

## **Supply Chain Management Practices in Construction Procurement: Perceptions of Professional Quantity Surveyors in Ondo State, Nigeria**

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### **Abstract**

Using a questionnaire survey administered among fifty five professional quantity surveyors who are members of the Nigerian Institute of Quantity Surveyors, the research herein reported sought to elicit the awareness of quantity surveyors of supply chain management and its practices, the involvement of quantity surveyors in supply chain management as well as factors constraining the involvement of quantity surveyors in these activities. The data collected from the survey was analyzed using SPSS-embedded Mean Item Scoring and Involvement Index. The results shows that of the 55 quantity surveyors surveyed, 39 useful responses were received, thus representing a 71% return rate. The research reveals that the top three popular supply chain management activities are information dissemination (with mean item score of 4.05 and ranked 1 out of 13 activities), management leadership (with mean item score of 4.03 and ranked 2) and relationship development (ranked 3 with mean item score of 3.85). With regards to the involvement of quantity surveyors in supply chain management activities, relationship development has the highest involvement index of 58.5, while the effective use of management options has the least involvement index of 3.94. The study also reveals that inadequate infrastructure in information technology is perceived to be the most serious constraint to the involvement of quantity surveyors in supply chain management issues, while ignorance of buildability issues to be the least constraining factor. In generalizing the findings, the limited geographical scope and small population should be borne in mind.

### **1.0 Introduction**

In many parts of the world, the construction industry has been criticized for its less than satisfactory performance, its fragmentation and its adversarial orientation to procurement (Hoonakker, Carayon & Loushine, 2010 in Lin & Gibson 2011; O'Brien, 1999). Industry stakeholders have been called upon to jettison adversarial relationships for long term collaborative relationships (Cheung, 2011). With a characteristic high level of fragmentation, supply chain management is a fitting path for construction enterprises in creating value through the effective integration, coordination and management of the chain, from suppliers to clients; supply chain management adopts a holistic approach towards relationship management within and without the focal enterprise (Ahmed, Azhar & Ahmad, 2002; Emuze, 2009).

Supply chain management seeks to synchronize a firm's functions and those of its suppliers to match the flow of materials services and information with customers demand. The notion of supply chain management was developed from the management doctrine in the 60's based on the belief that a single activity cannot assure the effectiveness of a system with a chain of activities (Chen, 2004). A supply chain consists of a network of key business processes and facilities,

involving end users and suppliers that provide products, services, and information (Cheng, Law, Bjournson, Jones and Sriram, 2010). While the construction industry is in search of a better methodology for procuring built assets, the quantity surveying profession has been in search of greater relevance in the procurement and management of built assets.

Besides delivering traditional services for which quantity surveyors are known, argues that quantity surveyors must get inside the head of their clients, fully appreciate their business objectives, and find new ways in which to deliver value and conversely remove waste from the procurement and construction process. Ashworth and Hogg (2000) reviewed the development of quantity surveying and identified a shift in emphasis from cost to value with many quantity surveying firms extending the range of services that they offer clients. Iyortyer (2006) opines that in order to face the future effectively Quantity Surveyors must seek to enhance their management skills to be successful.

The paper stated that the importance of this stems from the tendency to become complacent in daily routines, but must avoid such complacency in order to move with the times and face the 21<sup>st</sup> century with proficiency. Could an understanding of supply chain management and its popularization by quantity surveyors in Nigeria become a path to more strategic relevance for the profession in Nigeria? This is the key question for a wider research effort. As part of the effort to answer this question, the research reported herein seeks to answer the following questions:

- How aware are quantity surveyors of construction supply chain management (CSCM) practices?
- What is the level of involvement of quantity surveyors in supply chain management activities?
- What are the factors militating against the involvement of quantity surveyors in of construction supply chain management activities?

