ABSTRACT

This paper attempts to do a comprehensive research about public-private partnership (PPP) implementation through a two-round Delphi survey, conducted among experienced practitioners. The study is done to identify the preferred risk allocation in China's PPP projects. The results portray that the public sector takes the sole responsibility for the risk "Expropriation and nationalization", taking the majority of responsibility for 12 other risks related to government or government officials and their actions. Risks which neither the public nor private sector may be able to deal with are preferred to be shared equally. The private sector majorly takes responsibility for 10 risks present at the project level.

Keywords: Public-private partnership, Risk management, Allocation of risk, China’s projects

1. Introduction

The aspects related to PPC or the Public–Private-Partnership is a kind of procurement, identified in an effective manner for delivering services based on value-for-money infrastructure/services/norms. It looks forward for the amalgamation of competitive advantage and flexible mode of negotiation, as well in terms of allocating risk over agreed concern related to public as well as private sectors (Li et al., 2005). As the process of transparent procurement gets noted as complex for the PPP projects’ success (Jefferies et al., 2002), the core concern here is about the significance of risk allocation that gets communicated comprehensively among the parties. Thus, this remains important for public clients as well as bidder from private sectors in terms of evaluating potential risks in the entire project life. Private and public sectors need to emphasise specialised attention towards the process of procurement, as the negotiation stays against PPP in order to assure allocation of fair risk among them.

In past years, a notable increasing in PPP market for the purpose of developing as well as infrastructural operation projects in China. There is the fast-pace in the market-oriented mode of transformation under planned China's economy, whereby a
delicate balance is noted among the capacity of private sector, government regulators and public-satisfaction. The basic objective of this paper is to develop the instance of scheme of equitable risk allocation for delivering PPP projects in the China's market. The derivations from practice as well as research based on management of risk PPP projects of China and management research offering valued data about the international companies that are keen to invest in the sector of infrastructure and construction in China.

2. Secondary Data Sources

Risk remains inherent as well as hard to deal and demands for appropriate kind management structure theoretically as well as empirically.

Thus, specialised attention has been led over research related to the allocation of risk for the PPP projects. Procurement of government led PPP project are subject to prefer the risks related to the project that are liable to get shared; assess the private investors as well as their capability of taking respective risks, as well as propose price for bidding. Negotiation of contract laid emphasis on scheme of sharing risk. The every general principle is about the allocation of risk to the best party that can manage and can accomplish the project within least possible cost (Cooper et al., 2005). There is the optimum allocation of risk that is not liable to pass all kinds of risks from private sector, yet can seek necessary solution for the minimization of total public management costs and private sectors.

Unfortunately, this is very sensible matter and is subject to cause contrasting outcomes in the process of allocating risk. At times, there is the thread of partnership, from where risk emanates and the same is liable for the best controlled domain, yet might not be able to control risk in the best efficient way, along with lowest possible cost (Medda, 2007).

Survey based on questionnaire has been noted as commonest tool for research for the attainment of scheme for sharing risk. As for example, Li et al. (2005) came up with a preferred scheme for the allocation of risk to deal with PPP projects in the UK as per survey based opinion of 53 selected sampled responses: Roumboutsos and Anagnostopoulos (2008) led similar
questionnaire based survey in Greece and derivations are compared with the UK; Jin and Doloi (2008) collected data from industry-based survey towards the testing of theoretical structure in the process of comprehending PPP projects’ practice. Another kind of technique is the Case Study approach that assists in exploring scheme with suitable allocation of risk for PPP projects. As for example, Abednego and Ogunlana (2006) initiated research based on case study over a toll-mode of project in case of Indonesia to demonstrate a determined means and attain right allocation of risk under PPP tollway mode of projects. In the same way, Ng and Loosemore (2007) initiated a research by allocating through case study related to railway project in Sydney. In some of the current researchers, there is the process of adopting very complex, complicated and vigorous kinds of allocation of risk, like game theory (Medda, 2007), etc., rather than qualitative analyses as implied in former research work.

Still, the author has best possible knowledge with little effort that gets committed towards systematic identification as well as management of risks based on PPP projects in China, like the one as reported by international construction management journals. Capitalizing China's PPP experience as per government initiations in last 10 years, there are many efforts led towards the development of investment environment, that is comprised of international contractual practices as well as equitable scheme for risk-sharing (Wang and Ke, 2008; Chen and Doloi, 2008). This research is about the allocation of risk as well as management of China's PPP projects.

