



Original article

Seaport quality and seaport competitiveness: An innovative assimilation in Malaysian Seaport System[☆]

Noor Azwa Noralam.^{a*}, Mohamad Rosni Othman.^b, Jeevan, J.^c, Mohd Saiful Izwaan Saadon.^d

^{a*} Faculty of Maritime Studies, University Malaysia Terengganu, gsk2814@pps.umt.edu.my, Corresponding Author

^b Faculty of Maritime Studies, University Malaysia Terengganu, rosni@umt.edu.my

^c Faculty of Maritime Studies, University Malaysia Terengganu, jagan@umt.edu.my

^d Faculty of Maritime Studies, University Malaysia Terengganu, izwaan@umt.edu.my

Abstract

The seaport system is one of the complex systems which involves many stakeholders; i.e. seaport cluster; seaport authority, seaport operator, government, shipping agent, forwarding agent etc. Due to this concern, the aims of this research is revealed the relationship between the three elements of seaport quality towards the seaport competitiveness. Subsequently, the scope of this research identified three elements of seaport quality (seaport effectiveness; seaport reliability; seaport governance) and seaport competitiveness as the influential elements from the Malaysian Seaport perspective. Then, the methodology of this research used quantitative method analysis and questionnaire as the instrument for the Malaysian seaport cluster stakeholders. Multiple regressions and the reliability test were employed for the data analysis. The 143 out of 180 respondents had approved after data screening. Consequently, the finding was the 8 influential elements of seaport quality onto seaport competitiveness; (i) highly stability on strong cooperation about ship and cargoes, (ii) systematic arrangement of facilities and equipment, (iii) demonstrates good understanding of client requirement, (iv) reliability on the ability of equipment and facilities, (v) easy understanding towards the implementation of the guidelines of process involves, (vi) highly attending by customer on the cooperation through community, (vii) highly understanding and knowledge to the security compliance and (viii) minimizing the ship turnaround time, and those were statistically significant under the Malaysian seaport quality perspectives. As conclusion, the element of seaport quality would contribute as the benchmark to improvise the Malaysian seaport competitiveness. The contribution from this research is foreseen under the developing the guidelines through the seaport quality while enhancing the seaport operation efficiency and the strategies development in determining the continuous sustainability of seaport industry.

Keywords: *Benchmark*, Malaysia Seaport, Seaport Cluster, Seaport Competitiveness, Seaport Quality.

1. Introduction

The development of seaport generations is moving towards the fifth generation port (5 GP) and sixth generation port (6 GP). 5GP introduced the proposition of two groups of stakeholder involving the port users and local community (Flynn, 2011, p. 497). Based on the 5GP, the closest seaport that fulfilled the criteria was Singapore Port in year 2015 (Kaliszewski, 2018, p. 15). Through the 5GP, the importance of influential factor of seaport competitiveness is identified through uniform system, which combining the systems on infrastructure, superstructure and information technologies in order to maximize the convenience of seaport users (Kaliszewski, 2018, p. 14).

On the 5GP, it was referred that seaport generation contribute in the wholesale center in order to minimize the timeliness in cargo delivery, point of joining water and land passenger stress, and industrial centers with comprehensive intermodal transport in handling and logistics center. The development of seaport function was moving ahead to 6GP, which proposing the criteria for the handling ships with 50 thousands TEU capacity (Kaliszewski, 2018, p. 14). Nowadays, the function of seaport has becoming more challenges due to the demand of seaport users. According to the development of seaport generations, the seaport services must concerned with the seaport users requirement and giving the best offered to the seaport users. By giving the best offered, seaport users must concerned about the capability of the infrastructure of the seaport since the element is reflected towards the current development of seaport function.

1.1 Literature Review on seaport quality and competitiveness

The quality is a relative concept and that it is socially and market driven (Thai, 2008, p. 494). According to the quality concept, the seaport quality can relates to the stakeholder's real needs

implied and expressed in seaport operations and management actions. On the other hand, the seaport service quality as a part of seaport quality and related with the seven components; efficiency in seaport services provision, environmental awareness, safety, security, seaport users' satisfaction, timeliness, and seaport infrastructures (Vaggelas, 2016). As far as quality is concerned, seaports are indeed an important part of the maritime transport chain.

