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Logistics Planning and Its Role in Developing Construction Projects in Khartoum State

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ABSTRACT

There are lots of construction projects been implemented in Khartoum State in the last decades. And, in order to implement construction projects successfully, there should be a perfect flow of materials, services and information related to those projects. The provision of providing projects with those essential needs lies within the concept of the logistics management; so, there will be a critical need for developing perfect planning for logistics services. The provision of supplying construction requirements should be conducted and handled in best manner with all the related aspects including quality, safety, time and cost to the proper execution of the construction projects. Many projects are failed and terminated because problems of the flow of logistics services. Those problems are occurred as result of many factors, but bad planning of logistics services is the one of the most important factors. Thus, in order to implement construction projects, there is a great need for the logistics supply service. Because, without delivering construction inputs in the required manner to the location of project, the project shall never be executed. And, in order to provide the project with the needed inputs in the best way and at a required time, there must be an effective planning for the logistics services of projects; in details, there must be a greater concern with the processes of purchasing, transporting and storing, handling as well as flow of information of all materials that used in the execution of projects. The study finds out that applying project management as well as perfect planning of logistics services play vital roles in better execution of construction project in Khartoum State and help maintaining the urban development master plan.

Keywords: Logistics Planning, Project Management, Logistics Management, Supply Chain Management, Khartoum State, Construction Projects, Project Life Cycle.

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Introduction:

Logistics and supply chain management are not new ideas. From the building of the pyramids to the relief of hunger in Africa, the principles underpinning the effective flow of materials and information to meet the requirements of customers have altered little. Throughout the history of mankind wars have been won and lost through logistics strengths and capabilities – or the lack of them. It has been argued that the defeat of the British in the American War of Independence can largely be attributed to logistics failure. (Christopher, 2011, p.1)

In the Second World War logistics also played a major role. The Allied Forces' invasion of Europe was a highly skilled exercise in logistics, as was the defeat of Rommel in the desert. Rommel himself once said that '… before the fighting proper, the battle is won or lost by quartermasters. However, whilst the Generals and Field Marshals from the earliest times have understood the critical role of logistics, strangely it is only in the recent past years that business organizations have come to recognize the vital impact that logistics management can have in the achievement of competitive advantage. (Christopher, 2011, p.1)

Conceptual Clarifications:

Definition of Logistics and Supply Chain Management:

Before defining logistics, it is very important to confirm that there are many terms used to denote the word "logistics". (Waters, 2003, p.4) clarifies that as: "Unfortunately, people use many different terms to describe aspects of logistics. Even something as basic as a 'supply chain' may be called a 'process' when emphasizing operations, a 'marketing channel', 'logistics channel' or 'distribution channel' when emphasizing marketing, a 'value chain' when considering added value, a 'demand chain' to show how customer demand is satisfied or a 'supply network' or 'supply web' to emphasize its complexity. The variety of terms can be confusing, but each gives a subtle difference in meaning.

Whatever names we give to different logistics activities, the important point is that they combine to form an essential function in every organization. Christopher emphasizes this broad importance by saying that 'Logistics has always been a central and essential feature of all economic activity.' Shapiro and Heskett agree, saying that 'There are few aspects of human activity that do not ultimately depend on the flow of goods from point of origin to point of consumption. (Water, 2003)

So, it has been noticed that there are many different terms used to describe "logistics" and this will help us when we deal with the concept and definition of the logistics.

Moreover, (Christopher, 2011, p. 2) defines logistics as: "Logistics is the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organization and its marketing channels in such a way that current and future profitability are maximized through the cost-effective fulfilment of orders."

The concept of logistics has been explained, also, by (Waters, 2003, p.4) as: "All organizations move materials to support their operations. These materials are both tangible (such as raw materials, components, finished goods, and spare parts) and intangible (predominantly information). Logistics is the function responsible for these movements; it manages the transport and storage of materials on their journey from original suppliers through supply chains and on to final customers."