3. Research methodology

3.1. Identifying risk factors

Literature review from desktop and telephone interviews are initiated for the collection of data from 16 numbers of China's PPP projects. The derivations showed, 13 principal risks that can cause failures of identified cases. Determined analyses of such risks are basically about the political risks that are related to the legislative changes, approval of project, political opposition, worth the credit and
reliability of China’s entities, etc. (Table 1).

There is another research that is based on survey based on empirical questionnaire about the features of PPP as well as management of risk management in mainland China and Special Administrative Region of Hong Kong. This has been led by the authors since October 2007 to December 2007. This research is based on comparative analysis in perceiving risks meant for different respondents’ group. Research derived from the secondary sources gets compared against industrial practitioners, along with those from mainland China’s, compared with respondents from Hong Kong. Derivation specified some risks, whereby different respondent groups shared different kinds of point of views about the relative importance. Such risks are inclusive of project approval along with norms for permit, notable intervention of government, inflation, poor political decisions, oppositions in public and politics, etc. such risks remain prominent with specified interest; thus are inclusive of further analysis.

Moreover, there are the comparative analysis related to diversified schemes meant to allocate risk in Lam et al. (2007), Ng and Loosemore (2007), Li et al. (2005), Arndt (1998), Wang and Tiong (2000), Victorian Department of Treasury and Finance (2001) and National Treasury of South Africa (2004) as in Table 2. Though respective analysis might not appear meaningful because of diversified definitions for the risk

As well as different list of risk, observation that can lead to equitable allocation of risk which is highly connected to the unique social, legal, economic status of the country. Conclusively, the approach reinforces the objectives related to this research. Factors related to the risk factors remain allocated towards diversified sectors as noted in Table 2 as enlisted in this research. 89 on the basis of the secondary sources collected from desktop literature review, surveys through telephone, 34 potential risks get enlisted for the identification of risks and are noted in Table 3.

This list of risks comprised of three parts. These are: (1) principal risks from past
projects; (2) risks related to different respondents groups (academics vs. Practitioners from industrial sectors, mainland China's vs. Respondents from Hong Kong) sharing different point of views about the relative importance as well as allocation of preferences from former relative survey; and (3) risks with different allocations for current allocation of foreign risk schemes. This list assists in exploring PPP participants’ perceptions for allocation of risk for China's construction projects. Derivations are presented in the current paper.

3.2. Delphi survey

A Delphi survey of two-rounds was conducted in mainland China are noted since December 2008 to February 2009 in order to analyze risks allocations related to China's PPP projects.

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As the data demand for in-depth analysis as well as experience with the PPP projects
risks, being purposive being adopted towards the selection of expert groups who can satisfy a minimal of following criteria (Chan et al., 2001):

- Criterion 1: Having extensive mode of working PPP experience projects in China.
- Criterion 2: Having direct and recent participation of risk management scheme for China's PPP projects.
- Criterion 3: Having enough knowledge as well as understanding of PPP risks.

A total of 203 academics are selected and invited to be a part of this research. In the process of Delphi questionnaire survey, the foremost round was about invitation letters that were sent to the selected experts. In the letter, the research purpose has been explained and the participants are further informed about questionnaire two rounds. Risk related definition is noted in Table 3 that was shared with the participants in the beginning of the questionnaire rounds. The approach is to assure the understanding of such risks and the requests are made about the allocation of illustrated risk to public/private sector, or rather illustrate ‘shared’ approach among public as well as private sectors, as per five-point Likert scale (where 1 is for Government takes sole responsibility, 2 is for Government takes the majority of responsibility, 3 is for Both parties take equal responsibility, 4 is for Private sector takes the majority of responsibility, and 5 is for Private sector takes sole responsibility).

The research attained 47 numbers of completed questionnaires from first round Delphi survey that represented 23% rate of response. As per comments of the respondents, there are three determined risk factors are comprised in second round of survey, which are- “Private investor change”, “Subjective evaluation”, and “Insufficient financial audit”, along with the original list.