The development of seaport operation landscape is characterized by heightening seaport competition (Maritime Transport Annual Report, 2018). Initially, the seaport competitiveness has moving ahead as one of research interests by researcher. Referring to this, there was researcher who conducted a study in global seaport competitiveness. Among of elements that related to the study of global seaport competitiveness were seaport location, seaport productivity and efficiency, resources and infrastructural facilities, pricing of seaport services, seaport connectivity and organization of seaport (Madani, 2018, p. 24). However, others researcher suggested that the seaport competitiveness will change through the perception of the users and not solely rely on the influential factors (Knatz, 2017, p.7; Brooks, Schellink & Pallis, 2015, p. 701). Another perception of the measurement of seaport governance, green strategies and seaport competitiveness, emphasizing the role of factors such as resistance to innovation, port reputation, social and political tension would also bring new innovation to the hierarchy of the drivers (Parola et al., 2016, p. 17).

With the influential factor of seaport competitiveness, it creates the innovation of seaport quality and determination to support the elements of seaport competitiveness. The previous literature related to seaport must be competent in order to create a range of competitive advantage that user required (Mileski, Mejia and Ferrel, 2014). The suggestion on users' requirement will

support the significance of seaport quality towards the seaport competitiveness. From the previous literature review also, the element seaport quality was developed. Seaport quality was developed based on three focusing aspect on seaport operation, productivity and policy as a guidelines. From that, three element seaport quality was clarify that covers on seaport effectiveness (operation), seaport reliability (productivity) and government (policy) (Noralam et al., 2016, p.11).

The significance of seaport quality is reflected by the seaport performance, which performs as a platform of improvisation. This statement is supported from the United Nations Conference on Trade and Development (UNCTAD), UNCTAD (2005) that refer to the significance of seaport performance. The significance of seaport performance is providing the information management with planning and controlling for seaport operation purposes (UNCTAD, 2005). According to the statement, seaport performance also contributed the smoothing and the action that will be taken in the seaport operation (UNCTAD, 2005). The elements of seaport quality has created the platform of seaport performance with improvements such as timeliness, price acceptability, safety and security, infrastructure, management, resources, responsiveness cooperation, outcome, action, structure and elements. (Noor Azwa Noralam et. al 2016, p. 11; Brooks et al., 2015, p. 701; Yeo et al., 2015, p. 440; Gieger, 2011, p. 1).

In global trends on 2017, seaport activities and cargo handling of containerization and bulk cargo expanded rapidly in following two years of weak performance (Maritime Transport Annual Report, 2018). The Asian region contributed 63 percent on the highest world container volumes of seaport industry in 2017. However, is it all the Malaysian Seaport is also giving the contribution in the sustainability of volumes cargo handling in the Asian Region? Commonly, the ranking for Malaysian Seaport is always contributed by the

Port Klang and Port Tanjung Pelepas.

1.2 Seaport quality : Malaysian Seaport administration and legislation Perspective

Malaysian Seaport and administration and legislation were depicted on the seaport governance perspective. It was reflected on the elements of Malaysia seaport quality. The Malaysian seaport was governed by Malaysia government. The structure of Malaysian Seaport systems are legalized by federal government and state government. The Ministry of Transport is responsible in controlling the nine (9) seaports in Malaysia Seaport and eighty (80) small ports in Malaysia. The major nine (9) seaports in Malaysia are Penang Port, Johor Port, Tanjung Pelepas Port, Klang Port, Kuantan Port, Kemaman Port, Teluk Ewa Port, Malacca Port and Bintulu Port. Meanwhile, Sabah and Sarawak Port are posited under the jurisdiction of the State Government. Referring to Sabah Port, it is controlled by the Ministry of Infrastructure Development with eight (8) seaports in Sabah Port. The Sabah Port covers Kudat, Sepangar Bay Container, Sandakan Port, Kunak Port, Lahad Datu Port, Kota Kinabalu Port and Tawau Port. For Sarawak Port, it is controlled by the Ministry of Industrial Development which includes Kuching Port, Rajang Port and Miri Port.

