Chapter 11

Perspectives and Theory of Material Management

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Introduction

The joy of economic prosperity and utility derivation are stemmed from total utilization of raw material both rom organic and non-organic substance from its natural formation. These substance formed as the basic material used by organization in their productive activity for the satisfaction of societal need, such as industrial and construction use, commercial and consumption purpose, and service rendition, to mention a few. Therefore human activities can in no way be separated from with the use of material, neither do that of an organization. Due to the increasing demand and use of material, immerse pressure is been put on the available natural resources as endowed in different geographical locations and territories all over the world, leading to a high level of industrial revolution in the extraction of these resources for different uses as intended. Specifically, everything that are used and enjoyed by human are made out of natural resources called material today, so it formed as a total package for human livelihood for existence.

It would be of good understanding to isolate both terms, material and management as it relate to their distinct usage. Material are resources both in raw and processed form used as input for manufacturing, production and processing of industrial, commercial goods, services. It should be of note to further clarify that human capital is also known as material in real sense of organizational use. Whereas, the method of resources acquisition, and conservation in order to meet organizations daily capacity utilization, with the major purposes of avoiding shortage and abrupt obstruction in activities is termed as management.

Definition of Material Management

It is an approach for planning, organizing, and controlling all those activities principally concerned with the flow of materials into an organization. Also, Materials management can thus be defined as a joint action of various materials activities directed towards a common goal and that is to achieve an integrated management approach to planning, acquiring, processing and distributing of production materials from the raw material state to the finished product state.

Scope of Material Management

The scope of material management is closely different from the perspective of individual organization. Also, does management varies greatly from company to company, depending on the nature of operation and business activity, which may include operational functions such as material planning and control, production planning, purchasing, inventory control, in-plant materials movement, and waste management.

Basically, the scope are:

1. The process of material acquisition as it relates to inventory control, stores management, and material logistics.
2. Material movement control and handling during purchasing, supply, and transportation.
3. Materials carriage and handling within the organization after purchase.

4. supply management or logistics management

It should be emphasized that these scope are different levels of interrelated activities that need to be carefully understood material management.

Sub Areas in Material Management

In the process of managing, materials management has such sub fields as, inventory management, value analysis, receiving, stores and management of obsolete, slow moving and non-moving items. These various activities are represented in these four functions:

1. Planning and control
2. Purchasing
3. Value analysis and
4. Physical distribution

Objectives of Materials Management (MM)

The fundamental objectives of materials management function, often called the famous 5 Rs of materials management, which are founded on acquisition of materials and services:

1. of the right quality
2. in the right quantity
3. at the right time
4. from the right source
5. at the right price

Anyway, these objectives are basically general to the operation and use of materials in an organization. However, objectives of material management could as well be seen from management point of view, which is also classified as the key objectives of MM:

1. To ensure inclusive participation in make or buy decisions
2. To buy materials at the lowest price, consistent with desired quality and service to perform.
3. To ensure a sustainably high inventory turnover, by reducing excess storage, carrying costs and inventory losses occurring due to deteriorations, obsolescence and pilferage
4. To sustain a level of continuity of materials supply in order to prevent interruptions in the flow of materials and services to users
5. To retain a specified material quality level and a consistency in the quality of materials that would permit and allow efficient and effective work operation
6. To source and retain reliable vendors for consistency supply of materials
7. To develop alternative front of vendors whose materials are capable to promoting a competitive atmosphere in performance and pricing
8. To reduce the overall cost in materials acquisition and to improve efficiency in operations and procedures
9. To attract personnel with the right skill or talent, hire, train, develop and motivate for both immediate and future use
10. Retention of good supplier relationships in order to create a supplier attitude that are capable of furnishing he organization with new ideas, products, adequate prices and service
11. To achieve a high degree of cooperation and coordination with user departments
12. To sustain good records and controls that would provide easy audit and control

Classification of Materials Management Functions

Organization is saddle with the responsibility of ensuring efficient utilization of materials, since materials serves as major components for effective operation and actualization of objectives and goals. Material management is an integral aspect of business function responsible for planning, purchasing, moving, and storing material in an optimum way that would help the organization to

minimize total cost, such as inventory, purchasing, materials handling and distribution costs.

