RISK ASSIGNMENT PATTERNS OF SMALL SUBCONTRACTING FIRMS IN THE NIGERIAN CONSTRUCTION INDUSTRY

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Abstract

This paper is concerned with the appraising the patterns of risk assignment in construction works undertaken by small subcontracting firms. The aim of this study was to establish the prioritization of risks by small construction subcontracting firms, by (i) determining which risks were identified and assigned in construction contracts handled by SMEs, (ii) ranking the assigned risks based on their frequencies. The scope of the study covered completed or ongoing public and private sector construction projects within the F.C.T. Abuja and Niger State. Information realised from an extensive literature survey was filtered and modified to derive 29 risk events, which formed the basis of the survey questionnaire employed by the study. The findings of the study revealed that in about 54% of subcontracts, between 11 and 20 risk events were identified and assigned between the contract parties. This was below the number of risk events assigned under common construction contracts such as that of the Joint Contracts Tribunal (JCT). Sixty-eight percent (68%) of all identified risk events were assigned to the subcontractor. The top five risk events that were most frequently identified and assigned in construction subcontracts were all potential events that lay outside the influence of the subcontractors. The study recommended that on very small and simple jobs, the risk events to be covered by subcontracts could be limited to the 10 events presented in this paper. Special notice should be taken of (i) Inflation, (ii) Poor quality of procured material, because these risks were the least likely risks to be assigned.

Keywords: Assignment, Construction, Risk, SME, Subcontracting

Introduction

Risk in construction has different meanings and interpretations. Hertz and Thomas (1983) regarded risk is uncertainty and the result of uncertainty. Any exposure to the possibility of loss or damage to people, property or other interest has also been considered as risk. Risk as a concept varies according to viewpoint, attitudes and experience; engineers and contractors view risk from the technological

perspective; lenders and developers tend to lean more to the economic and financial side; health professionals, environmentalists, chemical engineers take a safety and environmental perspective. Risk is therefore generally seen as an abstract concept whose measurement is very difficult.

The Nigerian construction industry consists of a few very large multinational companies and a multitude of companies that run the gauntlet from very small to fairly big in size. Most of the subcontracting firms fall into the category of very small to small firms. Small and Medium Enterprises (SMEs) in Nigeria are defined as any enterprise with a maximum asset base of N1.5 billion (excluding land and working capital), and with no lower or upper limit of staff (Central Bank of Nigeria 2009). While the activities of large firms impact significantly on the industry's financial turnover, income redistribution and construction innovation on a wide scale is carried out by SMEs. Problems that affect the SMEs in the industry are thus important, and worthy of research.

Risk assignment may be defined as the process of identifying project risks and determining how they may be realistically shared by all of the parties in a construction project. Assignment of construction risks to the construction parties through proper contractual arrangements has a significant impact on the total construction costs paid by owners, according to the Association of General Contractors of America and American Council of Engineering Companies, (2007). Construction projects usually strive to meet targets established for cost effectiveness, time efficiency and performance quality; the most important risks in construction are those that prevent attainment of these targets. Construction projects are complex in nature and have many inherent uncertainties arising from the diversity of resources and activities they require to bring them to fruition; this is the origin of construction risk.

Finding workable solutions to the 'fundamental, serious, complex, and pressing structural problems' of the Nigerian construction industry (Ofori, 1993) will require detailed research into the ways and manner that SMEs are involved in construction. Risk assignment has become an important part of construction in recent years, and how it operates in SMEs will have an impact on the performance of the construction industry. This will be due in part to the ubiquitous nature of subcontractors, who are found on almost all projects. The study of risk assignment in subcontracting firms is also necessary in order to reduce extreme problems of the industry such as project abandonment.

The research problem addressed in this paper is how risk assignment is resolved in construction SMEs. The aim of this paper was to establish the prioritization of risks by small construction subcontracting firms. Specifically, the paper focused on (i) determining which risks were identified and assigned in construction contracts handled by SMEs, (ii) ranking the assigned risks based on their frequencies. The scope of the study covered the sampling of completed or ongoing public and private sector construction projects within the study area, which included the F.C.T. Abuja and Niger State. The study did not take into account the type of construction, ownership of the

project, methods of finance, or the specific location of the projects. Data employed in this study was limited to that collected using the research instrument (questionnaire) only.