The administration of the major Malaysian Seaport is legislated under the Port Acts. The legislations under the Port Acts on each of major port are shown as below:

- (i) Penang Port: **Penang Port Commision Act 1955**
- (ii) Port Klang, Johor Port, Port of Tanjung Pelepas, Kuantan Port, Kemaman Port, Malacca Port, Teluk Ewa Port : **Port Authorities Act 1963**
- (iii) Bintulu Port: **Bintulu Port Authorities Act 1981**
- (iv) Sabah Port: **Sabah Port Enactment 1981**
- (v) Sarawak Port: **Sarawak Port Authorities Ordinance 1961**

For the administration of the Malaysian Seaport, port authority is established to govern the Malaysian Seaport. The major seaport operations hold by the federal government have been privatized to the following operators; Penang Port (Penang Port Sdn. Bhd.), Port Klang (Northports Sdn. Bhd. and Westport Sdn. Bhd), Johor Port (Johor Port Sdn. Bhd.), Tanjung Pelepas Port (Port of Tanjung Pelepas Sdn. Bhd.), Malacca Port (Malacca Port Authority), Kuantan Port (Kuantan Port Consortium Sdn. Bhd.), Kemaman Port (Kemaman Supply Base), Bintulu Port (Bintulu Port Sdn. Bhd.) and Teluk Ewa Port (Kedah Cement Jetty Sdn. Bhd.). For the administration of State Government, Sabah Port acts as a licensing authority and issuing the seaport operator to Sabah Port Sdn. Bhd under Sabah Port (Privatization) Enactment 1998. Meanwhile, Sarawak Port is operated by the seaport authority itself such as Kuching Port (Kuching Port Authority), Rajang Port (Rajang Port Authority) and Miri Port (Miri Port Authority).

From the Malaysian Seaport systems structure perspective, it would assist to improve the Malaysian seaport governance as one of the perspective of seaport quality that will be concerned by this article. The Malaysian seaport is having good potential systems which govern by federal and state government to sustain in the seaport industry. With the strategic geographical location, exploring the seaport quality will assisted the Malaysian seaport to implement the priority of improvement in the seaport systems.

1.3 Seaport quality: Malaysian Seaport performance perspectives

Seaport quality is reflected to the seaport performance, which acts as the platform to improve the seaport competitiveness (Noor Azwa

Noralam et al. 2016, p. 11; UNCTAD, 2013; 2005). Related with this statement, Figure 1 indicates the trends of cargo volumes in Malaysian Seaport. The statistic is shown for the seaport activities which involved the exports, import and transshipments. The large volume of cargo throughputs is in year 2016 and the smallest cargo volume is in year 2009. The decreasing of cargo volume in 2009 is because of the various challenges emerging from changes occurring in container shipping, particularly cost-saving and efficiency exercises that have led to the formation of new alliances among the major players and the subsequent loss of volume by ports to the alliances' of new hubs. Meanwhile, other transshipment hub in the region will also be affected from the traffic flow and the amount of cargo carried by the large trading ships. The smaller seaport will experience a reduction in entry compared to network support shipping or feeder traffic that is the larger alliance that served them through a bigger hub (Port Klang Authority Annual Report, 2017).

Meanwhile, the Figure 1 also shows transshipments as the trend of main activities that contributed to the Malaysian Seaport. Although the cargo volume in the transshipments activities was decreased in 2017, the different of cargo volume in transshipment activities still giving the huge impact towards the Malaysian seaports performance. Thus, the planning of new development and new extension like Kuantan Port would give the opportunity to cater the increasing of cargo volume. Based on this planning, this is the one step forward to ensure the effectiveness of seaport quality is contributable to the seaport competitiveness. Besides, the crucial seaport quality to sustain in the seaport industry through the seaport competitiveness could also be identified.

