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Determinants of Trade in Services With Focus on Tourism

Abstract

This paper estimates the gravity of bilateral trade in services at an aggregate level. The aim of the paper is to assess the effects of social and economic factors on the export of services. A large part of the trade-in services is directly or indirectly related to the tourism industry; therefore, the results of this research are mainly discussed from the perspective of the tourism industry. To achieve the paper's aim, we estimate the augmented gravity model on a sample of 5,359 trading partners from 2000 to 2018. We evaluate our model using the Poisson Pseudo Maximum Likelihood estimator. We include various fixed-effect dummies in our model to address the endogeneity issues. Our results show that standard gravity variables such as economic size and distance are significant for service trade. From the tourism industry perspective, it can be concluded that trade in tourism services is determined by the similarity in economic size, proximity, and common socio-economic factors such as common first language and shared religious beliefs. In contrast, common colonial history has no significant effects on service trade.

Keywords: trade in services, gravity model, bilateral trade, tourism industry, international trade

1. Introduction

Most empirical studies and analyses of international trade focus on trade in goods, while international trade in services is unfairly overshadowed, although trade in services accounts for about a quarter of world trade (Amstrong et al., 2019). One of the reasons for this is that until 2002, there was no cross-country data to study trade in services. Among the first studies to examine the factors affecting bilateral trade in services using the new OECD bilateral trade in services data set were Grünfeld and Moxnes's (2003). Their empirical analysis was based on the gravity theory of international trade, which until then had been applied mainly to the study of international trade in goods. It showed that the gravity equation applies to estimates of trade in services and has the same explanatory power as estimates of trade in goods. Later, Kimura and Lee (2006) studied and compared trade in goods and services using the extended gravity model and concluded that trade in services can be better predicted by gravity equations than trade in goods. However, trade in services has some unique features, such as that the production and consumption of a service must co-occur and that benefits are intangible (Kimura & Lee, 2006).

Information and communication technology development has facilitated trade in services and new opportunities for cross-border service provision (De, 2013). Services have become an important industry and account for a large share of economic income in many countries. Trade in services includes "manufacturing services on physical inputs owned by others, maintenance and repair services, transportation, travel, construction services, insurance and pension services, financial services, charges for the use of intellectual property, telecommunications, computer and information services, other business services, personal, cultural and recreational services, government goods and services, miscellaneous services, unallocated services, and

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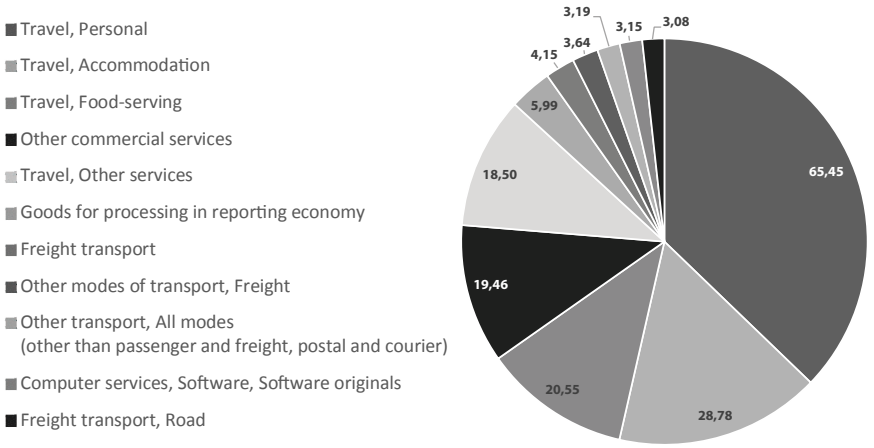
commercial services" (UN Comtrade, 2020). These services are directly or indirectly related to the tourism industry, e.g., transportation, financial services, insurance, telecommunications, cultural and recreational services are closely related to tourism, and limiting the analysis to travel services would be too narrow and could lead to biased results.

Therefore, this analysis includes aggregate data on trade in services, which provides a broader view of trade in services.

