. Ports should be intelligent logistic nodes that use modern technology to connect different modes of transport. This will improve the supply chain at national, regional and international level. In times of congestion and disruptions, ports should operate in an agile manner, using data provided on an ongoing basis from the Internet of Things (IoT) technology and intermodal transport (UNCTAD, 2021). The presented analysis raises further important research questions that should in the future constitute a reason for undertaking extended research: will the maritime transport and shipping market continue to develop dynamically in the conditions of the observed inflationary pressure? Will the tense international situation and the related uncertainty change the rules of its functioning? Answers to these questions will require in the future an in-depth analysis of the literature and data on the functioning of the maritime transport and shipping market after the COVID-19 pandemic.

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