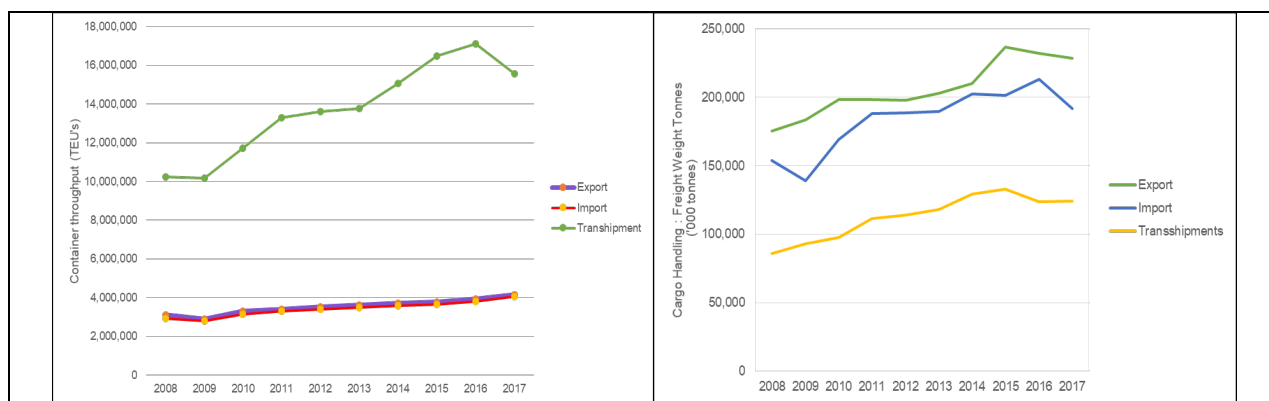


Figure 1 : Container and Cargo Throughput from year 2008 until 2017 (Export, Import and Transshipment)
Source : Ministry of Transport (2018)

1.4 The integration of seaport quality and seaport competitiveness: Malaysian Seaport perspective

Figure 2 indicates the integration between the seaport quality and seaport competitiveness as the conceptual framework for this article. The seaport quality is referred with the seaport effectiveness, seaport reliability and seaport governance. These three elements are indicated as an independent variable. Meanwhile, the seaport competitiveness is referred as dependent variable. The integration between seaport quality and seaport competitiveness appears with three hypotheses in this article:

H1: The relationship between seaport effectiveness and seaport competitiveness

H2: The relationship between seaport reliability and seaport competitiveness

H3: The relationship between seaport governance and seaport competitiveness

The contribution on rational in developing the three hypothesis was determine the most influential factor in seaport quality towards the seaport competitiveness and also identified the prior cause and problem for the Malaysian Seaport perspective.

The determination element of seaport quality was identified by the Systematic Literature Review (SLR) (Noor Azwa Noralam et al., 2016, p.11; Tranfield, 2003, p. 209). This conceptual

framework in Figure 2 was adapted from Thai (2005, p. 8) as a guideline to develop this concept framework. From this method, it was depicted that the elements of seaport quality contributed to the relationship between seaport effectiveness, the seaport reliability, and seaport governance towards the seaport competitiveness. As the result, the timeliness, price acceptability, safety and security, infrastructure and management are covered as the elements of seaport effectiveness. Meanwhile, the seaport reliability is referred on the resources, responsiveness, cooperation and the outcome. Finally, the elements of seaport governance are referred on the structure and implementation of regulatory framework, action (the degree of coordination among seaport users) and the element of efficiency in the flows of giving the information).

The determination of the final result would assist the contribution on the priority of the significance seaport quality. The significance of the seaport quality is important because it was the bridge of the fundamental to the improvement of seaport performance, and it also supported by United Nations Conference on Trade and Development (UNCTAD). According to the UNCTAD (2005), the seaport performance began on the smoothing of the seaport operation. Based on this statement, the seaport performance will contribute on the relation of the seaport quality. The seaport quality will give its strong

positive impact towards the improvement of the seaport competitiveness. It would be proven by the analysis test that will be implemented by the researchers of this research.

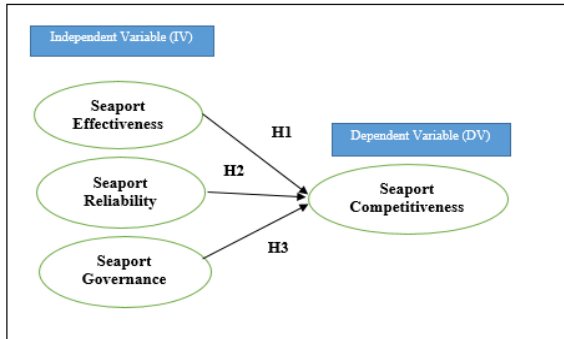


Figure2: Conceptual Framework of Seaport Quality
Source : Author(s) of the original source (2018)

2. Methodology

The method of this research is quantitative. This research is using the questionnaire as an instrument for distributing to the Malaysian seaport stakeholders. The questionnaires consists of 51 questions for respondent.