The General Functions of Materials Management are:

1. Materials planning and control: Materials required for any operation are based on the sales forecasts and production plans of the organization. Planning and control is done for materials ready and available for use, taking into account materials not available for the operation and those yet to be supplied. This may involve estimating cost associated with individual requirements of parts, preparing materials budget, forecasting the levels of inventories, scheduling the orders and monitoring the performance in relation to production and sales.

2. Purchasing: Basically, the job of a materials manager is to provide the user departments with the right material at the right time, in right quantity of right quality, at right price from the right source. To meet these objectives the activities undertaken include selection of sources of supply, formalization and finalization of terms of purchase, placement of purchase orders, follow up, maintenance of relations with vendors, approval of payments to vendors, evaluating, rating and developing vendors.

3. Storage facility: Once the materials are delivered, it is expected of the deceiving department to ensure physical control, preservation, minimization of obsolescence and damage through timely disposal and efficient handling, maintenance of records, proper locations and stocking is done at their various storage units

4. Inventory control: One of the powerful ways of controlling the materials is through Inventory control. It covers aspects such as setting inventory levels, doing various analyses such as ABC, XYZ, etc, fixing economic order quantities (EOQ), setting safety stock level, lead time analysis and reporting.

Theory of Supply Chain Management

Material management is hinged on the theory of supply chain management. In 1982, Keith Oliver, a consultant at Booz Allen Hamilton introduced the term "supply chain management" to the public domain in an interview for the Financial Times. In 1983 Wirts chafts Woche in Germany published for the first time the results of an implemented and so called Supply Chain Management project led by Wolfgang Partsch.

In the mid-1990s, more than a decade later, the term supply chain management gained popularity when a flurry of articles and books came out on the subject. Supply chains were originally defined as encompassing all activities associated with the flow and transformation of goods from raw materials through to the end user, as well as the associated information flows. Supply-chain management was then further defined as the integration of supply chain activities through improved supply chain relationships to achieve a competitive advantage. In the late 1990s, supply chain management (SCM) rose to prominence, and operations managers began to use it in their titles with increasing regularity

In commerce, supply chain management (SCM), is the management of the flow of goods and services, which involves the movement and storage of raw materials, of work-in-process inventory, and of finished goods as well as end to end order fulfilment from point of origin to point of consumption. Interconnected, interrelated or interlinked networks, channels and node businesses combine in the provision of products and services required by end customers in a supply chain. Supply chain management is generally defined as the design, planning, execution, control, and monitoring of supply-chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally. SCM practice draws heavily from the areas of industrial engineering, systems engineering, operations management, logistics, procurement, information technology, and marketing[6] and strives for an integrated approach. Supply chain management (SCM) is the broad range of activities required to plan, control and execute a product's flow from

materials to production to distribution in the most economical way possible. SCM encompasses the integrated planning and execution of processes required to optimize the flow of materials, information and capital in functions that broadly include demand planning, sourcing, production, inventory management and logistics -- or storage and transportation.
Although it has the same goals as supply chain engineering, supply chain management is focused on a more traditional management and business based approach, whereas supply chain engineering is focused on a mathematical model based one
Supply chain management, is a technique that is aimed at coordinating all parts of SC from supplying raw materials to delivering and resumption of products, tries to minimize total costs with respect to existing conflicts among the chain partners. An example of these conflicts is the interrelation between the sale department desiring to have higher inventory levels to fulfill demands and the warehouse for which lower inventories are desired to reduce holding costs.