Risk is a multi-faceted concept within the context of construction industry. A lack of predictability about outcome or consequences in a decision or planning situation (Hertz and Thomas, 1983), the uncertainty associated with estimates of outcomes there is a chance that results could be better than expected as well as worse than expected or the likelihood of occurrence of an event during the construction process to the detriment of the project (Faber, 1979) are all referred to as risk. In this research the more general and broad definition of risk as presented by Faber (1979) has been adopted. In addition to the different definitions of risk, risk may be categorized in various ways for different purposes. Examples are external risks and internal risks as a category, while political risk, financial risk, market risk, intellectual property risk, social risk, safety risk comprise another, more detailed category (Songer, Diekmann, and Pecsok 1997).

Risk typology is the study or systematic classification of types of risk. The typology of the risks appears to depend mainly upon whether the project is local (domestic) or international, (Flanagan and Norman, 1993). It is possible to classify all risks specific to construction into three broad levels, (country, market and project levels) as done by Hastak and Shaked (2000). They viewed country level risks as a function of the political and macroeconomic stability of the country in which the project will be executed. Construction market level risks included technological advantage over local competitors, complexity of regulatory processes, and attitude of local and foreign governments towards the construction industry. Project level risks are specific to construction sites and include logistic constraints, improper design, site safety, improper quality control and environmental protection, etc (Thobani, 1999).

Risk Assessment and Classification in Construction

The assessment and classification of risks follows many approaches in the literature. In Perry and Hayes (1985), an extensive list of factors was assembled from several sources, and classified in terms of risks retainable by contractors, consultants and clients. Cooper and Chapman (1987) employed two major groupings of risks associated with construction according to their nature and magnitude (primary and secondary risks). Tah, Thorpe and McCaffer (1993) used a risk-breakdown structure to classify risks according to their origin and to the location of their impact in the project. Wirba, Tah and Howes (1996) adopted a synergistic combination of the approaches of Tah et al. and Cooper and Chapman. Tah et al.'s approach was used to classify all risks exhaustively and then Cooper and Chapman's method was used to segregate risks into primary and secondary risks.

Risk Management Approaches

Risk management in the construction industry consists of three main stages:

(a) risk identification; (b) risk analysis and evaluation; and (c) risk response. The first stage of the risk management process begins with the initial identification of the relevant and potential risks associated with the construction project. Risk analysis and evaluation generally concentrate on risks with high probabilities, high financial consequences or combinations thereof which yield a substantial financial impact. Contractors need to decide how to handle each risk through the formulation of suitable risk treatment strategies or mitigation measures. Within a framework of risk management, the main objective is to remove as much as possible its potential impact, (Perry and Haynes, 1985).

The management of risk in construction projects has been written on extensively. For example, Bajaj, Oluwoye, and Lenard (1997) found that the most frequently used method of risk identification is the top-down approach technique, where the project is analysed from an overall point of view. Baker, Ponniah, and Smith (1999) listed personal and corporate experience, engineering judgement, and brainstorming as effective ways for identifying new risks. Ramcharran (1998) identified the risks usually faced by the engineering/construction service providers in a foreign country, while Kalayjian (2000) identified further the risks that are specific to the developing countries.

Risk response or handling refers to the action taken to avoid risks, to reduce the probability of risks occurring, or to mitigate losses arising from risks. Risk response methods are classified into four categories; (i) risk avoidance, (ii) risk transfer, (iii) risk mitigation, and (iv) risk retention. Risk avoidance simply means avoiding some hidden risk through the adoption of some other alternative. For example, to avoid schedule delay due to rain, a contractor could adopt a construction method that will not be influenced by rain.

Risk transfer means the switching of risk responsibility between contracting parties in a project. Risk transfer can be classified into three types: -

(i) Risk transfer type 1 involves insurance: parts of the financial losses resulting from risk events are compensated by insurance companies.

(ii) Risk transfer type 2 involves subcontracting: the contractor will transfer parts of the risks to the subcontractor.

(iii) Risk transfer type 3 involves claims to the owner for financial losses or schedule delay resulting from risk events. Risk mitigation means reducing the probability of some potential risk occurring or reducing the expected losses due to the occurrence of such risks.

Risk mitigation can be classified into two types: -

(i) Risk mitigation type 1 is to reduce the probability that a risk event would happen.