This research sampling strategy is using the seaport cluster organizations as a population. Since 2001 to 2012, Kocsis (2001, p. 51) is the first scholar who uses the term ‘port cluster’. The focused research for the target population is gained from the Malaysia’s seaport cluster organizations which include the internal and external stakeholders. By definition, seaport cluster is categorized in two groups including the internal and external stakeholder (Becker & Mason, 2014, p.7; Kocsis, 2001, p. 51). The internal stakeholder refers to seaport authority, while external stakeholder refers to the government, community and academician. This questionnaire is involved 143 respondents from the community of Malaysian Seaport.

2.1 Result of analysis

The analysis shows the result of demographics analysis, regression analysis and the reliability analysis of the Malaysian seaport quality perspectives.

2.1.1 Data Analysis: Demographics analysis

The data is collected through the sample across Malaysia Seaport from February to April 2018. There was a calculated sampling number by purposive random sampling technique; 143 respondents from the seaport industry. There were 78 respondents from internal stakeholder including the Malaysia Seaport authority and Malaysian Seaport operator. The external stakeholder was chosen through 12 respondents from the government agencies such as Ministry of Transport, Malaysian Marine Department and Royal Custom Malaysia. Other than that, from the community of seaport, there were 27 respondents from shipping agent, 14 from forwarding agent, and other than seaport cluster were 12 respondents. A large number of internal stakeholders demonstrated 54.6% respondents, while 45.5% came from the external stakeholders. The majority of (35.7%) respondents were from the seaport operator.

2.1.2 Regression analysis and Cronbach Alpha analysis.

Table 1 depicted the regression results. The F-statistics shown that three hypotheses (**H1, H2 and H3**) in this article as having statistical significance, means that the independent variable has giving the positive impact towards the dependent variable (Pallant, 2010, p. 1). The results had shown that the seaport reliability gives the most influential factor towards Malaysian seaport quality. The multiple correlation coefficient (r) for the seaport reliability of 0.852, followed by seaport governance (0.812) and seaport effectiveness (0.667). The reliability also been tested for each variable by using the Cronbach’s alpha. The result indicated the high level of measurement procedure, with seaport reliability of 0.960, seaport governance 0.954, and seaport effectiveness 0.924 respectively.

Table 1 also shows the significance level on

each independent variable. For the seaport effectiveness, only two determinants show the relationship; (i) highly understanding and acknowledge the security compliance ($B = 0.295$), and (ii) minimizing the ship turnaround time ($B = 0.223$); were statistically significant due to the Malaysian seaport quality perspectives. For the seaport reliability, four determinant elements were shown in the result. The result in the high level was highly stable on strong cooperation about ship and cargoes, ($B = 0.293$),

followed by systematic arrangement of facility ($B = 0.177$), demonstrates good understanding of client requirement ($B = 0.174$) and reliability on the ability of equipment and facilities ($B = 0.167$). Meanwhile, for the seaport governance, there are two elements that having a strong relationship; (i) easy understanding towards the implementation of the guidelines of process involves ($B = 0.317$) and (ii) highly attending by customer on the cooperation through community ($B = 0.275$)

Table 1: Regression Result

Dependent variables	Independent variables	Overall significant of regression			Individual significance of regression	
		<i>r</i> value	<i>F</i> value	P value	B	<i>p</i> value
Seaport Competitiveness	Seaport effectiveness	0.667	8.672	0.000		
	Minimizing ship turnaround time				0.223	0.028*
	Highly understanding and knowledge to the security compliance				0.295	0.007*
	Seaport reliability	0.852	19.546	0.000		
	Systematic arrangement of facilities and equipment				0.177	0.023*
	Demonstrates good understanding of client requirement				0.174	0.053*
	Reliability on the ability of equipment and facilities				0.167	0.056*
	Highly stability on strong cooperation with the seaport sales activities.				0.293	0.001*
	Seaport governance	0.812	16.371	0.000		
	Highly attending by customer on the cooperation through the community				0.275	0.003*
	Easy understanding towards the implementation of the guidelines of process involves				0.317	0.001*

Source: Author(s) of the original source (2018)

3. Discussion

The final result on the analysis test also creates the strong seaport competitiveness in relation to the improvement of seaport quality. Then, the analysis result indicates the significance on strong relationship between Malaysian seaport quality and seaport competitiveness. The result has shown four (4)

influential factors onto Malaysian seaport quality; (i) highly stability on strong cooperation with the seaport sales activities, (ii) implementation of the guidelines of process involves, (iii) cooperation on attending customer, and (iv) security compliance.

