

Effect of Uncertainty, Supplier Involvement, Supplier Performance, and Partnership Quality on Buyer-Supplier Relationship

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Abstract

In this explanatory research, a model is developed to validate the premise that value-creating supplier relationships between firms and suppliers will affect the supply chain of manufacturing and non-manufacturing companies. The research examined the effect of uncertainty, earlier supplier involvement, supplier performance, and partnership quality on buyer dependence on the supplier. It also examined the moderating role of industry types on buyers' dependency. Of the four moderating relationships, we found support for two hypotheses, and we did not find empirical evidence for the other two. The study found that uncertainty, earlier supplier involvement, supplier performance, and partnership quality significantly affect buyers' dependency.

Keywords: *Supplier involvement, partnership quality, supplier performance, uncertainty, procurement.*

Introduction

Supply chain management involves managing material and information across an organization, utilizing the facilities, i.e., the vendors, manufacturing, product assembly,

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and distribution channels (Koberg & Longoni, 2019). It is considered a backbone for creating infrastructure within societies and businesses. Expanding global markets, technology, and the rapid exchange of information, ideas, goods, and services have become a big global supply chain network (Wieland, 2021). It starts from the idea of the product till the after-sale service. In previous decades, there was no concept of the supply chain, but over time, it has become an essential part of businesses to compete locally and internationally (Saber, Kouhizadeh, Sarkis & Shen, 2019). Marketers and practitioners believe it gives a competitive edge to a firm. For business operational efficiency, supply chain management has become a critical element. All business activity issues come under the domain of the supply chain. It deals with the issue related to finance, allocation and movement of funds, global sourcing, customer satisfaction, or the need to maintain a consistent supply of goods and services (Ketchen Jr, & Craighead, 2020).

Researchers have viewed supply chain management from different perspectives. Some researchers define it from a purely operational perspective, which is responsible for the flow of material, items, information, and products. While others view it in philosophical terms, some relate it to the management process (Richey, Roath, Adams & Wieland, 2022). The supply chain is not just a chain of dealing with a business relationship on a one-to-one basis; it also manages multiple relations concurrently (Shaw, 2019). Firms have to deal with related and non-related vendors, suppliers, and distributors for a consistent and efficient supply chain. Globalization has made it convenient for businesses to acquire materials and services from different global suppliers (Irfan, Wang & Akhtar, 2019). A reputable supplier can enhance a firm's image. Therefore, the proposed research mainly focuses on the supply side of SCM. It focusses on buyers and their dependence on suppliers. Firms in the current era have developed new business processes to deal with the local and international market. It includes the procurement of materials, supplier development, sourcing, negotiation and to some extent, inventory management (Sulaeman & Harsono, 2021). Firms improve their efficiency by building sustainable relationships with their distributors and suppliers (Siawsh, Peszynski, Young & Vo-Tran, 2021). This bonding between suppliers and buyers is beneficial to both. For an effective supply chain, the firm needs efficient and supportive operational staff, working on demand forecasting, developing timely demand requirements, and introducing development programs (Shaw, Grant & Mangan, 2021).

The relationship between buyers and suppliers is contingent on timely supply of goods and services. Consistency in ordering procedures promotes trust between buyers and sellers. Based on the specific requirement of the industry, both suppliers and buyers can develop new ways of collaboration that can increase the efficiency of the supply

chain (Herden, 2020). Buyers and suppliers have the same power to bargain if they are of similar size, and multiple buyers and sellers exist in the supply chain market. In supply chain relationships, the suppliers would have more power to bargain and dictate terms if they are a supplier of specific goods which others cannot deliver (Shaw, Grant & Mangan, 2021). Similarly, large retail giants like Walmart have more bargaining power because of the quantity of goods and services that they order. Buyers and sellers collaborate in strategic partnerships by investing technical and monetary resources (Tan, Yan, Chen & Liu, 2018; Fatorachian & Kazemi, 2021). Many firms like Honda and the pharmaceutical industry make huge investments in their vendors. They also transfer technology to the vendors, which improves the quality of supply and improves the efficiency of the supply chain.