(ii) Risk mitigation type 2 is to reduce the attendant schedule delay or financial losses when a risk event happens.

Risk retention involves absorbing the impact of the risk event, and is of two types: -

(i) Unplanned risk retention, where no action is taken for some risk whether known or unknown, and

(ii) planned risk retention, where after cautious evaluation, it was decided to take no action for some risk.

Project Risk Management through Risk Assignment

Contractors often have to bear most of the construction risks, including those over which they have little control (Baloia & Price 2003). This is most commonly observed in developing countries. Traditionally, contractors have used high mark-ups to cover construction risks, but as their margins have become smaller, mostly due to competition, this approach is no longer effective. In the past twenty years, innovations in contracting within the construction industry have resulted in significant changes. Such changes have particularly been most noticeable in procurement methods; clients now tend to allocate greater risks to contractors.

Evidence from the literature reveals that there is a gap between the existing risk management techniques and their practical application by construction contractors (Perry & Hayes, 1985; Flanagan & Norman, 1993). This makes the study of risk assignment an even more pressing and urgent subject of research in developing countries such as Nigeria. The dominant reason behind the adoption of risk assignment by clients is to improve the cost performance of construction projects. Poor cost performance in construction projects were traced to price fluctuations, fraudulent practices and 'kickbacks' in Nigeria by Okpala and Aniekwu (1988). Further research by Jahren and Ashe (1990); Elinwa and Buba, (1993) found similar variables as the most influencing factors of project cost overruns.

Threats to the timely completion of construction projects on budget usually arise from the (i) uncertainty about objectives and priorities (Kelly & Male, 1993); (ii) uncertainty about fundamental relationships between project parties, (Ward, 1999); (iii) uncertainty about the basis of estimates, (Project Management Institute, 2000); and (iv) variability associated with estimates, (Ward & Chapman, 2003). In this regard risk assignment has been used to reduce or neutralise potential threats.

At times, the interpretations of risk assignment implied by standard contract clauses may differ between contracting parties. Before the contract is awarded, owners already allocate project risks through contract clauses in projects; such advance allocation of risk is typically not within the sphere of influence of contractors or subcontractors. Under such risk allocation by owners, only parts of the risks are actually distributed by the contract, while other risks are appointed simply through common practice, (Wang, 1994).

Research Methodology

The research instrument of this paper was a questionnaire titled 'Risk Assignment Patterns of Construction Subcontractors'. This was based on information on potential problems in construction projects (called risk events) which were gleaned principally from Healy, (1981); Perry and Hayes, (1985); Shen et al, (2001) and Shen et al, (2004). Twenty-nine risk events were included in the questionnaire, which consisted of two parts. Part 1 sought information on professional and educational profiles of respondents. Part 2 was on the risks identified and assigned on the construction project currently being handled by the respondents.

The research required primary data, which was sourced directly from subcontractors within the study area, through a purposive sampling procedure. This was a non-probability sampling technique in which samples were purposely selected because of the following: -

(i) their relevance to the investigation, and

(ii) suitable research subjects were few, and efforts had to be made to reach as many as possible.

One hundred questionnaires were distributed to senior management staff of identified subcontracting firms in the following proportion: -

1. 70 questionnaires in Abuja,
2. 10 questionnaires in Minna,
3. 10 questionnaires in Bida and
4. 10 questionnaires in New Bussa.

Seventy-one questionnaires were successfully retrieved; ten questionnaires had to be rejected on the grounds of incompleteness. The number of correctly completed questionnaires used for the study was thus 61, representing a response rate of 61%. Considering the fact that the work of Wang, Dulaimi and Aguria (2004) was based on a 7.75% response rate, a 61% response rate was considered realistic and reasonable for this paper.

Results and Findings

Demographic Profile of the Research Sample

The subcontracting firms sampled by this study ranged from very small firms to quite large firms. The size of the firms was inferred from the value of the last (or current) job handled by the firms. There was a preponderance of larger firms, able to handle projects between N20 million and N40 million (38%). Very small firms that handled projects below N1 million constituted only 3% of the sample (Figure 1).

Of the 61 senior management staff of the SMEs who responded to this study, 50% had worked for between 6 and 10 years. 20% of the sample had worked for over 15 years. Fresh entrants into the construction industry made up 15%, while those with 3 to 6 years of experience made up 10% of the sample (Figure 2).