This paper aims to evaluate the determinants of trade in services, i.e., export of services at an aggregate level. The motivation for this research is that service trade has tripled in the last two decades (Benz & Jaax, 2022), but it is still under-researched. Another motivation for this research is to evaluate the determinants of trade in services from the tourism industry, which holds an essential position in the global economy. Tourism as an exporting service is significant for small, open economies that rely heavily on tourism, such as the Republic of Croatia. Most of the services that the Republic of Croatia exports are tourism-related. In the last observed year, 2018, travel services accounted for the largest share of Croatia's services exports, according to the International Trade Centre, as shown in Figure 1 The figure shows that more than two-thirds of the Republic of Croatia's services exports are related to travel and accommodation. Therefore, it is crucial to include tourism-related services when discussing the determinants of trade in services.

Figure 1
Top 10 exporting services of the Republic of Croatia in 2018 (%)



Source: International Trade Centre (2023).

The analysis of this research is based on a sample of 5,359 trading partners and covers 19 years, i.e., from 2000 to 2018. This paper contributes to the existing literature from a theoretical and empirical perspective, as the interpretation of the results is from the perspective of the tourism industry and offers policy recommendations for countries that are highly dependent on tourism. From an empirical perspective, it includes several dummy variables to address the problems that usually arise in gravity model estimations.

The paper is divided into five sections. After the introduction, section two reviews the literature on trade in services. The specification of the gravity model and data description are presented in section three. The results are presented and discussed in section four, while the conclusions and policy implications are presented in section five.

2. Literature review

Tourism has never been explicitly mentioned in the international trade theory. In the eighteenth and nineteenth centuries, when the first theories of international trade were developed, such as Adam Smith's theory of absolute advantages and David Ricardo's theory of comparative advantages, neither trade in services nor tourism played a role. The first international trade theory was the theory of international real exchange of goods. In the 21st century, however, international trade theories are more about services than goods. In fact, from the 1990s to the present, trade in services has become the most dynamic segment of world trade, growing faster than trade in goods (World Trade Organization [WTO], 2015). The growth of trade in services is partly the result of the liberalization of the services sector and the rulebook of the General Agreement on Trade in Services (GATS), which entered into force in 1995. It remained the only multilateral set of rules for international trade in services. When we talk about trade in services, trade in services captures the value of services exchanged between residents and non-residents of an economy, including services provided through foreign-based affiliates.

In the economic literature on trade in services, most studies have been conducted at the industry level, e.g., banking, insurance, and consulting, but the tourism industry has often been neglected. However, in 2019, tourism was the most significant services sector in the world – accounting for nearly seven per cent of total international trade and 25 per cent of global services exports; it is a primary foreign exchange earner. In 2019, the tourism sector was valued at over $9 trillion, accounting for 10.4 per cent of global GDP (World Bank, 2022).

Within mainstream economics, two distinct directions have developed concerning the study of trade and services. One strategy fundamental to traditional or neoclassical economics is to compare services with manufacturing, usually using the same models. The primary justification for this line of research is that both manufacturing and services are subject to the same economic laws, and authors have shown that models for understanding trade in services can be as valuable as those for understanding trade in goods (Deardorf, 2001; Kimura & Lee, 2006). Deardorff (1985) and Findlay (2002) have positively evaluated the theoretical validity of the principle of comparative advantage in international trade in services. Deardorff (2001) believes that the causes of the exchange of goods and services do not differ and that there are only difficulties in monitoring services in international trade. Copeland and Matoo (2008) argue that the reasons for trade in services are the same as for trade in goods: comparative advantage, specialization, and economies of scale. Lee and Lloyd (n.d.) state that trade in goods and exchange in services should be considered together when analyzing international trade flows and their impact on resource distribution and national welfare.

The other approach is to reject mainstream models as appropriate for analysing services (Jensen & Zhang, 2013) because benefits, unlike physical goods, are intangible and cannot be stored but must be consumed at production. Hill (1977) argues that trade in services differs from goods because they belong to "different logical categories." Hill believes that the interaction between user and provider is crucial in services.

However, most of the literature (see Table 1) agrees that trade in services can be explained by the same models as trade in goods, e.g., the gravity model of international trade. For example, Kimura and Lee (2006) find that the gravity equation is equally robust for goods and services, especially for tradable services such as transportation and tourism.