## **2.0 Conceptual Foundations**

### **2.1 The Notion of Supply Chain Management**

The notion of supply chain management was developed from the management doctrine in the 60's based on the belief that a single activity cannot assure the effectiveness of a system with a chain of activities (Chen, 2004). A supply chain(SC) consists of a network of firms , their key business processes and facilities that is concerned with the delivery of products ,services or information to a given category of end users or customers (Cheng, Law, Bjournson, Jones and Sriram, 2010; Othman *et al.*2010). A SC in the public sector therefore includes all the parties ( external suppliers, partner organizations, internal corporate services units) both inside and outside the organization involved in delivering the inputs, outputs or outcomes that will meet a specified requirement of the public sector(Office of Government Commerce (OGC),2005)

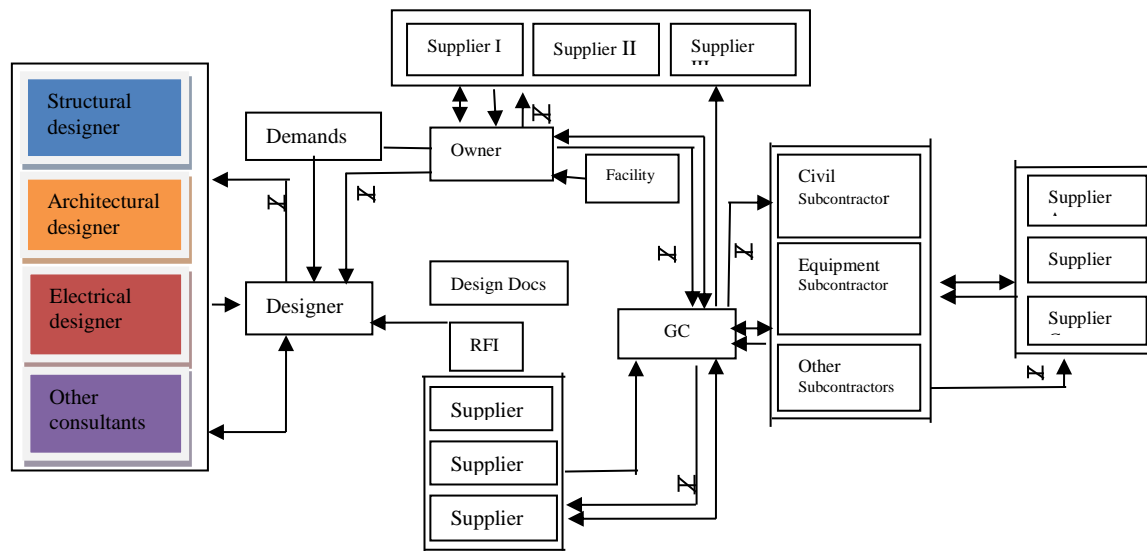
Hence supply chain management involves the management of an extended enterprise. Within the context of the construction industry, such an extended enterprise may include many autonomous firms: contractors, subcontractors, material and equipment suppliers, engineering and design firms and other consulting firms (Kumar and Viswanadham, 2007). According to OGC (2005), a supply chain can be an integrated network of interconnected, yet independent, companies with

common performance standards and relationship management processes. Given the strategic relationship amongst members of this kind of supply chain, their performance standards and relationship management practices are often carried from project to project. Alternatively a supply chain could be an adhoc post contract coalition of contractors, subcontractors, suppliers and other relevant stakeholders saddled with the delivery of a discrete, one –off objective. This kind of coalition is often seen to manifest arm’s length contractor-subcontractor relationships.

Figure 1 illustrates the general structure of a typical construction supply. Note the three objects of exchange within the supply chain: information, materials and funds. The flow of the three different objects of exchange within the supply chain must be properly coordinated if value, will eventually flow to the end user or the client (Emuze, 2009). Value creation for the end user or client is the ultimate goal of supply chain management (Handfield & Nichols,2002). Since value creation is dependent on the effective coordination of the flow of materials, information and funds (Isatto & Formoso 2006), one can argue then that the essence of supply chain management revolves around seeking answers to three fundamental issues, namely: (i) How to organize the work among supply chain members (ii) How to achieve and maintain cooperation among these firms (iii) How to coordinate process execution among people from different companies that are autonomous. Josep, Lario and Hospitaler (2004) argue that the traditional approach to procuring and managing construction projects focuses on activities and ignores the total flow of the project and fails to consider the value flow. Supply chain management therefore calls for managing the interaction between the different activities of the construction project as well as the combined effect of the dependency and variations between them, in an attempt to minimize them.