To initiate the second round of survey, the experts are offered with feedbacks from first round. Average scores for every risk related item, frequency of every option is as per five-point scale, and scores of the respondents from first round are declared. Respondents are asked about the process of re-assessment of scores related to average values, along with requested
aspects with explanations made over risk factors as noted importantly for different opinions towards experts. 46 numbers of completed questionnaires are received from the second round that is subject to represent highly favourable as well as successive 98% rate over survey of first round survey. Data attained from the respondents are in Table 4.

### 3.3. Tools for data analysis

Collection of data attained from current questionnaire survey has been analyzed by means of mean-score noted within different groups that get categorized as per primary roles led by respondents.
Five-point Likert scale gets illustrated as the way to calculate mean score related to
every risk that gets used for the determination of respective allocation. These attained results created the scope to cross-compare risks allocation preferences towards respondents having instance without hands-on PPP experience through independent 2-sample t-test.

Kendall’s concordance (that is W) analysis has been initiated for the measurement of agreement related to the different respondents over respective ratings meant for allocation of risk as per mean values in specified group. Siegel and Castellan (1988), stated W as the best possible instance as various attributions remain
lesser than or otherwise equal to 7. In case of various attributions being greater than 7, the relevant chi-square gets implied as closest approximation. Critical value attained from chi-square is attained by referring critical value table meant for of chi-square distribution that is also available in Siegel and Castellan (1988).

Agreement among two groups of respondents (with as well as without hands over PPP experience) as per risk ratings get assessed by Spearman rank correlation coefficient (or the rs). Moreover, in case the rs value crosses critical value at the level of 0.05, the same gets asserted about the relationship among two diversified groups of respondents. Critical rs values are in appendix tables for Siegel and Castellan (1988).

4. Survey Results: Discussion

The results are based on the statistically derived descriptive analysis carried out using the Statistical Package for Social Sciences (or the SPSS). The feedback on the survey is about preferred allocation of risk as in Table 5.

4.1. Agreement among respondents over PPP experienced and inexperienced

In accordance to the declarations made in Table 4, some respondents are without enough PPP experience (yet interested to invest) are part of Delphi survey. Closer look shows 36 degrees of freedom, where the Chi-square critical value was 50.998 at
level of 0.05. In terms of values from computed Chi-square, the allocation (497.365 ‘with PPP experience’ and 389.355 ‘without PPP experience’) gets critical Chi-square value.

Thus, respondents for the allocation assessments remain consistent. The correlation coefficient for rankings over allocation was 0.970 that is greater than critical value of estimated 0.275 at level 0.05. as a result, there remains no determined disagreement over the PPP experiences of the respondents as well as inexperienced respondents. The derivations assure completed questionnaires being valid for more analyses.

Moreover, independent 2-sample t-test examined significant mean value difference among two groups of respondents with each comprising 37 risks. T-test results attained for allocation of 37 risks, led to no risk below level of 0.05 (as in Table 5). It further reinforces former assertion related to higher extension of agreement that remains valid among two rating sets, permitting two data sets for obvious larger sample size.

4.2. Preferences for Allocation of Risk

In reference to all the respondents, computed Chi-square value is about the allocation of 873.609 that remain more than critical Chi-square value of 50.998 at freedom degree of 36 at level of 0.05. Thus, assessment attained from respondents over risk allocation remains consistent for more analysis. Preferred allocation of risk options are participant’s mean values Five categories for the allocation of risk are as per “half-adjusting” principle. These are - .

(1) Risks (mean score < 1.5) solely allocated to public sector;
(2) risks (mean score >/= 1.5 and < 2.5) mostly allocated to public sector;
(3) risks (mean score >/=to 2.5 and <3.5) equally shared by both the parties;
(4) risks (mean score >/= 3.5 and < 4.5) mostly allocated to private sector; and
(5) risks (mean score >/= 4.5) solely allocated to private sector.
However, there is no risk in the category that is solely allocated to private sector as in Table 5. Thus, respondents can still believe private investors to encounter diversified problems by government/government officers. According both experts and project managers in the PPPs, reliability is on investment environment under legal as well as banking systems, without any mature project, models or practices. In contrast to this PPP remains as an interdisciplinary approach needed for all participants with enough comprehensive knowledge that lack in China (Sachs et al., 2007). Moreover, central government as well as local governments of China lack necessary experience and are not matured with policies and laws (Wang et al., 2000; Wang, 2002; Ho, 2006). This can cause various problems while executing PPP projects in China. Thus, respondents consider private sector without the capability to take sole responsibility. However, reasons are there for respondents collected from survey sample.

