

Supply Chain Management in Residential Construction Sector

Deshmukh P. S, More A. B, Chavan S. A

Abstract:- Supply chain management (SCM) is a concept which originated from manufacturing industry to control logistics. SCM is a management process by which organization control the worldwide network of stockholder such as supplier retailer and distributor through which raw material are procure, manufacture final product and delivered to customers. In construction process, procurement activities occur during all stage of a project. Construction process is fragmented so supplier of resources like man, material, money and machine are not available at right time and right quantity. It is difficult to control all the activity, so SCM process is more essential to control over all the activity on the construction process. In this paper introduce the concept of supply chain management in construction sector. Also explain the problem to adopt the supply chain management process in the residential construction projects and describe the benefits in effective implementation of SCM. Finally explain simple model of SC in residential project.

Key Words: Residential construction firm, Supply chain management, social housing

I. Introduction

SCM concept 1st originated and conjointly more with success full-grown within the manufacturing industry. Toyota manufacturing implements the SCM concept in their organization and getting maximum benefit in terms of time and money. The supply chain integrates all the activities which associated with moving goods from the raw-materials stage through to the end user. Handfield & Nichols (1999) define "A supply chain encompasses all activities associated with the flow and transformation of goods from the raw material stage, through to the end user, as well as the associated information flows". Indian residential construction firm are in the lack of efficient organization structure, better quality provide, and effective management. This constrain reduced the profit margins and industry players have been averse of making investments for productivity enhancement. If Indian residential construction firm use new advance tool like SCM which help to improve the productivity by reducing the cost, time and improving the quality. SCM also help to maintain the relationship with all the stakeholders. The adopting SCM concept in the residential construction sector is not simple because it needs new innovations, complete knowledge about market and also know to manage a difficult which is occurs in construction process.

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India is one of the youngest countries in the world. The strong economic growth led to sharp income generation, which led to rise in middle class segment. This segment's rising purchasing power therefore there investment will be occurred in housing sector.

II. Concept of supply chain management

The best companies which are present in all over the world discover a new powerful tool to face the global market. It is call as SCM and it integrate all the activity from production stage to satisfy the customer. Fig shows the simple example of supply chain for single product line. In this case, raw material is procured from vendors, transformed into finished goods and then transported to distribution centers, and finally to customers. However, the realistic supply chains have a multiple end products.

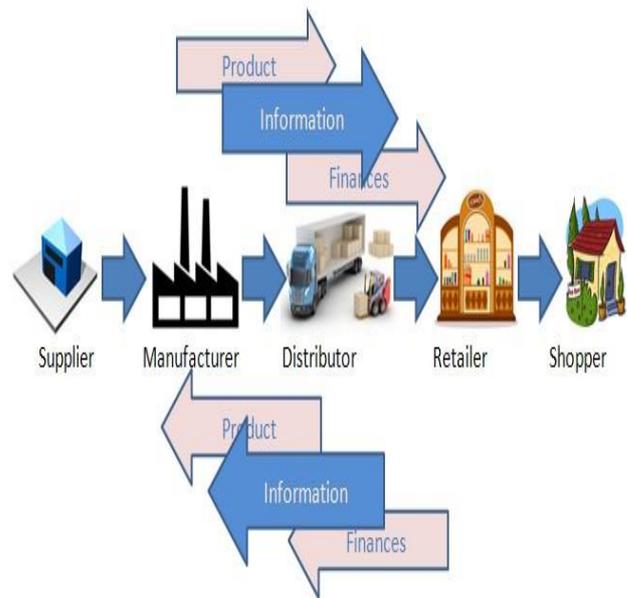


Fig. 1: Basic Supply Chain Model (Supply Management Magazine)

Ganeshan and Harrison (1995) has defined SCM as a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers. Lee & Corey (1995) stated that SCM consists of the integration activities taking place among a network of facilities that procure raw material, transform them into intermediate goods and then final products, & deliver products to customers through a distribution system.

Van der Vorst (2007) supply chain management differentiates with traditional management system approaches in many different aspects which illustrated in the table.