(i) **Seaport reliability: Highly stability on**

strong cooperation with the seaport sales activities

In seaport reliability element, the high and strong cooperation with the seaport sales activities is significant between the seaport quality and seaport competitiveness perspectives. In Malaysian seaport industry perspective, this is importance because seaport sales activities will increase the seaport profit hence reflected to the seaport performances. Regarding the UNCTAD, the significance of seaport performance is also contributed to the seaport quality. This statement is supported by previous studies, which stated the minimization of ship turnaround time could contribute towards the seaport performance (UNCTAD, 2005). Through that, the minimization of ship turnaround time is reflected to the seaport quality; simultaneously, this has required the capability of the staff as to be well trained and the capabilities of facilities and equipment in the seaport terminal are at the best condition.

(ii) Seaport governance : Implementation of the guidelines of process involves on easy understanding

The implementation of guidelines of process involves easy understanding. It also contributed in the seaport quality element with its influential capability onto the seaport competitiveness. The implementation of the guidelines of process involves the seaport activities, legal framework, information workflow, information about the reform process, and the program must be easily understood by seaport (Gieger, 2012, p.1). This is important because the systematic, easy and complete understanding would instill client's interest to use the services that offered by seaport operator.

(iii) Seaport governance : Cooperation on attending customer

Malaysian seaport perspective regards

cooperation on attending customer among seaport cluster as very important. With the analysis result, the information of the process, which involved from the beginning till the end process play the important role and must be completely understood by each customer. Good information reception will give the customer an overview to make the choice of the service that offered by the seaport operator. Generally, price, quality, reliability, empathy, responsiveness are the main factors that influence the customer satisfaction and loyalty (Gajjar 2013, p.11). Due to these subject matters, the elements of seaport quality need to improve the existing process in order to assist the seaport quality system in Malaysia.

(iv) Seaport effectiveness : Security compliance of seaport

The second highest contribution in the analysis is security compliance of seaport. Security compliance in seaport is referred to the security in seaport facilities. This security compliance is one of provision on additional measures of the seaport (Onwuegbuchunam et al., 2018, p. 56). For examples, these measures include the introduction of port pass, additional security personnel, new access control of gate measures at the gates, screening measures, use of CCTV camera, and provision of perimeter fencing (Onwuegbuchunam et al., 2018, p. 57). Security compliance is important for reducing the risk of the intrusion in the seaport terminal. This is reflected to the awareness on taking a good care of ships and cargoes.

With the finding of the result, there are differences compare to other research. This is because the previous study commonly covered on the port service quality with the customer satisfactions. The result of previous research giving the most influential factors on port service quality in customer perception such as tangibles (Onyemechi, 2017, p. 61), port security quality (Chia and Thai, 2016, p. 732), , management

(Yeo et al., 2015, p. 443) and attributes (Kolanovic, 2011, p.500). Then, the differences of this research was focusing aspect which integrated the seaport quality and seaport competitiveness. Due to this, the most priority influential factor on was seaport reliability.

4. Conclusion

As a conclusion, this article found that there was a strong relationship between seaport quality and seaport competitiveness in Malaysian seaport perspectives. Thus, the element of seaport quality would contribute as the benchmark to improvise the Malaysian seaport competitiveness. The element of seaport quality is crucial in order to support the Malaysian Seaport to sustain in the industry and listing the priority of the main element that need to improvise in the seaport main activities. Besides, it was developed for the Malaysian seaport to move forward to the global level. For future research, the enhancement of the seaport quality elements and seaport competitiveness onto the performance of Malaysian seaport need be improvised from a long term period in order to gain the intense and compelling result.

The research contribution was enhanced the knowledge on sustaining the growth and development of seaport industry focusing on seaport quality; to improvise the guidelines of the Malaysian Seaport performance; identifying the prior cause of problem in the main seaport activities and presents and emphasizes the holistic approach on seaport quality. The differences of this research on previous literature was the integration the element seaport quality towards the seaport quality and on how the seaport quality influential the seaport competitiveness in Malaysian Seaport perspectives.

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