4.2.1. Risks allocated solely to public sector

The risk noted as “Expropriation and nationalization” with mean value of 1.28 (Table 5) is just solely allocated to public sector and remains obviously meant for the country level risk as per categories (Hastak and Shaked, 2000).
High tariff assigned for users, with huge profits for investor, or wrong decision taken by government over PPP project can lead to great social and political pressures. Thus, the government can be terminated for concession and can further take over private firms’ facility without any reasonable compensation (Sachs et al., 2007). In case of private partner, there is hardly any scope for such deal caused by nationalization and expropriation. So, it has been recommended that agreement for concession must offer warranties, liabilities, indemnities and mechanical compensation for early contact termination (Efficiency Unit, 2008).
4.2.2. Risks mostly allocated to public sector

Twelve risks are subject to get mostly allocated towards public sector are in Table 5 as: “Government’s intervention”, “Government’s reliability”, “Land acquisition”, “Tax regulation changes”, “Approval and permit”, “Corruption”, “Supporting facilities risk”, “Poor political decision making”, “Change in law”, “Competition(Exclusive right)”, “Uncompetitive tender”, and “Immature juristic system”. The derivations show that risks follow same features as they get related to government/government officers.

By closer observations on these risks, necessary divisions can be initiated under 3 subcategories-

i. risks at country level towards legal system;

ii. risks at country level towards some specific officers of government; and

iii. risks at project level.

Five determined risks are, “Change in law”, “Uncompetitive tender”, “Tax regulation changes”, “Approval and permit”, and “Immature juristic system” can be counted at the country level related to China's legal system. Apart from some local governments’, regulations by ministries’ towards PPP, as Beijing and Ministry for Housing and Urban–Rural Development’s (Ministry of Construction) policies, without national China's PPP law (Ho, 2006). Tendering process related to various China's PPP projects as well as tendering documents being varied from one project to another and from one province to another without transparent/standardized models (Sachs et al., 2007). Thus, this remains hard for private investors, particularly foreign investors to adapt and study different kinds of regulations under diversified kinds of regulations with wider geographical distribution in China. Thus, for those planning to set infrastructural construction, it is highly recommended to hire professional mode of legal consultant towards the mode of handling legal affairs. Moreover, risks related to this category can remain at a probable cause for macro control as well.
as intervention over investment and the market from central government. Thus, the same is essential towards the avoidance of contravening policies of central government, long term goals/interest of public as negotiation is made local governments (Wang et al., 2000; Wang and Ke, 2008).

These kinds of risks can be covered under the concession agreement as:

(1) In case of important change, law prevents Project Company by means of fulfilling obligations, whereby the Project Company gets entitled towards the receipt of corresponding payments and remain irrespective of supply service inability;

(2) Project Company is liable to restore same economic position that is in relevance to the change within results of law with costs towards Project Company over as well as more over agreed threshold;

(3) Change noted in law provision remain applicable in terms of any law change after Bid Submission Date with changes within tax regulations, etc. (Wang et al., 1999, 2000).

In respect to second category country level in connection to government officers comprises of four risks: “Poor political decision-making”, “Government’s intervention”, “Government’s reliability” and “Corruption”. China's local governments might make wrong decisions, like offering too many guarantees towards the investors or remain lack of accurate predictions for the project oriented demand, as their limited number of experience as well as knowledge related to PPP or otherwise considering career achievement or the note of short-term goals meant for the personal interests (Wang et al., 2000; Wang, 2002). Unrealistic/unreasonable kinds of guarantees as well as supports led by China's local governments are structured towards higher cost related to local governments in terms of fulfilling the contracts, leading to default payments by respective local governments (particularly in the time of change at the time of office terms expiration as well as changes in the key officers).
The wrong decisions from the end of local governments can lead to complaints from public and can lead to key officials relevantly stepping down (Sachs et al., 2007; Ho, 2006). Thus, in case of private investors, creditworthiness risks are related to local governments (Wang et al., 2000), and are in need of assessment liability meant by decisions of government officials, particularly verbal promises. Thus, for the private sector, there is the possibility to strive cooperation of the governments, but the same might remain substantial in terms of increasing cost for these cooperation as well as assistance led by corruption by some officers of local government (Wang, 2002). With money, the respective project companies need to spend enough time as well as effort in terms of dealing with government relations that can even have some negative influence over efficiency level of management and operation of the companies and their profits (Ho, 2006).