Table 1: Traditional Management and Supply Chain Management (Van der Vorst: 2007)

Element	Traditional management	Supply chain management
Inventory management approach	Independent efforts	Joint reduction of channel inventories
Total cost approach	Minimize firm costs	Channel-wide cost efficiencies
Time horizon	Short term	Long term
Amount of information sharing and monitoring	Limited to needs of current transaction	As required for planning and monitoring processes
Amount of coordination of multiple levels in the channel	Single contact for the transaction between channel pairs	Multiple contacts between levels in firms and levels of channel
Joint planning	Transaction-based	Ongoing
Compatibility of corporate philosophies	Not relevant	Compatibility at least for key relationships
Breadth of supplier base	Large to increase competition and spread risks	Small to increase coordination
Channel leadership	Not needed	Needed for coordination focus
Amount of sharing risks and rewards	Each on its own	Risks and rewards shared over the long term
Speed of operations, information and inventory levels	"Warehouse" orientation (storage, safety stock) interrupted by barriers to flows; localized to channel pairs	"Distribution center" orientation (inventory velocity) interconnecting flows; JIT, quick response across the channel

The eleven elements are differentiating based on traditional and supply chain management. In supply chain inventory management approach joint reduction of inventory channels but in traditional it is an interdependent effort. Time horizons in traditional management are short term however in supply chain these are long term. The compatibility and channel leaderships are not considered in the traditional management but in supply chain these are considered as key factors. The speed of information, inventory flows are not warehouse oriented within the supply chain management, which has additional advantage and are easy to handle and distribute within the distributed supply chain environments.

III. House building process

In residential construction sector, social and private house building operation are described in fig 2. Seven stages are representing the difference between them. Firstly the demands of the customer should be understood, either by the local house authority within the case of social or by the marketing department of the private developers. Now the next step is land appraisal and acquisition. In the case of social housing is done by housing associations. But in private housing the developers appraise and acquire land themselves. Now the specific sites have been purchased the next step is to draw design schemes. Generally, social housing associations appoint architects to design the new site, whilst private developers utilize their own architects to perform construction operation. The primary designs are

developed under planning permission from the respective local authorities.

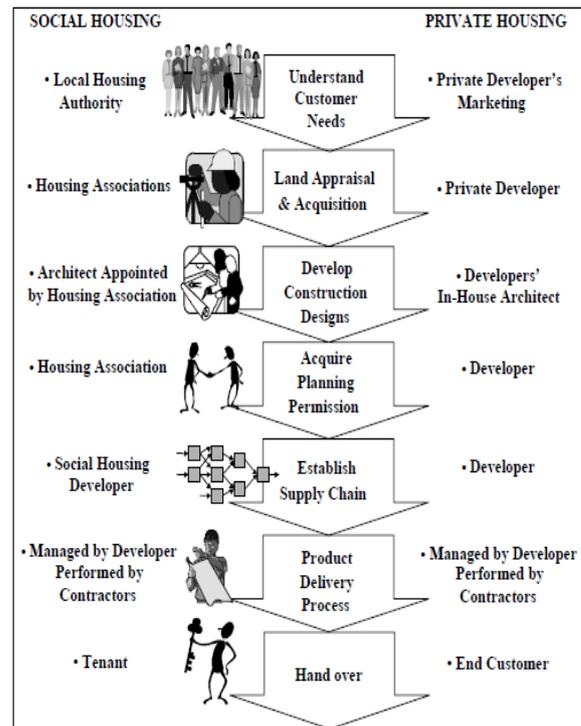


Fig. 2: House Building Value Stream for Private and Social Housing (Paul Childrenhouse)

Once coming up with permission has been acquired the tough task of making a proposal chain takes precedence. In the case of social housing, developers maintain relation with supplier of materials, sub-contractors, and customers and adopt the supply chain for the construction by using these contacts. In the same way private developers maintain relationship with material and labour supplier and make their private supply chain according to their design. In residential construction sector price process is that the product delivery methodology, throughout that developer. Every social and personal manages the material, cash, resources and data flows in conjunction with on-site construction processes. The final stage is hand over a product to the customer; either the social or private purchaser acquires the new development.

This paper SCM concept is focused on the final three stages of the social construction sector, i.e. establishment and operation of the supply chain and product delivery process. In this context the housing building supply chain is defined (Paul Childerhouse and Séverine M. Hong-Minh)The management, control and co-ordination of material, cash, resource and information flows in order to construct habitable dwelling based on specific design requirements, including the appraisal and selection of skilled labor and material suppliers.

IV. Supply Chain Management (SCM) in Construction

In construction, supply chain involves all the stakeholders and partners they are come together on individual projects during construction process.



In a project supply chain are includes the owner, planner, designer, architect, engineer, construction manager, general contractor, subcontractors, suppliers, distributors, and manufacturers, and also include the components that is, human resources, equipments operations, accounting etc.

(McCaffer and Root 2000) The authors have proposed a simple model of supply chain management concept in construction, and also their applications which is shown in Fig.