Given the above discussions, the study aims to:

1. Identify the effect of uncertainty, supplier involvement, supplier performance, and partnership quality on buyer dependence.
2. The moderating roles of firm category on (i) uncertainty and buyer dependence, (ii) earlier supplier involvement and buyer dependence, (iii) supplier performance and buyers dependence, and (iv) partnership and buyer dependence.

Conceptual Framework

We have developed a model containing four direct relationships and four mediating hypotheses to meet the above objectives, presented in Figure 1.

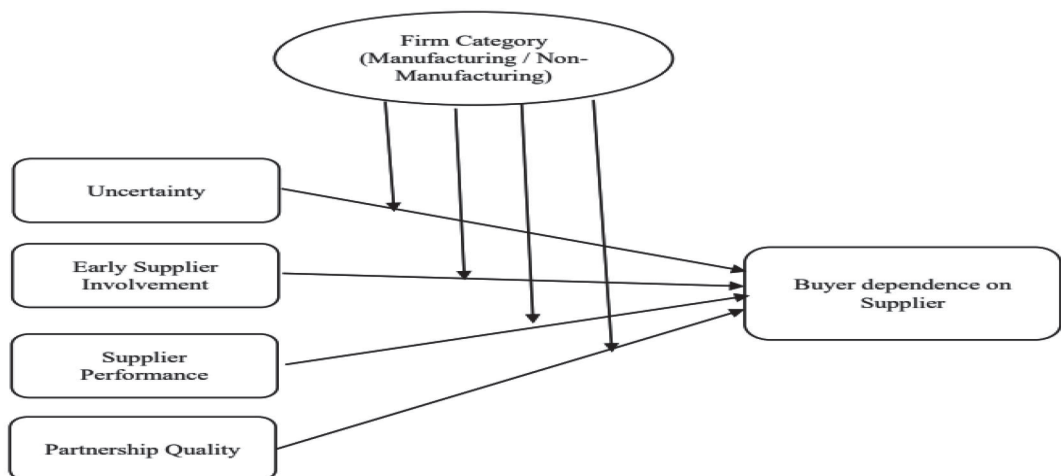


Figure 1: The Research Model

Hypothesis Development

Uncertainty and Buyer Dependence

Rasi et al. (2019) tested an uncertainty model in the buyer-supplier market. The author used communication, strategic sourcing, and market and supply chain orientation as mediators in the model. Based on the data collected from 515 professionals employed in the supply chain, the study concluded that uncertainty negatively affects buyer dependence, and the four mediators used in the study indirectly affect buyer dependence. Another study based on a sample of 2399 collected from several industries, including electronic, metal, textile, and steel, concluded that the vertical control of the manufacturers positively affects supplier performance (Ryu, Min & Zushi, 2007). It also reduces the uncertainty aspect of the suppliers. Previous researchers also suggest a significant impact of uncertainty on buyer dependence. Murray-Prior and Wright (2001) found that “when asset value is high, uncertainty in the relationship also gets high.” Researchers concluded that uncertainty stimulates supplier dependency (Zhou, Chong, Zhen & Bao, 2018). Chu, Wang, Lai and Collins (2019) assert that low operational excellence in an uncertain environment promotes high vulnerability—however, supplier relationships and Integration help improve operational excellence in an uncertain environment (Lee, 2015). Kamble and Gunasekaran (2020) also assert various external factors can increase organizations’ dependency on suppliers.

H1: Uncertainty has a significant impact on buyer dependence.

Early Supplier Involvement and Buyer Dependence

Tseng and Liao (2015) examined the supply chain’s integration, innovation, and orientation. The study gathered data from 124 transportation firms in Taiwan. The study found that integration in the supply chain positively affects IT application and market orientation. Research also documents that the market-oriented and IT-based firms share information and data efficiently, which increases supply chain effectiveness and organizational performance (Darby, Ketchen Jr, Williams & Tokar, 2020). Qrunfleh and Tarafdar (2013) studied various strategies in the supply chain based on the data collected from the 205 managers of US organizations. The study found that strategic partnership mediates lean supply chain responsiveness and supply chain strategy. Firms that involve themselves with the supplier early are more successful. At the same time, postponement partially mediates supply chain strategy and responsiveness (Cheng, 2020).