However, there are barriers to the integration of construction supply chains. These barriers according to Dainty *et al* .(2001) include attitudinal barriers such as narrow minded “win-lose” attitudes and short-term focus, arrogant attitudes, exclusion of the subcontractors and suppliers from the early involvement phases, lack of praise for good performance, and lack of understanding of the subcontractors and suppliers problems. Others are quality of information-related issues: such as poor information quality from general contractor and less transparency coupled with inadequate information exchanges and limited communication; financial/cost-related issues: these are related to competitive tendering based on price (with inadequate focus on life-cycle costs and ultimate value), which develops adversarial relationships among clients, general contractors, subcontractors and suppliers that result in serious problems with regards to payments.

Dainty *et al* . (2001), Elmuti (2002) and Wong,Tsoi and Cheung(2004) report CSCM implementation obstacles to include diverse objectives, unfair risk allocation, poor understanding, lack of commitment, inadequate performance evaluation, unclear anticipated rewards , passive sub-contractors and suppliers, inadequate life-cycle planning, ignorance of end-users needs, ineffective communication, apathy to innovation and ignorance of buildability. Others are inappropriate tendering methods, inappropriate organizational structure, inadequate investment in I.T., poor quality assurance and lack of training. Hence, to succeed in SCM implementation, it is instrumental to realize the potential obstacles so that implementation strategies can be devised appropriately (Elmuti (2002).



**Key**

↔ Flow of information, → Flow of materials, → Flow of funds

Figure 1: General structure of a construction supply chain  
 Source: (Xue *et al.*2007)

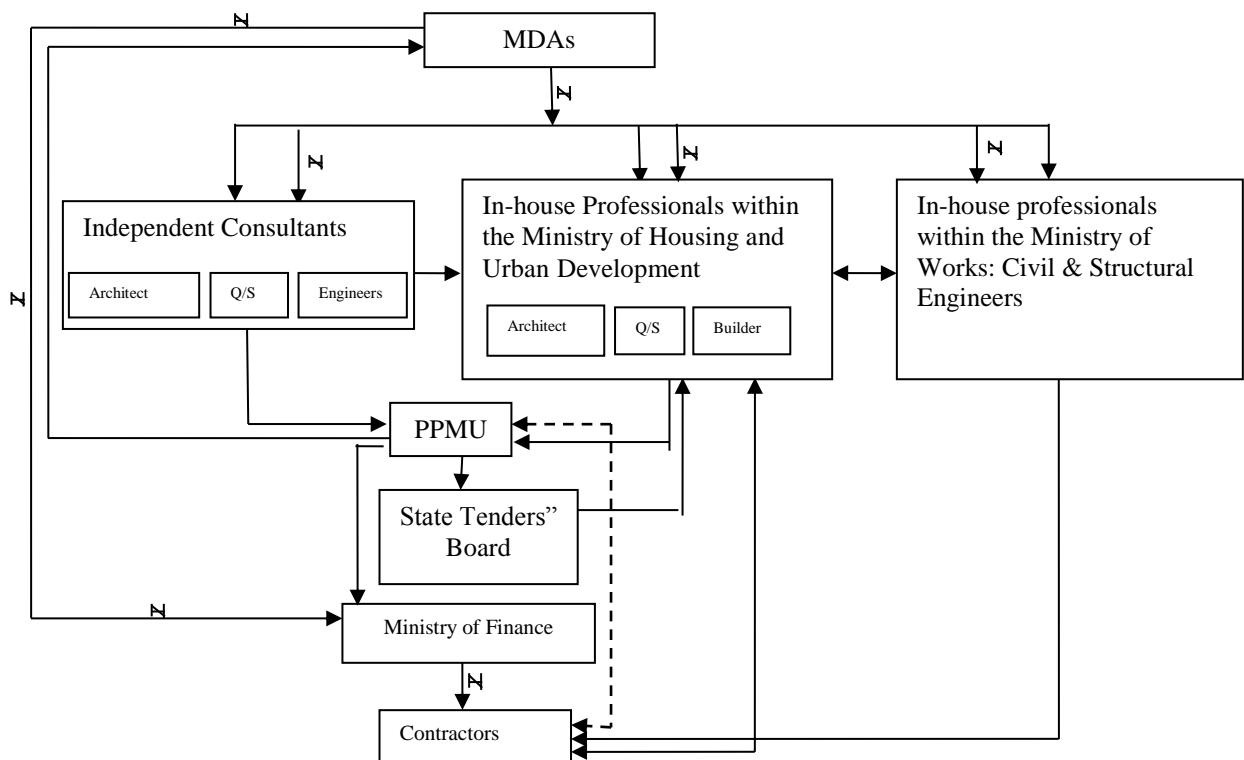
**2.2 The State of Construction Project Procurement and Management in Ondo State**