(Waters, 2003, p.4) also confirms that "logistics" and "supply chain management" used to give the same meaning and that as: "In practice, the terms 'logistics' and 'supply chain management' are used interchangeably."

Logistics is the time related positioning of resources or, the strategic management of the total supply-chain. (Waters, 2003, p.4)

Logistics is the process of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in –process inventory, finished goods and related information from point of origin to point of final consumption for the purpose of conforming to customer requirements. (Matooke and Methanivesana, 2012, p.9)

Supply Chain Management has been defined, also, by the Council of Supply Chain Management Professionals (CSCMP, 2011) as: "Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement…and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies."

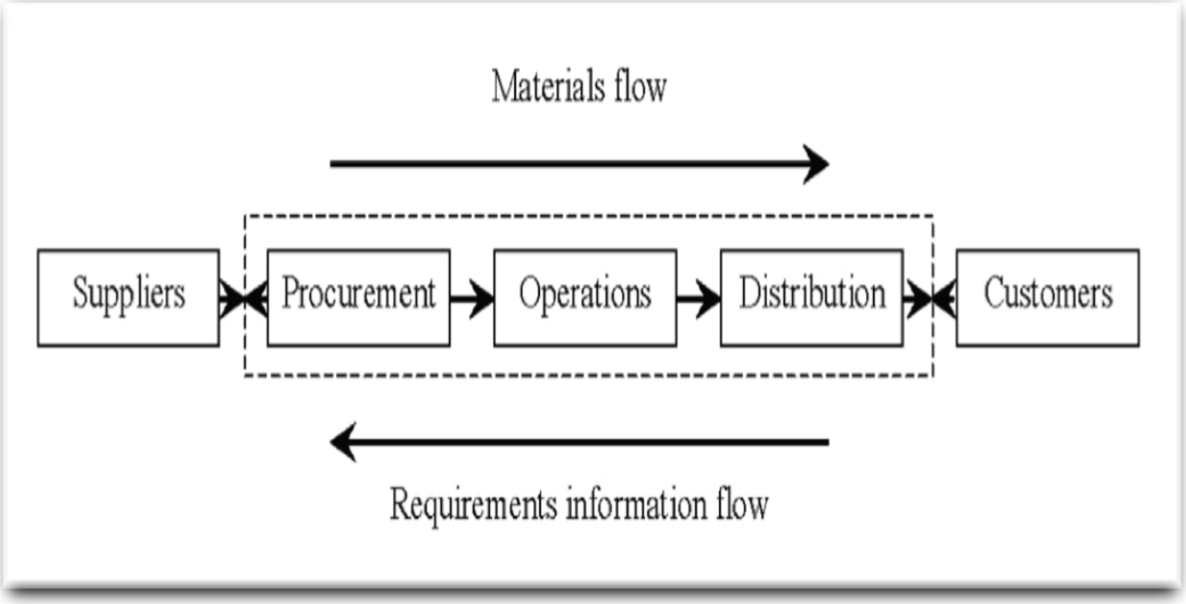

Figure 1: Logistics management process (source: Christopher, 1998)