Kannan and Tan (2006) investigated the firm performance concerning vendor selection and their engagements with the buyer’s firms. Based on data set of 527

collected from suppliers, the study concluded that firms that judiciously select suppliers are more successful than others. Caniëls, Vos, Schiele and Pulles (2018) assert that a firm's success also depends on the relationship with the suppliers. Extant literature documents a significant association between early supplier involvement and buyer dependence (Giri & Masanta, 2020). Firms that involve suppliers in product design and development stages have more efficient supply chain mechanisms, leading to a sustainable relationship between firms and suppliers (Cheng, 2020). Many firms increase the efficiency of the supply chain by allowing suppliers to become their stakeholders. Such arrangements are beneficial for suppliers and firms.

H2: Early supplier involvement has a significant impact on buyer dependence.

Supplier Performance and Buyer Dependence

Supplier performance has a direct and indirect association with information and logistics integration. O'Connor et al. (2020) found that the association between cooperation between suppliers and firms significantly affects supplier performance. Prajogo and Olhager (2012), in a study on Australian manufacturing firms, concluded that information sharing and information technology capabilities both have a direct impact on logistics integration. A study examined the association between development and performance and supplier strategic purchasing in Spain. The study found a significant association between strategic purchasing and the performance of the suppliers and their development (Lindgreen et al., 2009; Bhardwaj & Ketokivi, 2021).

Tan et al. (1999) suggest that supplier performance significantly impacts buyer dependence. Companies always rely on their key performing suppliers to a certain extent. Due to their interaction and extensive communication and knowledge exchange, the organization depends on that supplier (Chu, Wang, Lai & Collins, 2019). Similarly, Terpend and Krause (2015) also suggested that competition plays an important role in buyer-supplier relationship building. Due to this relationship, supplier performance increases gradually, and it helps to sustain the relationship. In this manner, the tendency to depend upon each other increases, and supplier performance leads to buyer dependency on its suppliers (Trent, 2008; Najafi-Tavani et al., 2020)

H3: Supplier performance has a significant impact on buyer dependence.

Partnership Quality and Buyer Dependence

Seo, Dinwoodie and Kwak (2014) examined the significance of innovation in supply chain performance through integration. The study focused on South Korean manufacturers. The variable used in the research included SC integration, innovation,

and SC performance. The results suggest that innovativeness positively impacts SC integration and performance. Research also suggests that integration does not mediate SC performance. But internal and supplier integration mediates innovativeness and SC performance relationship (Radhakrishnan et al., 2018). Zhao et al. (2013) studied the impact of risk integration on firm performance within supply chains. The study's variables include supply chain risk, company performance, SC integration, supply, and demand. The study collected data from 317 individuals representing three different industries having manufacturing plants in 10 countries. Past studies found that SC integration is negatively related to SC risks, especially supply delivery risks. Further, they found a contingent relationship between performance and SC integration (Aprianingsih et al., 2018; Singhet et. al., 2019).

Theodorakioglou, Gotzamani, and Tsiolvas (2010) studied vendor and buyer quality management. The study found a significant positive relationship between vendor management and practices adopted in quality management. Researchers believe organizations adopt and implement quality management practices to simplify supply chain management implementation (Teo, Dang-Pham, Nkhoma & Nguyen, 2018). Ryu, So and Koo (2009) explored the partnership and a firm's performance within the supply chain. The study collected data from 141 buyer-supplier practitioners in South Korea and tested it through structural equation modeling. The results show that operational and strategic variables affect the buyer-supplier partnership and eventually influence the firm's performance. Sánchez-Rodríguez et al. (2005) investigate the significance of supplier development on buying firms' performance through structural equation modeling. The study collected data from 306 manufacturing companies in Spain. The study found that supplier development significantly influences firm performance which is important for sustainable growth.

H4: Partnership quality has a significant impact on buyer dependence.

Moderating Relationships

The above sections provided the theoretical support for the association of uncertainty, supplier involvement, supplier performance, and partnership quality on buyer dependence. The literature suggests the discussed relationships may vary from manufacturing to non-manufacturing concerns. Therefore, we argue that firm category would moderate all the discussed relationships.

H5: Firm category moderates the association between uncertainty and buyer dependence on suppliers.

H6: Firm category moderates the association between early supplier involvement buyer dependence on suppliers.

H7: Firm category moderates the association between supplier performance and buyer dependence on suppliers.