The procurement of built assets within the public sector in Ondo State follows the traditional contracting approach. The traditional contracting approach is axiomatically characterized by the dichotomy between design and construction. The Architect prepares a design brief for the client, hands it over to the Quantity Surveyor to prepare the preliminary estimates. These documents are sent to the Due Process Office for benchmarking and used for the preparation of tender documents. The open tendering system is most prevalent whereby adverts are placed in newspapers and interested contractors may show interest. Contractors are chosen based on the lowest bidder. Afterwards, construction commences.

Problems with the prevailing procurement method include: unrealistic construction periods, contractors bidding at unreasonably low prices just to make sure they get the job, incomplete documentation and lack of project and site analysis prior to preparation of documents due to the unreasonable time limit given to consultants to prepare contract documents. These problems have in turn caused delay in project execution, delay in project completion, high levels of variation, additional works to project thereby increasing the contract sum, project abandonment, etc. Figure 2 shows the existing supply structure in the state.

The figure clearly shows that there is no flow of information between the independent consultants and the contractor. The flow of information between the project management agent of the government and the contractor is one directional flow. This implies that the contractor only takes directions from the in-house professionals working on behalf of the government. No effort is made to tap into the construction expertise of the contractor at the pre-construction stage. Note also that subcontractors and suppliers are missing in this procurement structure. This

shows that the procuring public sector organization is only interested in dealing with the consultants and contractors only. It appears the procuring organization is not interested in the roles of the suppliers and subcontractors in the project execution. That evidently is seen as the contractors business. Given the moves toward the integration of the entire supply chain in some quarters around the world, one wonders why public sector construction projects are still procured via the fragmented approach. Are public sector advisors to the client –the quantity surveyor in this case – aware of alternative approaches to procurement such as the supply chain management orientation? We seek to answer this question.



**Key**

→ Flow of information,

⇄ Flow of funds

Fig. 2: A structure of the existing framework for public sector construction procurement in Ondo State.

Source: (Author's Synthesis)

### 3.0 Research Design and Method

The research reported herein deploys positivist approach to elicit quantitative in order to answer the three questions raised in the introduction. Specifically, a structured questionnaire was the data collection instrument. The questionnaire was administered to fifty five quantity surveyors who are corporate financial members of the Nigerian Institute of Quantity Surveyors in the State.

The questionnaire designed for this research work was divided into four sections. The first section of the questionnaire contains questions for capturing the demographic variables of the respondents. Variables like the type of organization, grade of membership of professional body, number of projects handled by respondent, which will help to ascertain the quality of response received from the respondent. The other three sections are designed to elicit data for answering each of the three questions raised in the introduction. Respondents are asked to rate a set of pre-identified factors on a Likert scale. The analysis of the data was carried out using the following descriptive statistical methods: Percentiles, Mean Item Score (MIS) and Involvement Index.