Definitions of Supply Chain Management
Supply chain management is the management of upstream and downstream value-added flows of materials, final goods, and related information among suppliers, company, resellers, and final consumers. It is also been defined as a systematic, strategic coordination of traditional business functions and tactics across all business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole. A customer-focused definition is given by Hines (2004). He opined that, supply chain strategies require a total systems view of the links in the chain that work together efficiently to create customer satisfaction at the end point of delivery to the consumer. As a consequence, costs must be lowered throughout the chain by driving out unnecessary expenses, movements, and handling. The main focus is turned to efficiency and added value, or the end user's perception of value. Efficiency must be increased, and bottlenecks removed. The measurement of performance focuses on total system efficiency and the equitable monetary reward distribution to those within the supply chain. The supply chain system must be responsive to customer requirements. SCM was also seen as the integration of key business processes across the supply chain for the purpose of creating value for customers and stakeholders. Lastly, according to the Council of Supply Chain Management Professionals (CSCMP), supply chain management encompasses the planning and management of all activities involved in sourcing, procurement, conversion, and logistics management. It also includes coordination and collaboration with channel partners, which may be suppliers, intermediaries, third-party service providers, or customers. Supply chain management integrates supply and demand management within and across companies. More recently, the loosely coupled, self-organizing network of businesses that cooperate to provide product and service has been called the *Extended Enterprise*.
A supply chain, as opposed to supply chain management, is a set of organizations directly linked by one or more upstream and downstream flows of products, services, finances, or information from a source to a customer. Supply-chain management is the management of such a chain.
Securing the supply chain is another critical role of purchasing managers. Buyers are responsible for ensuring that all of the necessary materials appear on time, intact and of expected quality. If any of these shipments are delayed or of subpar, the effects reverberate throughout the production chain. A shipment of faulty screws, for instance, may cause the finished product to fall apart. In turn, the entire order is jeopardized because of the management's purchasing decision.

Customer Satisfaction
Purchasing managers play a fundamental role in ensuring customer satisfaction. Managers have this obligation in two ways: quality of product and on-time deliveries. When buyers select high-quality ingredients at lower costs, these cost savings can be issued to the customer. Likewise, poor quality deters customers from returning to the business. Delayed and defective products are other ways customers are affected by the decisions of purchasing managers. Thus, these employees play a critical role in shaping the customer's experience with the organization.

Supply chain management (SCM) is the broad range of activities required to plan, control and execute a product's flow from materials to production to distribution in the most economical way possible. SCM encompasses the integrated planning and execution of processes required to optimize the flow of materials, information and capital in functions that broadly include demand planning, sourcing, production, inventory management and logistics or storage and transportation. Companies use both business strategy and specialized software in these endeavors to create a competitive advantage.

Supply chain management is an expansive and complex undertaking that relies on each partner from suppliers to manufacturers and beyond to run well. Because of this, effective supply chain management also requires change management, collaboration and risk management to create alignment and communication between all the participants.

Benefits of Supply Chain Management

Supply chain management produces benefits such as new efficiencies, higher profits, lower costs and increased collaboration. SCM enables companies to better manage demand, carry the right amount of inventory, deal with disruptions, keep costs to a minimum and meet customer demand in the most effective way possible. These SCM benefits are achieved through choosing effective strategies and appropriate software to manage the growing complexity of today's supply chains.

Importance of Supply Chain Management

SCM has significant impacts on both the enterprise and the consumer. Supply chain management activities can improve customer service. Done effectively, they have the ability to ensure customer satisfaction by making certain the necessary products are available at the correct location at the right time. By increasing customer satisfaction levels, enterprises are able to build and improve customer loyalty.

SCM also provides a major advantage for companies by decreasing operating costs. SCM activities can reduce the cost of purchasing, production and the total supply chain. Lowering costs improves a company's financial position by increasing profit and cash flow. Furthermore, following supply chain management best practices can minimize overuse of large fixed assets such as warehouses and vehicles by allowing supply chain experts to redesign their network, for example, to maintain customer service levels while operating five warehouses instead of eight, reducing the cost of owning three extra facilities.

Perhaps lesser known and underappreciated is SCM's critical role in society. SCM can help ensure human survival by improving healthcare, protecting people from climate extremes and sustaining life. People rely on supply chains to deliver necessities like food and water as well as medicines and healthcare. The supply chain is also vital to the delivery of electricity to homes and businesses, providing the energy needed for light, heat, air conditioning and refrigeration.