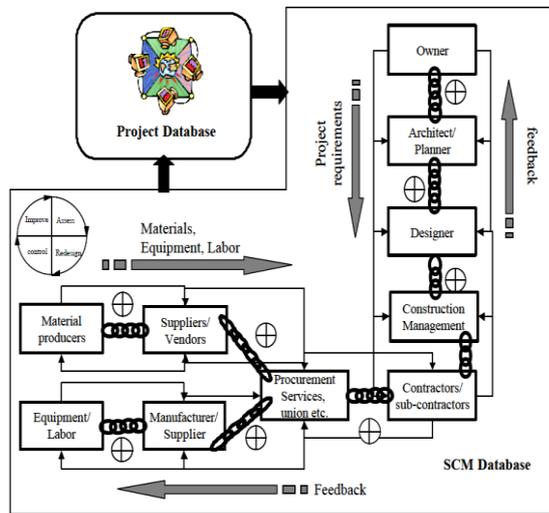


Fig. 3: Supply Chain Management Model for construction project (McCaffer and Root 2000)

In This model the construction process is divided in to two processes (i) the procurement process and (ii) the construction services process.

The procurement processes focus on the supply of materials, equipment and labor to the construction site. The stakeholders in this process are the material provider, equipment provider, the wholesalers, labors, the contractors and subcontractors. The chain in this process is known as 'procurement chain'.

The construction services process deal with the clients, architects, designers, builder, contractors and the engineer formed chain is known as construction chain. The model explains that all the supply chain activities are managed through a separate SCM database, which should be linked with the central project database. Only with this level of support, one can plan and control the complexity of construction processes in the project.

V. Benefits of SCM in residential construction sector

Walker and Alber (1999) highlighted that business organizations always want to reduce the product development time, improve the product quality and reduce production costs and lead times. With proper implementation SCM technique, the construction firm will take advantages as short term and long terms. It also increases the 10% annual turnover of the firm by innovated tools of SCM.

Stanford et al (1999) He pointed out that an efficiently organized supply chain could result in low transaction costs and highly competitive industry in global markets because

of internalizing the transactions between the stockholder in the chain through cooperation and coordination.

Bureaucracy reduction in residential construction firm by implementing SCM process, which is help to good understanding data of demand market, innovation in design, economical in utilization of resources and skills, increased safety and after-sales service to the customer, flexibility and a plan of action ability to set up and pioneer, improved worker motivation and team-working. By using supply chain management process the planning could take place between the various functional groups and several independent firms in the distribution channel .This can provide better service, reduce inventories, reduce paperwork and reduce transportation costs. Real SCM adopt in firm is only when all parties take benefits.

VI. Barriers in the Implementation of Supply Chain Management in residential Construction sector

Supply chain management offers advantages to the residential construction sector. But the list of some reason which shows difficulties an implementation of supply chain management in residential project.

- Failure to communicate project information
- Fear of loss management
- Lack of self knowledge
- Lack of communication with partner
- Unknown of the project complexity
- Poor define of project goals
- Lack of understanding customer requirement
- Lack of understanding SC concept
- Deficiency of mutuality

In SCM concept need to share information about historical back ground, design, new advance technology and market condition but most of the construction firm are not comfortable to shear such information because fearing of loss of management. The next problem in supply chain, member does not focus on one mutual goal when they work together. Another barrier to adopt SCM consists of lack of understanding customer due to communication gap. Also lack of understanding is a real supply chain management concept and effective leadership.

SCM provide new manner to doing business by effective integration of suppliers but most of the construction firm not interested doing this. The concept of supply chain management remains a critical factor for the long-term success of construction firms. Due to these supply chain management could also be out of reach from residential construction firm when firm application of its ideas can improve their competitive benefits such as quality, time and cost.

VII. Research methodology

7.1 Questionnaires design

This research will be base on sampling survey by using questioners. A two page close-ended questionnaires send to the builder of residential construction firm. The questions consist of three segments which are related to back ground information of firm, SCM relevance, implementation and barriers of SCM in residential firm.



The final section of the questionnaires is done by using a five point likert scale with 5 indicating strongly sure and 1 indicating strongly differ.

7.2 Sample survey

The questionnaires send to 30 largest builders in local area, choose of builders according to their experience. In respond to 28 replies were receiving after 15 days. Therefore respond rate is 60%.The result of proposal survey base on respond rate.

VIII. Conclusion

Residential construction firm are in the lack of efficient organization structure, better quality provide, and effective management. This constrain reduced the profit margins and industry players have been averse of making investments for productivity enhancement. Increasing the benefits in the construction project is not only goal of firm but face the global market with the increasing global competition. Residential construction firm use new advance tool like SCM which help to maintain the relationship with all the stakeholders (customer, supplier, contractor ect) in the construction process and also improve the productivity of the project in terms of cost, quality and time.

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