### 4.0 Data Presentation, Analysis and Discussion

Using the Statistical Package for Socio Sciences, the Cronbach alpha was computed to test the reliability of the 5point Likert scale used for the study. As evident from Table 1 the Cronbach's alpha values for scales of measure of the measuring instrument range from 0.884 to 0.916 , implying their reliability.

**Table 1: Reliability coefficients for the measuring scale**

Scale of measure	$\alpha$ - value
Level of awareness of respondents	0.916
Level of involvement of Quantity surveyors in the practice of SCM	0.898
Factors affecting the level of involvement of quantity surveyors in the practice of SCM	0.884

Table 2 shows the demographic variables of respondents. Of the 55 questionnaires sent out specifically to Quantity surveyors, only 39 were completed and returned by the respondents representing 71% return rate. Some of these variables, like the respondent's perception of importance of SCM to project success and the respondent's use of SCM, are not generic demographic variables; they are specific to this research. They are included to identify respondents that are supply chain management savvy.

**Table 2: Demographic Variables of Respondents**

Category	Classification	Frequency	Percentage
Academic qualification of respondents	HND	10	25.6
	BSc	9	23.1
	MSc	17	43.6
	PhD	2	5.1
	Neutral	1	2.6
Years of working1-5 experience	3	7.7	
	6-10	14	35.9
	11-15	6	15.4
	16-20	8	20.5
	Above 21	8	20.5
Highest Professional Qualification	MNIQS	36	92.3
	FNIQS	1	2.6
	Neutral	2	5.1
Type of construction Projects involved in	Building only	20	51.3
	Engineering only	0	0
	Both	19	48.7
Importance of SCM to project success?	Yes	37	94.8
	No	1	2.6
	Neutral	1	2.6
Frequency of the Use of SCM	Never	7	17.9
	Rarely	15	38.5
	Often	7	17.9
	Regularly	6	15.4
	Frequently	1	2.6
	Neutral	3	7.7

#### 4.1 Level of awareness of supply chain management practices by Quantity Surveyors

In order to answer the question: how aware are quantity surveyors of construction supply chain management (CSCM) practices? Respondents to the questionnaire survey are asked to rate their awareness of a number of supply chain management practices identified in the literature on a 5-point Likert scale with “1” representing least level of awareness and “5” the highest level of awareness. Table 3 shows the mean score of the rating of the respondents with regards to their awareness of the 13 construction supply chain management (CSCM) practices.

**Table 3: Level of awareness of CSCM practices by Quantity Surveyors**

SCM Practices	Mean Score	Rank
Information dissemination	4.05	1
Management leadership	4.03	2
Relationship development	3.85	3
Early appointment of key partners	3.84	4
Customer relationship management	3.77	5
Supplier relationship management	3.74	6
Trust based relationship	3.67	7
Open exchange of information	3.61	8
Appropriate deployment of information	3.54	9
Long term collaborative working experience	3.50	11
Increased use of collaborative procurement options	3.38	12
Transparency in financial matters	3.37	13
Effective use of management options	3.13	14

The research shows that the most popular supply chain management practice is information dissemination. While the effective use of management options is the least popular. This is not surprising because information dissemination is at the heart of project delivery even in traditionally procured projects. Furthermore this finding supports the statement of Ahmed *et al.* (2002) that although engineers, construction managers and contractors do not typically consider the supply chain or SCM, they deal with the supply chain and make SCM decisions on a daily basis.

#### 4.2 Level of involvement of Quantity Surveyors in CSCM activities.

It is one thing for a person to be aware of something; it is another thing for one to practice the thing. As evident from table 2, more than 50% of quantity surveyors that responded to the survey hardly deploy supply chain management. This raises the second research question: To what extent are quantity surveyors involved in supply chain management activities? To answer this question, respondents are asked to rate the level of their involvement in thirteen supply chain management activities on a 5-point Likert scale. “1” denotes least involvement and “5” highest level of involvement. The ratings are thereafter converted to involvement index following Romey (1968) as found in Mergo (2012).