H8: Firm category moderates the association between partnership quality and buyer dependence on suppliers.

Research Methodology

Population and Sample

The target population for this study includes the procurement personnel working in the manufacturing and non-manufacturing sector across the city of Karachi, Pakistan. The study used a purposeful sampling technique as we wanted to target the experts in the field. We have collected a sample of 228 from the suppliers of Karachi. We used a close-ended questionnaire for collecting the data.

Scales and Measures

The study has adopted the questionnaire from earlier studies. It has five latent variables and 21 indicator variables. All the indicator variables were based on the 5 point Likert Scale. "1 indicates highly disagree and 5 represents highly agree." Table 1 shows the summary of the constructs used in the study.

Table 1: Constructs used in the study

Construct	Sources	Items	Reliability in earlier studies
Early Supplier Involvement	Trent (2008)	3	0.748 to 0.832
Supplier Performance	Mora-Monge et al. (2010)	4	0.721 to 0.762
Partnership Quality	Mora-Monge et al. (2010)	6	0.764 to 0.813
Uncertainty	Gao, Sirgy, and Bird (2005)	4	0.772 to 0.864
Buyer Dependence	Hallikas et al. (2005)	4	0.844 to 0.872

Statistical Analysis

The study has used Smart PLS for data analysis. While generating the measurement model, several statistics related to reliability, convergent validity, and discriminant validity were calculated. While generating a structural model, it concurrently gives results of all the direct and indirect hypotheses, effect sizes and significance levels.

Demographic Characteristics of Respondents

The study has collected data from 228 respondents. The respondent profile in terms of the industry type, age, gender and education is presented in Table 2.

Table 2: Respondents' Profile

Description Sample Size = 228		Frequency	Percent
Industry	Construction	38	16.7
	FMCG	31	13.6
	Textile Manufacturing	28	12.3
	Information Technology	24	10.5
	Petroleum	24	10.5
	General Trading	19	8.3
	Printing & Packaging	16	7.0
	Public Sector	16	7.0
	Pharmaceutical	13	5.7
	Financial Services	7	3.1
	Other Manufacturing	6	2.6
	Other Services	6	2.6
	Total	228	100.0
Designation	Executives	82	36.0
	Manager	69	30.3
	Asst. Manager	40	17.5
	Head of Department	37	16.2
	Total	228	100.0
Education	Masters & Above	161	70.6
	Graduate	66	28.9
	Intermediate	1	0.4
	Total	228	100.0
Company Age (in years)	13 or above	155	68.0
	7 to 12 years	47	20.6
	1 to 6 years	26	11.4
	Total	228	100.0
Gender	Male	194	85.1
	Female	34	14.9
	Total	228	100
Category of Firm	Manufacturing	125	54.8
	Non-manufacturing	103	45.2
	Total	228	100

Descriptive Statistics

The study has assessed the internal consistency and univariate normality of the constructs. The results are summarized in Table 3.

Table 3: Descriptive Analysis

	Cronbach's Alpha	Mean	Std. Dev	Skewness	Kurtosis
Buyer Dependence	0.848	3.580	1.789	1.902	1.440
Early Supplier Involvement	0.857	4.350	1.985	1.257	-1.749
Firm Category	0.843	3.350	1.444	1.303	-0.964
Partnership Quality	0.894	3.670	1.063	-1.215	1.678
Supplier Performance	0.864	3.930	0.530	-1.968	2.645
Uncertainty	0.899	3.710	1.607	2.552	1.535

The results suggest that the internal consistency of the constructs is within the acceptable range as all Cronbach's Alpha values are greater than 0.70. Similarly, the constructs do not deviate from the requirement of univariate normality as both Skewness and Kurtosis values are between ± 3.5 .

Convergent Validity

We have assessed the theoretical relevance of the indicator variables and latent variables through convergent validity analysis. The results summarized in Table 4 show the values of composite reliability and AVE.

Table 4: Convergent Validity

	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Buyer Dependence	0.859	0.887	0.668
Early Supplier Involvement	0.863	0.898	0.638
Firm Category	0.845	0.895	0.681
Partnership Quality	0.896	0.919	0.654
Supplier Performance	0.878	0.901	0.646
Uncertainty	0.899	0.937	0.833

The results show that composite validity values range from 0.887 to 0.937, and all AVE values are at least 0.60, suggesting that latent variables and their indicator variables are theoretically aligned.