Principle of strategic management is about the demand meant to attain strong support from central government to underpin local government’s obligations under respective project (Wang et al., 1999, 2000).

Rest of the risks “Competition (or Exclusive right)”, “Supporting facilities risk” and “Land acquisition” are of third category of target project and usually initiated by the public sector for the government support and incentives. In reference to Guangxi Laibin B Power Project (Wang and Ke, 2009), responsibility of Guangxi Government is noted as following in the span of construction:

(1) Delivery of site as well as completion of basic contract works along with access road;

(2) Coordination as well as facilities meant for all dealings, added by appropriate Government Authorities in the time of construction;

(3) Obtaining in ontime manner, and maintaining, approvals as needed for the purpose of construction that is possible by Guangxi Government;

(4) Offering Project Company added by transmission line along with offering of start-up electricity, all fuel and steam for testing.
Risks noted as “Land acquisition” and “Supporting facilities risk” are thus allocated towards Guangxi Government as above. Support of the government are further offered in order to assure different competitive projects that is liable to approve in a way that market volume will never undermined by other projects.

4.2.3. Risks equally shared by both the parties

14 risks are shared equally in the risk category. 4 of the risks must be shared equally by both the parties (“Public or Political opposition”, “conditions of ground or weather”, “Force majeure” and the “Environmental protection”) at country level. These four risks are related factors are like public sectors and private sectors that might not be able to deal with. Thus, shared approach is subject to appear as the best option (Li et al., 2005). The recognitions are made by severity, yet low probability of occurrence. “Force majeure” risk gets commonly covered through insurance policies.

For the risk “Public or Political opposition”, it is necessary for the private invest to have enough assessments about the project that is against long term aims of central government or public interests as the same is liable to submit tender document (Wang and Ke, 2008). In case the invitation is made over bidding that is related to environment standards for respective project, added by measurements for protecting environment through private sector that is liable to changes as needed for rational compensation. In the time of construction, historical, archaeological and geological objects can be derived or there can be other weather or ground level conditions that can be met as in rainstorm or in case of earthquake. In such kind of instance, all costs are increasing or any are delaying effects over the schedule of the project led by risks that need to get compensated by apt extension related to period of construction or concession period or preference for both.

Four risks are –“Interest rate”, “Foreign exchange and convertibility”, “Inflation” and “Market demand change” can be catergorised as per risk level that get preferably shared with both the parties in an equal manner. The cause behind this is about both partners not being able to handle the same in an apt manner. An
experience is about sharing these risks is about setting up threshold in relation with higher or lower changes in the revenue by events of risk. Considering Laibin B project, as for instance, will exemplify the matter better (Wang and Ke, 2009) and the portion of US$ portion for operating tariff will get adjusted in due course of time as per variations in US$ – RMB rate of exchange noted beyond some threshold (of 5%), which is offered in Power Purchase Agreement. Thus, as exemplified, the Project Company is subject to bore risk related consequence through risk event related to rate of foreign exchange below 5%, whereas local government is considering risk as the foreign exchange rate remains more than 5%. In the same way, relevant solutions can be attained from other three risks. To exemplify, many ways can be noted to cope with risk demand. It can directly be connected by guaranteeing minimum buying price of project output, or aspects that are indirectly noted for making adjustments in tariff with demand, or in collaboration (Ye and Tiong, 2003). In adjusting tariff, the determined mechanism is noted as per demand, where the price increases as per reduction in demand, which is beyond agreed threshold, or vice versa for increased demand. Still, at times government never request for the reduction of price, in case there is an increase in market volume to motivate private partner for the development of service quality.