**Table 4: Level of involvement of quantity surveyors in CSCM activities**

CSCM practices	Deployment Index	Rank
Relationship development	58.50	1
Information dissemination	34.00	2
Management leadership	28.50	3
Appropriate deployment of information	12.63	4
Transparency in financial matters	11.89	5
Early appointment of key partners	11.80	6
Supplier relationship management	9.83	7
Open exchange of information	9.70	8
Long term collaborative working experience	8.67	9
Trust based relationship	8.60	10



Customer relationship management	6.42	11
Increased use of collaborative procurement options	5.00	12
Effective use of management options	3.94	13

Table 4 shows the deployment indexes for the thirteen supply chain management activities. The index scores ranges from to 58.50 (for relationship development practice) to 3.94 for effective use of management options). This indicates that quantity surveyors within the state are involved in supply chain management activities to varying degrees. This also shows that there is much room for quantity surveyors in promoting supply chain management practices as means of improving the performance of the local construction industry. Are there obstacles to the involvement of quantity surveyors in supply chain management activities? This is examined empirically in the next section.

### 4.3 Factors affecting the involvement of Quantity Surveyors in CSCM activities.

A review of the literature yields 15 different inhibitors to the deployment of construction supply chain management practices in the procurement of construction projects. These factors were presented to the respondents of the questionnaire survey. Respondents were asked to rate the extent to which they agree with the statement that the factor poses constraint to the deployment of CSCM practices on a 5-point Likert scale where “1” is strongly disagree and “5”.As evident in Table 5, inadequate investment in I.T ranks as the highest factor constraining the deployment of supply chain management and ignorance of buildability issues as the lowest ranking factor.

**Table 5: Factors limiting the deployment of CSCM practices by Quantity Surveyors**

<b>Factors</b>	<b>Mean</b>	<b>Rank</b>
Inadequate investment in I.T	3.59	1
Diverse Objectives	3.56	2
Ineffective communication	3.49	3
Passive subcontractors	3.36	4
Anticipated rewards unclear	3.31	5
Poor understanding	3.26	6
Inappropriate tendering methods	3.23	7
Lack of training	3.23	7
Lack of partners with appropriate collaborative skills	3.22	9
Inappropriate organizational structure	3.21	10
Discouraged innovation	3.21	10
Lack of commitment	3.16	12
Unfair risk allocation	3.13	13
Ineffective problem solving mechanism	3.10	14
Ignorance of buildability issues	2.53	15

## 5.0 Conclusion

Using a questionnaire survey administered among professional quantity surveyors who are members of the Nigerian Institute of Quantity Surveyors in Ondo State, this paper has investigated the awareness of quantity surveyors, of supply chain management practices. It has also examined the level of involvement of quantity surveyors in supply chain management factors constraining their involvement in these activities. The findings reveal that the top three popular supply chain management activities are information dissemination (with mean item score of 4.05 and ranked 1 out of 13 activities), management leadership (with mean item score of 4.03 and ranked 2) and relationship development (ranked 3 with mean item score of 3.85). With regards to the involvement of quantity surveyors in supply chain management activities, relationship development has the highest involvement index of 58.5, while the effective use of management options has the least involvement index of 3.94. The study also reveals that inadequate infrastructure in information technology is perceived to be the most serious constraints to the involvement of quantity surveyors in supply chain management issues, while ignorance of buildability issues to be the least constraint. This study has clearly shows that there are opportunities for improvement when it comes to deploying supply chain management practices within the local construction environment in Ondo State. Given the central role of the quantity surveyor in construction information dissemination, professional quantity surveyors should seize this opportunity to enhance the performance of projects and increase their professional relevance in the process. A limitation of this work is the geographical scope and the small research population. Given the fact that there are thirty six states in Nigeria, the findings of this research might not be generalizable to the entire country. A future research aimed at developing a guideline for using supply chain management as a means of enhancing the professional relevance of quantity surveyors in Nigeria will address this gap.

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