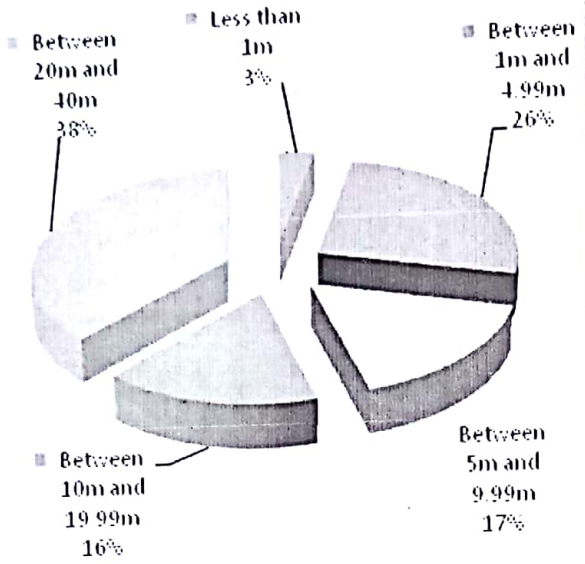

Figure 1: Estimated size of responding firms based on value of last (or current) project handled.

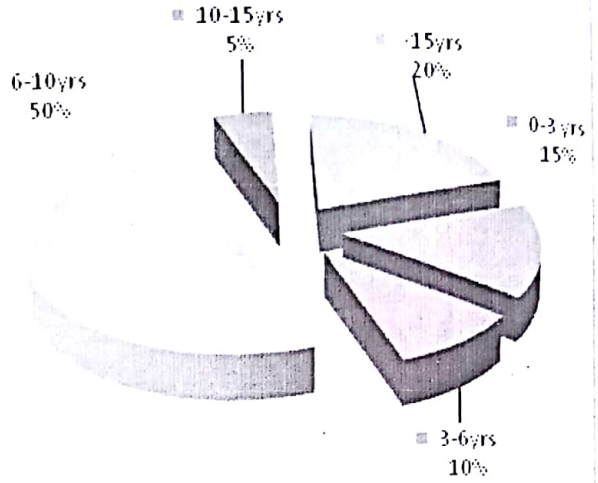

Figure 2: Length of working experience of respondents

Number of Assigned Risks in Construction Subcontracts

In 12% of the research sample, subcontracting firms had to contend with only a maximum of five risk events. The larger proportion, 44% of subcontracting firms, had 11 to 15 risk events assigned to the contract parties. Only 10% had between 15 and 20 risk events identified in their contracts (Figure 3). Overall, based on the responses received and analysed from 61 subcontracting firms, 68% of all identified risk events was assigned to the subcontractor. The client bore 32% of the identified risk. This is displayed in Figure 4 below.

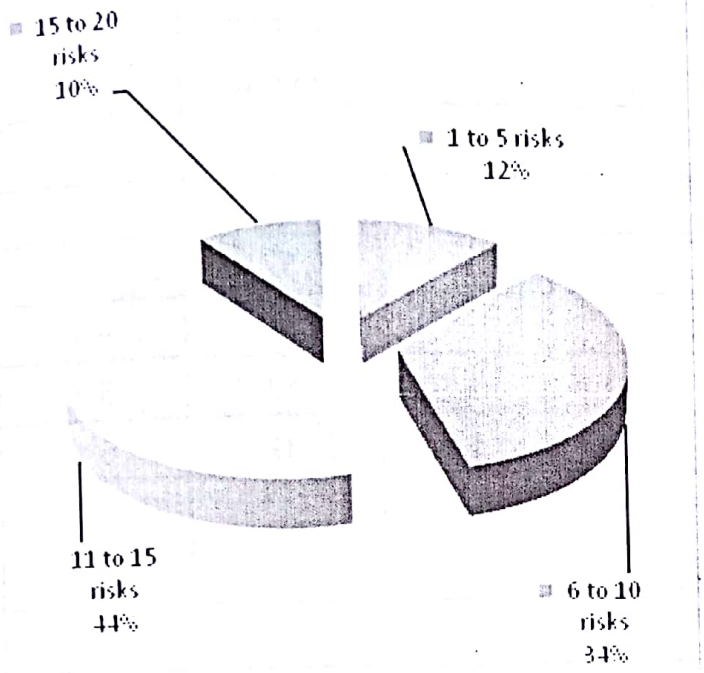

Figure 3: Proportions of risk events identified and assigned in contracts handled by subcontracting firms.