Discriminant Validity

It is necessary to ascertain the uniqueness and distinctiveness of the constructs. This study used Fornell and Larcker (1981) discriminant validity criteria and presented the summarized results in Table 5.

Table 5: Discriminant Validity

	BD	ES	FC	PQ	SP	UC
Buyer Dependence	0.753					
Early Supplier Involvement	0.656	0.799				
Firm Category	0.403	0.332	0.825			
Partnership Quality	0.763	0.609	0.384	0.808		
Supplier Performance	0.717	0.725	0.388	0.628	0.804	
Uncertainty	0.377	0.716	0.283	0.375	0.596	0.912

The results suggest that all the constructs are unique and distinct since all Pearson correlation values are less than AVE.

Variance Explained By Exogenous Variables

The R squared values explain the change in the endogenous variables due to the change in exogenous variables. Their values should be greater than 0.10, suggesting movement in the exogenous variables significantly explains the change in the endogenous variable. The summarized results are presented in Table 6.

Table 6: R-Squared & Adjusted R-squared

Constructs	R Squared	Adjusted R Squared
Buyer Dependence	0.697	0.694
Early Supplier Involvement	0.110	0.109
Partnership Quality	0.147	0.146
Supplier Performance	0.151	0.150
Uncertainty	0.080	0.079

Predictive Relevance of the Model

The study has examined the predictive relevance of the model based on the Q square values. The summary of results presented in Table 7 shows that Q squared values are greater than zero, suggesting adequate model predictive power.

Table 7: Predictive Relevance of the Model

	SSO	SSE	Q² (=1-SSE/SSO)
Buyer Dependence	7188	4426.91	0.384
Early Supplier Involvement	5990	5574.076	0.069
Firm Category	4792	4792	
Partnership Quality	7188	6508.634	0.095
Supplier Performance	5990	5418.459	0.095
Uncertainty	3594	3356.963	0.066

Fit Indices of the Model

The study has presented the summary of fit indices in Table 8. The results suggest that the SRMR value <.08 and NFI >0.80. Other fit measures are within the prescribed range suggesting the model fits adequately.

Table 8: Fit Measures

	Saturated Model	Estimated Model
SRMR	0.077	0.079
d_ ULS	2.612	22.979
d_G	1.833	2.67
Chi-Square	8322.456	10497.18
NFI	0.892	0.896

SEM Results

The study based on bootstrapping generated the results summarized in Table 9. Also, refer to the measurement model in Figure 2 and the structural model in Figure 3.

Table 9: SEM Results

	Beta	T Stat.	P Values	Results
Uncertainty -> Buyer Dependence (H1)	-0.11	4.310	0.000	Accepted
Early Supplier Involve. -> Buyer Dependence (H2)	0.156	3.872	0.000	Accepted
Supplier Performance -> Buyer Dependence (H3)	0.337	9.725	0.000	Accepted
Partnership Quality -> Buyer Dependence (H4)	0.471	18.707	0.000	Accepted
Moderating Effect 1 -> Buyer Dependence (H5)	0.101	4.247	0.000	Accepted
Moderating Effect 2 -> Buyer Dependence (H6)	-0.004	0.093	0.926	Rejected
Moderating Effect 3 -> Buyer Dependence (H7)	-0.069	1.995	0.047	Accepted
Moderating Effect 4 -> Buyer Dependence (H8)	0.017	0.980	0.328	Rejected

The study has empirically tested four direct hypotheses and four moderating hypotheses. Our results support all the four direct hypotheses and reject two moderating hypotheses.