SCM can also improve quality of life by fostering job creation, providing a foundation for economic growth and improving standards of living. It provides a multitude of job opportunities, since supply chain professionals design and control all of the supply chains in a society as well as manage inventory control, warehousing, packaging and logistics. Furthermore, a common feature of most poor nations is their lack of developed supply chains. Societies with strong, developed supply chain infrastructures such as large railroad networks, interstate highway systems and an array of airports and seaports can efficiently exchange goods at lower costs, allowing consumers to buy more products, thus providing economic growth and increasing the standard of living.

Supply Chain Management Processes

Each major phase of a product's movement through the supply chain from materials to production and distribution has its own distinct business processes and disciplines. Most of them began decades ago as paper-based methods but now are usually handled in specialized software. The SCM process

starts with figuring out what products customers want -- the early stages of supply chain planning, traditionally considered one of the two overarching categories of SCM, along with supply chain execution.

Supply chain planning starts with demand planning, a process for gathering historical data, such as past sales, and applying analytics and statistical modeling to create a forecast or demand plan that the sales department and operational departments such as manufacturing and marketing can agree on. The forecast determines the types and quantities of products to be manufactured. Some companies perform demand planning as part of a formalized process called Sales and Operations Planning (S&OP), which prescribes an iterative process of data gathering, discussion, reconciling of demand plans with production plans and management approval. Some companies include S&OP in a broader process called Integrated Business Planning (IBP) that incorporates other departments' plans in a single, companywide plan.
In the next major step, production planning, the company nails down the specifics of where and how the products called for in the demand plan will be manufactured. (Production planning is also used in other industries, such as agriculture and oil and gas.) A more fine-tuned variation -- typically automated in specialized software -- called advanced planning and scheduling seeks to optimize the resources that go into production and make them more responsive to changes in demand.
Material Requirements Planning (MRP) is a process dating back to the '60s that most manufacturers use to ensure sufficient materials and components (such as subassemblies) are available for use in the manufacturing process by taking inventory of what's on hand, identifying gaps and buying or making the remaining items. The central document in both MRP and production planning is the Bill Of Materials (BOM). It is a complete list of the items needed to make a product. MRP is sometimes done as part of Manufacturing Resource Planning (MRP II) which broadens the MRP concept to other departments such as HR and finance. MRP and MRP II were the predecessors of Enterprise Resource Planning (ERP) software, which is designed to integrate the major business processes of companies in any industry.

Two complex processes play important roles in most of the major steps of SCM:

1. Inventory management and
2. Logistics.

Inventory management consists of various techniques and formulas for ensuring adequate supply from raw materials in a manufacturing plant, perhaps managed in an MRP system, to packaged goods in a retail store for the least expenditure of time and resources. Manufacturers are faced with a variety of inventory management issues, many of which involve coordinating demand planning with inventory at both ends of the production process. For example, sometimes material requirements planning leads to more inventory, especially when the system is first implemented and the manufacturer must work to synchronize MRP parameters with the inventory already on hand.

Logistics is everything having to do with transporting and storing goods from the start of the supply chain, with delivery of parts and materials to manufacturers, to delivery of finished products to stores or direct to consumers and even beyond for product servicing, return and recycling a process called reverse logistics. Inventory management is threaded throughout the logistics process.

Procurement, sometimes called sourcing, is the process of finding suppliers for goods, managing those relationships, and acquiring the goods economically -- along with all the communication, such as sending out requests for bids, and paperwork, including purchase orders, invoices, etc. It is a major component of supply chain management, given how much is bought and sold at all points along the chain. Most players in the supply chain, such as suppliers, manufacturers, distributors and retailers do have dedicated procurement staff. Strategic sourcing is an elevated and more sophisticated type of procurement that aims to optimize a company's sourcing process by taking advantage of its consolidated purchasing power and align it with overall business goals.

Supplier relationship management (SRM), in contrast, addresses sourcing issues by focusing on the suppliers the company deems most critical to success and systematically strengthening relationships with them while fostering optimal performance.