To review the relevant literature on trade in services, the first step of the frame is identifying and selecting the most pertinent papers in the Web of Science Core Collection database (2022). The paper's second step is organizing and summarizing the literature. According to Web of Science (2022), there are 357 sources related to the search terms “trade in services in general” and “gravity”. Table 1 provides a summary of the selected relevant papers in the field of trade in services in general and specifically of trade in tourism services.

Table 1
Summary of the literature review on trade in services

Author/Year	Title	Model	Findings
Kimura & Lee (2006)	The gravity equation in international trade in services	Gravity model	Trade in services is better predicted by gravity equations than trade in goods.
Ceglowski (2006)	Does gravity matter in a service economy?	Gravity model	There is a positive link between regional trade agreements and trade in services.
Lee (2012)	International Trade in Services and the Role of English	Gravity model	English skills have a significant impact on trade in services.
De (2013)	Assessing Barriers to Trade in Services in India: An Empirical Investigation	Gravity model	Improving trade facilitation can help unlock the untapped potential of trade in services.
Karam & Zaki (2013)	On the determinants of trade in services: evidence from the MENA region	Gravity model	Membership in the World Trade Organization – WTO, promotes trade in services, and the number of commitments bound increases exports, imports, and overall trade in services.
Salmani et al. (2013)	The Effect of the Internet on International Trade in Services: Developing Countries' Case Study	Gravity model	Internet usage has a positive and significant impact on developing countries' trade in services.
Lee & Cho (2017)	Free trade agreement and transport service trade	Gravity model	Free trade agreements have an overall positive impact on trade in transport services.
Anderson et al. (2015)	Dark costs, missing data: Shedding some light on services trade	Gravity model	On-border barriers gradually but unevenly decline. Derived border barriers are modified for institutional, geographic, technological, economic, and other factors.
Nordas (2018)	What drives trade in services? Lessons from the Nordics	Gravity model	Deeper institutional and cultural issues may play a role in the complete integration of service marketplaces.
Tu & Cao (2019)	The Impact of Trade Facilitation Level of G20 Countries on China's Services Export	Gravity model	Important factors affecting China's export of services to G20 nations include trade facilitation, GDP, territory extent, geographic distance, and population size.
Gervais & Jensen (2015)	The tradability of services: Geographic concentration and trade costs	Gravity model	The measures of trade costs are, on average, higher for service industries.
Dincer & Tekin-Koru (2020)	The effect of border barriers to services trade on goods trade	Gravity model	Trade restrictions on services have significant and robust negative consequences on trade in goods. When the level of development is taken into account, there are significant differences in the effects of these barriers on goods trade.
Harms & Shuvalova (2020)	Cultural distance and international trade in services: A disaggregate view	Gravity model	Cultural distance has a significantly negative effect on overall bilateral services trade, and the strength of this effect differs across different types of services and other aspects of cultural space.
Didier (2020)	Comparing the Impacts of Some North-North and North-South Trade Agreements on Trade in Services	Gravity model	The impact of trade agreements on service trade varies by region and sector.
Ciuriak et al. (2020)	The Effect of Binding Commitments on Services Trade	Gravity model	Trade in services responds positively, but inelastically, to removing trade barriers to services.
Chen et al. (2020)	Factors affecting the cost-of-service trade: empirical evidence from China and the European Union	Gravity model	The differences in the factors influencing the costs of trade in services between countries with different levels of economic development exist.
Kern et al. (2021)	Cutting red tape for trade-in services	Gravity model	Reforms in services trade have a trade-creation effect. At the expense of domestic flows, reforms also have a trade diversion effect.
Boulatoff et al. 2021)	Does Distance Matter for Trade in Services? The Case of Interprovincial Trade in Canada	Gravity model	Distance presents an essential determinant of trade in services, and the income elasticity of demand is heterogeneous within the services sector.
Benz & Jaax (2022)	The costs of regulatory barriers to trade in services: New estimates of ad valorem tariff equivalents	Gravity model	There is a potential for liberalising trade in services, which the trade policy modelling can support.

So far, the research literature does not agree on whether demand- or supply-side factors should be studied when analyzing trade in services. So far, the literature shows the relevance of both factors (Song & Li, 2008; Jensen & Zhang, 2013). In this research, we focus on both demand- and supply-side factors, such as economic and social factors, that might influence the trade in services and can also be attributed to trade in tourism services. Since the tourism industry has a significant share in trade in services and is of great importance for small open economies like Croatia, which are highly dependent on tourism, it is important to discuss trade in services from the tourism perspective.