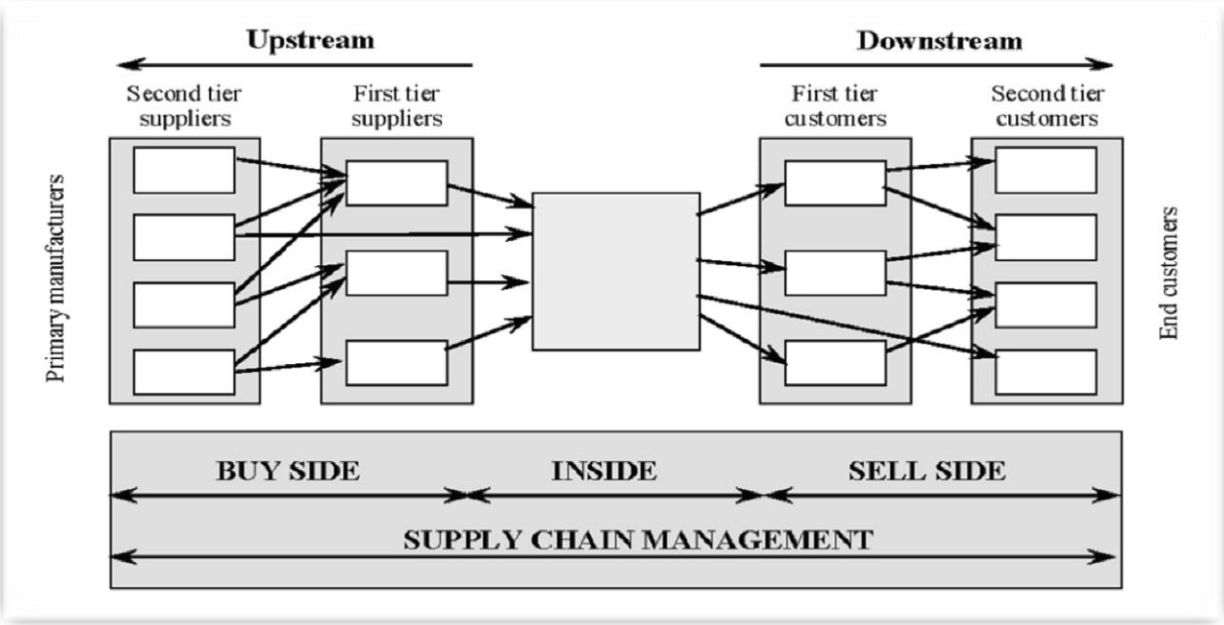

Figure 2: Relationships in the supply chain (source: Harrison & Hoek, 2005, p. 9)

Moreover, Yung (2005, p. 1659) explained the whole logistics system and process as: "Logistics services comprise physical activities (e.g., transport, storage) as well as non-physical activities (e.g., supply chain design, selection of contractors, freightage negotiations). Most activities of logistics services are bi-direction. Information systems include modelling and management of decision making, and more important issues are tracking and tracing. It provides essential data and consultation in each step of the interaction among logistics services and the target stations. Infrastructure comprises human resources, financial resources, packaging materials, warehouses, transport and communications. Most fixed capital is for building those infrastructures. They are concrete foundations and basements within logistics systems."