Supply Chain Complexity

The most basic version of a supply chain includes a company, its suppliers and the customers of that company. The chain could look like this: raw material producer, manufacturer, distributor, retailer and retail customer.

A more complex, or extended, supply chain will likely include a number of suppliers and suppliers' suppliers; a number of customers and customers' customers, or final customers; and all the organizations that offer the services required to effectively get products to customers, including third-party logistics providers (3PLs), financial organizations, supply chain software vendors and marketing research providers. These entities also use services from other providers.

The totality of these organizations, which evokes the metaphor of an interrelated web rather than a linear chain, gives insight into why supply chain management is so complex. That complexity also hints at the types of issues that can arise from demand planning issues, such as a release of a new iPhone that chokes demand for old iPhone cases, to natural supply chain disruptions, such as the halt of transportation due to extreme winter weather or droughts that kill crops, to political upheaval, such as labor strikes that throttle movement at a country's container ports.

In response, companies increasingly use supply chain risk mitigation strategies, such as shoring up communication with critical suppliers and analyzing their financial stability. Some are employing specialized supply chain management tools to automate monitoring and assessment of risk.

Supply chain sustainability is the umbrella term for the strategies that organizations use to ensure their supply chains are sustainable and can withstand the risks coming from many quarters, be they financial, social, environmental or political. Regulatory compliance issues have grown as supply chains have become more global, and trading partners face a hodgepodge of local laws. Despite the need, the market in specialized supply chain sustainability software is fragmented, and most companies use other tools and processes to address the problem.

Logistics and Supply Chain Management

The terms supply chain management and logistics are often confused or used synonymously. However, logistics is just one -- albeit vital -- component of supply chain management. It focuses on moving a product or material in the most efficient way so it arrives at the right place at the right time. It manages activities such as packaging, transportation, distribution, warehousing and delivery. In contrast, SCM involves a more expansive range of activities, such as strategic sourcing of raw materials, procuring the best prices on goods and materials and coordinating supply chain visibility efforts across the supply chain network of partners, to name just a few.

BIBLIOGRAPHY

Anderson, M. & Larsen, T. (2009), Procurement Practices in global supply chain, Supply Chain Management: An International Journal,

Baily, P. (2011). Purchasing principles and management, 8th edition. London city: Pearons education limited

Baily, P. J. H. (2008). Procurement principles and management. Harlow, England: Prentice Hall Financial Times. p. 394.

Hart, A. J. (2009). Purchasing and Supply Chain Management: Analysis, Strategy,

Planning and Practice. NY: Cengage Learning EMEA. Proceedings of 1st JKUAT-SHRD Research Conference 12th and 13th September 2013

Madina Bakieva (2010 & 3). "Enhancing competitiveness and public procurement in Kazakhstan". European Union - EEAS (European External Action Service) Delegation in Kazakhstan: 1.

McClendon, R. (2007). Procurement strategies development, 2nd edition. New York: Pitman

Mackay, W. H. (2010), Total quality management in manufacturing systems: a review of integrative Studies, Asia Pacific Journal of Quality Management. Vol. 32

Mugenda, M., Mugenda, G. (2003). Research Methods; Quantitative and qualitative approaches. Nairobi: Acts press.

Mugenda, O. M. & Mugenda, A. G. (Eds.) (2008). Research Methods, Quantitative and Qualitative Approaches. Nairobi, Kenya: African Centre for Technological Studies.

Ombaka, M. F. (2009), Strategic Supply Management, Industry Forum, Management Association.

Orodho, A. J.(2003). Essentials of Educational and Social Science Research methods: Qualitative and Quantitative Approaches. Nairobi Acts Press

Palmer, N.A. (2009). Purchasing and supply management, 2nd edition. Nairobi: Saleemi publications limited

Singh, D. & Punia, L. (2010), Purchasing and materials management, McGraw Hill, New York,
Srivastava, U.K., Shenoy, G.V., & Sharma, S.C. (2008). Quantitative techniques for managerial decisions, 2nd edition. New Delhi: New Age International

Ukalkar, S. (2011). Strategic Procurement Management for Competitive Advantage. London: Oxford University press.