Other levels of project risks meant for sharing are: “Third party reliability”, “Improper contracts”, “Tariff change”, “Payment risk”, “Subjective evaluation” and “Insufficient financial audit”. Reliability from the third party for risk normally appears in the construction/operation phase of PPP project, that remain out of control for both parties, as the government and Project Company meets an agreement over allocation of risk added by definition under concession contract (Li et al., 2005). Thus, the respondents are supposed to share equally among private and public partners. These are of significant importance for government and determined private investors who are liable to make decisions related to investment as per reliable feasibility researches. Still, there are cases, whereby the private investors, foreign
investors in particular who would never stand familiar to local governments as well as off-take capability, added by China’s business environments. They are intend to meet agreements easily with promises made by government, particularly as the government is in need of fund, whereas the investors need projects (Wang, 2002). Thus, “Improper contracts”, “Tariff change”, “Payment risk” and “Subjective evaluation” is obvious to occur.

As feasible researches as well as negotiated contract are for both the parties, it is best that the private as well as public sectors, share risks’ responsibility. Though financial audit is about obligation in public sector for supervising performance of the project, there are intrinsic reasons meant for financial hassles in the private sector. Thus, reasonable aspects for private partner are subject to share risk.

4.2.4. Risks mostly allocated to private sector

The results attained from the survey (Table 5) that is marked by 10 risks of 37 risks that are mostly allocated towards private sector.

These selected risks are: “Financial risk”, “Construction completion”, “Construction/operation changes”, “Delay in Supply”, “Technology risk”, “Operation cost overrun”, “Residual assets risk”, “Consortium inability”, “Organization and coordination risk” and “Private investor change”, that are part of risks in the project level. As a result, there is the aspect that coincide survey over traditional procurement of the contract in Hong Kong, where contractors are assigned 20% risk items (Ahmed et al., 1999). However, the same remains in contrast to survey of allocation of risk in PPP construction projects under the UK that has 32 risks of 46 (and are representing 70% of catalogued risks). These are allocated towards private sector (Li et al., 2005). Eventually, it suggests PPP procurement related to China’s construction projects that are not yet there to attain objective related to risk transfer from public sector towards private sector like the UK.

Risks are noted as “Consortium inability” and “Private investor change” that remain relative towards private consortium, added
by aspects as suggested being in private sector. The definition is for “PPP” as noted by Efficiency Unit (2008), Hong Kong, is towards private and public sectors with complementary skills related to PPP project for offering public services efficiently. Thus, basic principle is commercial for private investors, which is not appropriate towards the mode of investing in infrastructure development, in case the same are relatively less efficient in terms of construction/operation rather than public sector.

As the government fund appears to be short, it stands as a major driving force towards public sector in order to promote PPP related implementation. Thus, private partner are liable to remain responsible towards the availability of various financial resources. Still, there are cases like urban railway projects that are expected low fare income, assistance from government, like minimum mode of return guarantee, need to get the demand of making private sector eligible to find lenders in terms of financial market.

According to the previous comparative analysis of different allocation of risk schemes, most construction and operation risks are assigned to the private partner. The results in Table 5 reinforce determined statement. it is the responsibility of the private sector to undertake majority of instances for “Construction/operation changes”, “Construction completion”, “Delay in Supply”, “Technology risk”, “Operation cost overrun”, as well as “Residual assets risk”.

As per former derivations attained from research led by Li et al. (2005), “Organization and coordination risk” is connected to the day-to-day demands of project.

As the operation and construction responsibilities remain with private sector within the domain of PPP procurement, allocation remains apt.

5. Conclusions

This paper is about the preferences of allocation of risks in China's PPP projects. The identified allocation of risk is subject to assist the public as well as private sectors in order to attain relevant balance in the sharing of responsibilities as well as risks and the same remain liable to reduce
cost and time as per contract negotiation. The derived analyses, showed that only 1 of 37 risks (“Expropriation and nationalization”) remain solely allocated towards public sector. 12 risks are subject to remain allocated towards public sector get noted in relation with both government and officers of government. 14 risks are noted to remain equally shared under the category of risk. These risk factors remain hard for both private and public sectors in order to deal alone. Private sector is subject to consider majority of the responsibilities towards remaining 10 risks that are part of level risks. Interestingly, there is no risk related to the category that needs to remain solely allocated towards private sector. Thus, another observation that can be initiated by PPP procurement towards China’s construction projects not for the attainment aims of full transfer of risk from public sector towards private sector, like the UK. There are causes related to these preferences of allocation as well as recommendations over commercial principles or otherwise contract among the government and the private consortium are part of this research paper.

References


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