3. Methodology and data

Our analysis is based on the gravity theory of international trade. The gravity model is the most common and widely used in economic analysis. Although it is predominantly used to model international trade in goods, most papers (see Table 1) have proven successful in explaining international trade in services. The idea behind the gravity model is based on Newton's law of universal gravitation. "The gravity model of trade predicts that international trade (gravitational force) between two countries (objects) is directly proportional to the product of their sizes (masses) and inversely proportional to the trade constraints (the square of the distance) between them" (Yotov et al., 2016, p. 5).

The original gravity equation had the following form:

$$trade_{ij} = constant \frac{GDP_i\, GDP_j}{distance_{ij}} \quad (1),$$

where $trade_{ij}$ represent total trade between reporting country *i* and partner country *j*. *constant* stands for all the factors that affect the total trade but do not depend on the countries included in the model. GDP_i and GDP_j are the gross domestic products of country *i* and country *j*, which serve as a proxy variable for economic masses, and $distance_{ij}$ stands for the distance between the capitals of country *i* and *j* expressed in kilometres. The basic gravity equation is in multiplicative form, while the gravity equation commonly used in international trade analysis is in additive form, with the dependent and independent variables logarithmically transformed (Host & Zaninović, 2018) and has the following form:

$$lntrade_{ij} = \text{constant} + \beta_1 lnGDP_i + \beta_2 lnGDP_j - \beta_3 lndistance_{ij} \quad (2).$$

Over the years, in addition to the fundamental gravity variables, the gross domestic products of the trading partners, which stand for economic masses, and the weighted distance between the capitals of the trading partners, many authors have included various trade facilitation, logistics, socio-economic variables that influence bilateral trade (Anderson & van Wincoop, 2004; Baier & Bergstrand, 2001; Baldwin & Taglioni, 2007; Soloaga et al. 2006; Head & Mayer, 2014; Host et al., 2019; Bugarčić et al., 2020; Zaninović et al., 2020; Zaninović et al., 2023). This equation was previously estimated based on cross-section data. However, the gravity model works better on panel data covering both series of countries and a time span of several years, which is why our analysis is based on the panel data sample.

3.1. Model specification

To estimate the determinants of trade in services, we follow the intuition of the gravity model but use trade in services data as the dependent variable instead of the usual total trade in goods between trading partners. The gravity model is quite modular and can be adapted to the empirical data the author is working with. In this analysis, a structural gravity model is developed that includes socioeconomic variables that affect trade in services and the standard variables, GDPs of trading countries, and the distance between them. The selection of variables is based on the literature review in Table 1. As a proxy variable for trade, we use data on exports of services, as suggested in the literature (Yotov et al., 2016).

Our econometric model is specified as follows:

$$service\_ex_{ijt} = \exp(\alpha + \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 lndistw_{ij} + \beta_4 rta_{ijt} + \\ + \beta_5 language_{ij} + \beta_6 colony_{ij} + \beta_7 religion_{ij} + \lambda_t + \eta_{ij} + \varphi_i + \pi_j + u_{ijt}) \quad (3),$$

where $service\_ex_{ijt}$ the value of service exports of reporting country *i* to partner country *j* in year *t stands for.* $lnGDP_{it}$ is the log-transformed gross domestic product of country *i* in year *t*, and $lnGDP_{jt}$ is the log-transformed gross domestic product of country *j* in year *t*. $lndistw_{ij}$ represents the weighted distance between the

capitals of reporting and partner countries *i* and *j*. rta_{ijt} indicates a regional (free) trade agreement between reporting and partner countries *i* and *j*. It is a dummy variable with the value one if an agreement exists and zero if it does not. $language_{ij}$ is also a dummy variable with the value of one if their trading partners share a common first official language and with a value zero if they do not. $colony_{ij}$ is a dummy variable with a value of one if the trading countries share a common colonial history and a value of zero if they do not. Finally, religion is "an index calculated by adding the products of the shares of Catholics, Protestants and Muslims in the exporting and importing countries. It is bounded between 0 and 1 and is maximum if the country pair has a *religion* which (1) comprises a vast majority of the population, and (2) is the same in both countries" (Disdier & Mayer, 2007). Fixed effects variables, $\lambda_t+\eta_{ij}+\varphi_i+\pi_j$,i.e., time-fixed effects, county pair fixed effects, reporting country fixed effects, and partner country fixed products are also included in the gravity equation. We cluster the distance. Estimating gravity equations tends to produce biased results because some gravity variables, such as GDP or regional trade agreements, may be endogenous. Therefore, addressing these issues must be addressed by including fixed-effects dummies (Hummels, 2007; Baier & Bergstrand, 2007).