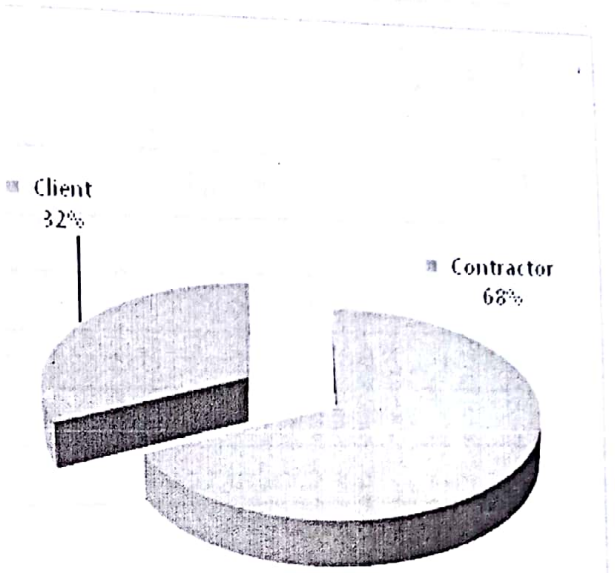

Figure 4: Proportion of risk events borne by subcontracting firms as construction contractors.

Types of Assigned Risks in Construction Subcontracts

The 29 potential risk events which were included as part of the research questionnaire were not divided into categories, since the research was interested in patterns of risk events which were assigned across the sample of small subcontracting firms, and not in the grouping of the risk events themselves. Ranking of risk events based on their frequency of inclusion in subcontracts facilitated the extraction of the top ten risk events that were most frequently identified and assigned in construction subcontracts entered into by subcontracting firms. These risk events were displayed below.

Table 1: Ranking of risk events based on frequency of inclusion in construction contracts

S/No	Risk	Frequency of risk event	Ranking of risk event
1	Delayed payments	46	1
2	Project delay	42	2
3	Design changes	37	3
4	Variations due to changes in the scope	35	4
5	Variations due to faulty design	33	5
6	Poor construction workmanship	31	6
7	Inadequate supply of relevant amenities on site (water, electricity, etc.)	31	6
9	Faults in tender documents	30	7
8	Accidents on site	30	7
10	Shortage of skillful workers	29	8
11	Inflation	27	9
12	Poor quality of procured materials	25	10
13	Loss due to interest rate	23	11
14	Force majeure	22	12
15	Loss due to bureaucracy for late approvals	22	12
16	Incompetent Nominated Subcontractors	22	12
17	Fluctuation	21	13
18	Increase in site overheads	21	13
19	Materials shortage	21	13
20	Cost increase due to changes of policies	18	14
21	Unavailability of skilful workers	14	15
22	Equipment failure	13	16
23	Improper selection of project location	12	17
24	Materials Unavailability	11	18
25	Loss incurred due to change in Government	9	19
26	Obsolescent of building equipment	9	19
27	Breach of contracts by participants	8	20
28	Equipment Inadequacy	8	20

Subcontractor Perception of Assigned Risks

It becomes evident that the five most frequently assigned risk events in construction contracts handled by subcontracting firms are all events outside the control of the subcontractor. The subcontractors interviewed opined that clients and main contractors should assume the burden of these risk events, as well as for 'faults in tender documents'. The rest six risk events they felt, ought to be borne by the subcontracting firms. One of these, 'inflation', is actually not within the control of the subcontracting firms.