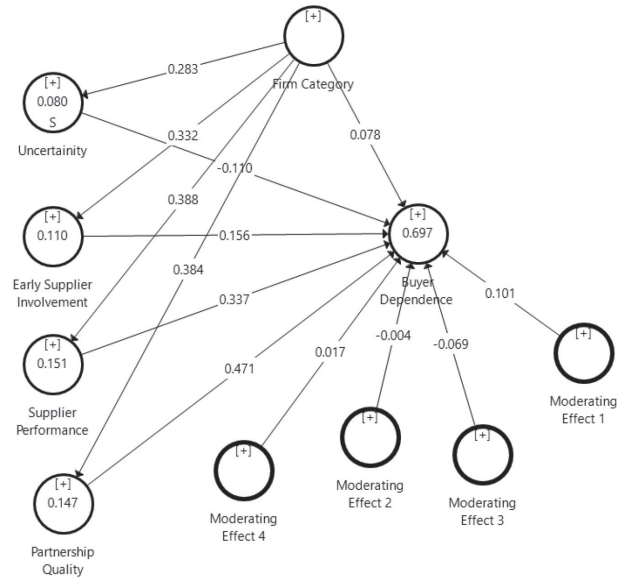


Figure 2: Measurement Model

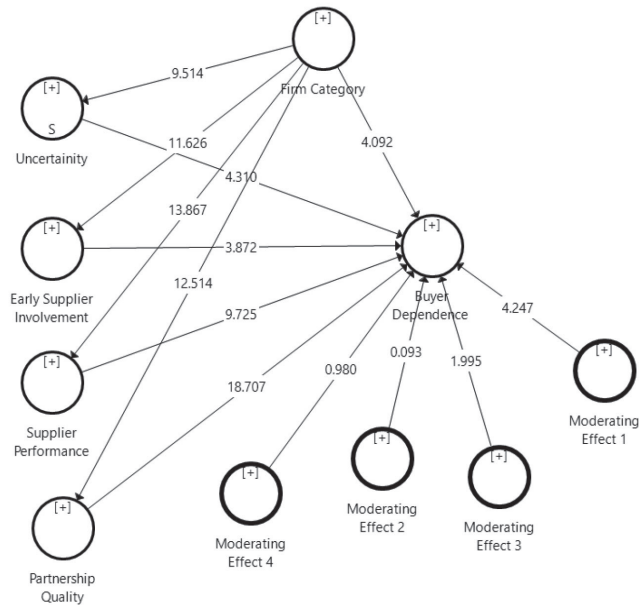


Figure 3: Structural Model

Discussion and Conclusion

Lee's (2015) findings are consistent with this study's result. This study suggests that the uncertainty aspect negatively affects buyers' dependence on suppliers. Supplier

uncertainty reduces firms' operations and performance. Therefore, while developing relationships with the suppliers, it is necessary to ensure how consistent and trustworthy they are. Many firms also incorporate a clause that penalizes suppliers if they fail to deliver goods and services in time. The study has shown that supplier involvement significantly affects buyer dependence on the supplier. This finding is consistent with a study on SMEs (Bothof & van-Weele, 2015). Zahari's (2017) study in Malaysia has also validated the association. Supplier integration is associated with the level of buyer dependency. If the dependency is high, the chances of integration are low, and vice versa (Oh et. al., 2016). Supplier performance has a significant effect on the buyer's performance. Avery et al. (2014) also validated this association and suggested that the firms must provide technical and other support to their vendors and suppliers.

The study found that partnership quality is a significant predictor of dependency on suppliers. The finding is in line with Kull and Ellis (2016), who also found that the quality of partnership with the supplier can effectively manage and control buyer dependency on suppliers. It undermines an organization's core competencies and increases reliance on suppliers. Buyers who are dependent on suppliers may not perform optimally. Thus, it is necessary to have an adequate balance in the buyer and supplier relationship (Avery et al., 2014).

Conclusion

The study has focused on examining the effect of uncertainty, supplier involvement, supplier performance, and partnership quality on buyer dependence. It has also used firm types, i.e., manufacturing and non-manufacturing, as a moderator. Of the four moderating relationships, we found support for two hypotheses, and we did not find empirical evidence for the other two. The study found that uncertainty, earlier supplier involvement, supplier performance, and partnership quality significantly affect buyers' dependence.

Limitations and Future Research

The study has focused on selected manufacturing and non-manufacturing concerns of Karachi. This finding cannot be generalized unless researchers collect the samples from the major cities of Pakistan. This study has examined the moderating effect of firm category on suppliers' dependence. We suggest a comparative study between the service sector and the non-service sector which will bring more insight to the issue. Similarly, comparative studies between different cities in Pakistan may also help understand the issues related to the supply chain. Perception of age, experience, and gender may vary, which we did not consider. Future studies can use the demographic factors as control variables.

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