Another problem is the case where, in gravity estimation, trade flows between trading partners in a given year are zero, for example. If the dependent variable is zero and gravity, estimation is in its logarithmic form, this could be a problem. Therefore, we estimate our gravity equations using the Poisson Pseudo-Maximum Likelihood (PPML) estimator Santos Silva and Tenreyro (2003) proposed. The PPML estimator is robust even in the presence of heteroskedasticity, and most relevant papers use PPML as the primary estimator of the gravity equation (Lee, 2013; Saslavsky & Shepherd, 2013; Yadav, 2014; Zaninović et al., 2020; Zajc Kejžar et al., 2022; Kern et al., 2021).

3.2. Data description

This paper uses panel data for trade in services, i.e., exports between 5,359 trading partners from 2000 to 2018. The data for trade in services are from the UN Comtrade database (2020). Data for the independent variables, namely gross domestic products of trading countries and a set of dummy variables, data on distance, regional trade agreements, language, and religion, are from the CEPII (2019) database. Trade in services includes manufacturing services on physical inputs owned by others; maintenance and repair services; transport; travel, construction, insurance and pension services; financial services, charges for the use of intellectual property, telecommunications, computer and information services, other business services, personal, cultural, and recreational services, government goods and services; various services; unallocated services, and commercial services.

Table 2 presents the descriptive statistics for all variables included in the estimation. Since our data provides trading partners with different levels of development, a high standard deviation of export and GDP data can be observed.

Table 2
Descriptive statistics

Variable	Observation	Mean	Standard deviation	Minimum	Median	Maximum
service_ex	38,928	8,26e+08	3,23e+09	-4,09e+09	5,30e+07	9,21e+10
GDP_i	38,742	8,31e+08	1,60e+09	1224221	2.42e+08	1,95e+10
GDP_j	37,856	8,17e+08	2,16e+09	39875.71	1.97e+08	2,06e+10
distw	38,749	5267.10	4388.091	59.617	3660.103	19586.18
rta	38,928	0.49	0.500	0	0	1
language	38,749	0.08	0.266	0	0	1
colony	38,749	0.02	0.140	0	0	1
religion	35,572	0.19	0.255	0	.0465444	.985059

4. Results and discussion

The results of estimating trade in services based on a gravity model are shown in Table 3. We estimated the same model using two different estimators. The first (1) column shows the regression results with the Pooled Ordinary Least Squares (POLS) estimator, and the second column shows the results with our primary estimator, the Poisson Pseudo Maximum Likelihood (PPML) estimator. The results with the Pooled Ordinary Least Squares (POLS) estimator serve as a benchmark for comparison with our primary estimator. However, the effects of POLS are usually overestimated and biased, so using this estimator for the analysis is not recommended. However, most of the gravity model estimations were performed using the POLS estimator, so in this paper, we also present the results of the POLS estimation.

The POLS regression results show that GDP, i.e., the size of the economy, has significant and positive effects on service exports. The PPML results also show a substantial and positive impact on services exports. On the other hand, the results also show a significant negative effect of distance on service exports. These results are consistent with previous findings (see Table 1), which show that trade in services can be explained by the gravity variables, and the coefficients are even higher than in the case of trade in goods. As for the other socioeconomic variables, the results show that the existence of regional (free) trade agreements positively affects the export of services. This confirms that removing tariff barriers and implementing trade agreements or integration have led to increased trade in services. A common official language, as does a common religion, also promotes trade in services. Regarding colonial history, the results of the POLS estimation show significant positive effects on trade in services. However, estimation with PPML shows that colonial history is not substantial for service trade.