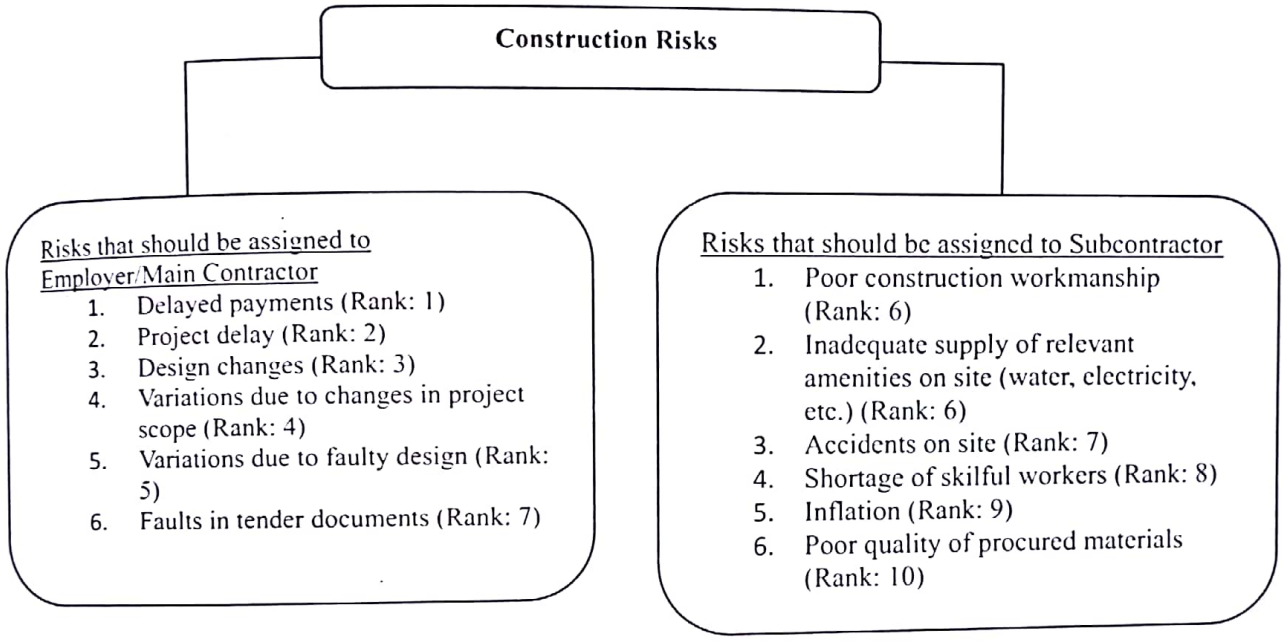

Fig. 5: Subcontractors' preferred distribution of risks

Implications of Findings

In about 54% of subcontracts, between 11 and 20 risk events were identified and assigned between the contract parties (Figure 3). This was below the number of risk events assigned under common construction contracts such as that of the Joint Contracts Tribunal (JCT). The fact that 68% of all identified risk events (Figure 4) was assigned to the subcontractor implied that subcontractors were expected to be fully in control of the jobs they were hired to perform. The judiciousness of the assignment of risk events was not included as part of the scope of this paper.

The top five risk events that were most frequently identified and assigned in construction subcontracts were all potential events that lay outside the influence of the subcontractors. This has implications for subcontract design in Nigeria.

Conclusion

This research paper concluded that the majority of subcontracting firms had to contend with between 10 and 20 risk events. In addition, based on the responses received and analysed from 61 subcontracting firms, 68% of all identified risk events was assigned to the contractor.

It was further concluded that all of the five most frequently assigned risk events in construction subcontracts consisted of events that lay outside the control of the subcontractor. The five top-ranked risk events were: (1) Delayed payments, (2) Project delay, (3) Design changes, (4) Variations due to changes in the scope, and (5) Variations due to faulty design.

Recommendations

Consequent upon the conclusions arrived at in the preceding section; the following recommendations were proffered as means of improving risk assignment practices involving construction subcontractors in the study area.

(i) Clients, project managers and main contractors could restrict the risks they include in contracts for construction to the twenty-nine risks that this paper covered. For very small and simple projects, the nature of which does not necessitate complex legal drafting of contracts, the risk events to be covered by subcontracts could be limited to the first 12 events (ranked 1 to 10, in **bold face** type) that were presented in Table 1 of this paper.

(ii) It was also recommended that special notice should be taken of the following risk events during risk assignment processes: (i) Inflation, (ii) Poor quality of procured materials. This might be necessary because these risks were the least likely risks to be assigned, going by the ranking developed by this study.

(iii) Special emphasis should be placed on the three top ranked risk events, because they have the potential of resulting in the extension of the planned project period (i.e. time overrun).

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