Table 3
Results of the POLS vs. PPML regression on service export

	(1) POLS	(2) PPML
VARIABLES	lnservice_x	service_x
GDP_i	0.185** (0.0727)	0.789*** (0.0825)
GDP_j	0.520*** (0.0576)	0.557*** (0.0758)
Distw	-0.000216*** (1.03e-05)	-0.000152*** (1.19e-05)
Rta	0.419*** (0.0781)	0.364*** (0.0959)
Language	0.758*** (0.0889)	0.631*** (0.0803)
Colony	0.923*** (0.273)	-0.219 (0.183)
Religion	0.801*** (0.120)	0.908*** (0.171)
Constant	4.862*** (1.685)	-5.912*** (1.989)
Time FE	Yes	Yes
Pair FE	No	Yes
Reporter FE	Yes	Yes
Partner FE	Yes	Yes
Observations	34,480	34,484
R-squared	0.820	

*** p<0.01. ** p<0.05. * p<0.1.

These findings are similar to those of Chang and Lai (2001), whose empirical results show that the economic size of tourist origins, or the supply-pull effect from origin countries, is a significant factor in improving exports of tourism-related services in the destination countries. On average, the export of services takes place between closer destinations rather than distant ones, and distance has a negative effect on the export of services. It can also be discussed that the existence of regional (free) trade agreements, even if they mainly relate to trade in goods, has a positive effect on trade in services and that tourists tend to travel to destinations that are, for example, in the context of economic integration, as travel is facilitated overall. Looking at the European Union, for example, most travel occurs within or between member states that share similar political and economic positions on integration. In 2019, 222 million tourist trips with at least one overnight stay were made by EU citizens to other EU countries. Over 1.5 billion overnight tourist trips were spent by EU citizens in other EU member states in 2019. (Eurostat, 2019). Language plays a vital role in services trade, especially in the tourism industry, as it is closely linked to tourism. A common language means more straightforward and safer communication with fewer misunderstandings and gives, for example, tourists more confidence when travelling to foreign countries. As for colonial history, it does not seem to play a significant role in the service industry, and people do not tend to travel to certain countries just because they were once colonies. Finally, religion, closely linked to culture and the tourism industry, also plays an essential role in service trade.

5. Conclusion

This paper's objective was to empirically investigate the determinants of trade in services and discuss the results from the perspective of the tourism industry since tourism plays a vital role in trade in services in general. Trade in services has often gone relatively unnoticed in the economics literature. In statistical data sets, services are classified into several categories. However, since most services are directly or indirectly interrelated, the analysis of the aggregate service level provides better insight into the trade dynamics of services. The tourism industry, which includes many different services, not just travel services, must be viewed from an overall perspective. This paper estimated the gravity model of international trade in services. The analysis was conducted based on the augmented gravity model for a sample of 5,359 trading partners from 2000 to 2018. The Poisson Pseudo-Maximum Likelihood estimator was used to estimate the augmented gravity model, which successfully handles specific gravity estimation problems such as zero trade and heteroskedasticity. The model included time-fixed effects, reporter and partner fixed effects, and country-pair fixed effects to address potential endogeneity issues. The estimation results show that trade in services can be explained by the economic size of the trading partners, and that distance still plays an important role. Distance significantly negatively impacts trade in services and leads to a decline in services exports. From the perspective of the tourism industry, it can be concluded that trade in tourism services is determined by similarity in economic size, proximity, and shared socioeconomic factors such as a common first language and shared religious beliefs. Shared colonial history does not have a significant impact on trade in services. Free trade agreements have a positive effect on the exports of services. In addition, the common language leads to higher exports of tourism-related services. Religion also plays an important role, and shared religious beliefs lead to higher levels of exports of services. It must be acknowledged that this study has certain limitations, as the analysis is based on aggregate data for all services, and we cannot say with certainty which specific factors are most important for tourism services and in which direction they act. In addition, the analysis was conducted for the 5,359 trading partners. Although this contributes to the study from an econometric point of view due to the large sample size and many observations, the results cannot be generalized to every country. However, these limitations also open the way for further analysis of service trade.

These results have important policy implications, as they show which factors determine the trade in services and which area investments need to be made to increase services exports. Although not directly, these results

can also be used by the government and policymakers in the tourism industry to show what socioeconomic factors might determine trade in tourism services.

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