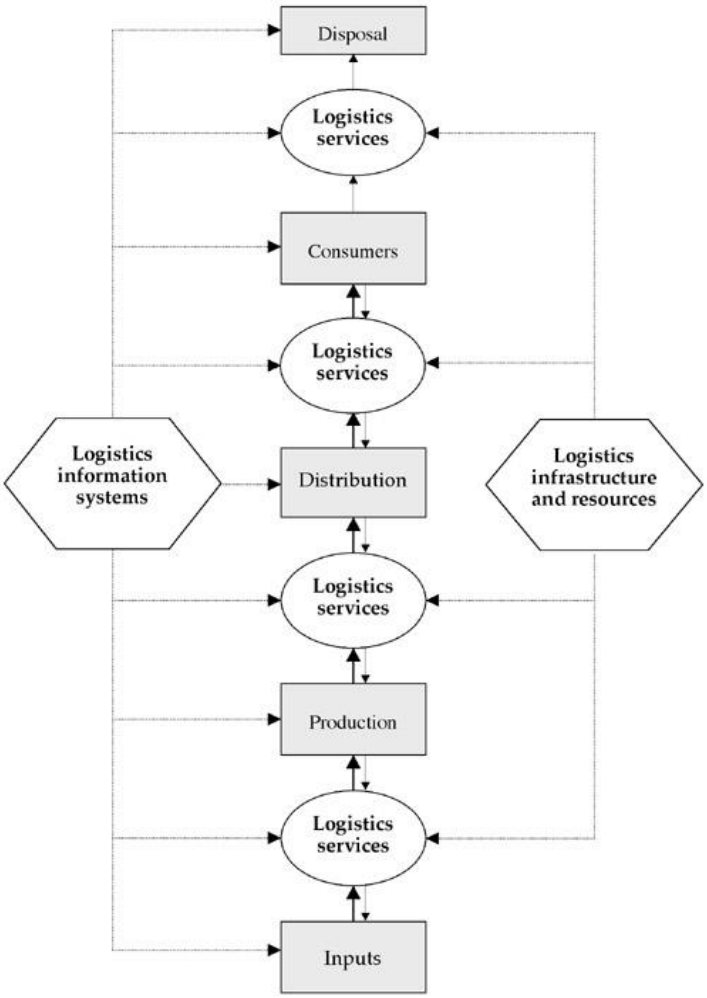

Figure 3: Overview of Logistics System (source: BTRE, 2001)

Difference between Logistics and Supply Chain Management:

Although many schoolers believe that logistics and supply chain carry the same meaning, however, there are many opinions think that they differ. And, when it related to scientific research, both ideas must be viewed and discussed in order to get the best results.

(Christopher, 2011, p.3) described the different between logistics and supply chain management by say: "Logistics is essentially a planning orientation and framework that seeks to create a single plan for the flow of products and information through a business. Supply chain management builds upon this framework and seeks to achieve linkage and co-ordination

between the *processes* of other entities in the pipeline, i.e., suppliers and customers, and the organization itself. Thus, for example, one goal of supply chain management might be to reduce or eliminate the buffers of inventory that exist between organizations in a chain through the sharing of information on demand and current stock levels.

It will be apparent that supply chain management involves a significant change from the traditional arm's-length, even adversarial, relationships that so often typified buyer/supplier relationships in the past. The focus of supply chain management is on co-operation and trust and the recognition that, properly managed, the 'whole can be greater than the sum of its parts."

Farahani, Rezapour, and Kardar (2011, p. 45 & 46) identify the differences between logistics and supply chain as: "We defined logistics and mentioned its importance. It is now generally agreed that for better planning and to realize the real benefits of logistics, its logic should be extended upstream to suppliers and downstream to final customers.

In managing a supply chain, factors such as partnership and the degree of linkage and coordination between chain entities are considered. (Rushton, et al., 2006) mention four differences between classic logistics and supply-chain management:

1. From systematic point of view, the supply chain is viewed as a whole rather than as a series of distinguished elements such as procurement, manufacturing, and distribution. Moreover, both suppliers and end users are included in the planning process.

2. Supply-chain management is a highly strategic planning process, based on strategic decisions rather than operational ones.

3. Supply-chain management has another view of inventory. Instead of bulking large inventories in a traditional way as a safety stock for each entity in a chain, supply-chain management uses inventory as a last resort to balance the integrated flow of product through the chain.

4. In a supply chain, it is crucial to construct an integrated information system in which all entities have access to information on demand and stock levels. If a supply chain was going to be the sum of entities, not their integration, this flow of information would not have existed, while it is a necessity for the success of the chain."

Based on the above, we can say that logistics management concerns with the process of material management, internal storage, and material distribution management process. While supply chain management includes managing relations with those basics suppliers even who do not directly connect with the organization and also the final consumers. And the differences in both concepts are because that the logistics management concerns with, in term of material management, coordinating the follow of material from the supplier to the organization stores and from stores to manufacturing units until the final products stores or the final consumers who may be regional store own by organization, part sale distributor or an individual consumer. On the other side, supply chain management is going further in both sides and it concerns with the primary sources of materials even those do not directly deal with the organization. And, in term of the distribution, it concerns with the final users of products even those are not direct customers buy a product from the organization.

It is very important, also, to confirm that the distinction between logistics and supply chain depends on the nature of the organization itself. Many organizations run their work in the way make it very difficult to separate the duties and tasks done by logistics department from that done by supply chain department. And that force even those schoolers who adapt the idea of distinction between logistics and supply chain management to agree with the idea that adapt they are used interchangeably.

Finally, we can say that logistics and supply chain management are different branches of management and each of them has its own tasks and works to serve identified purposes, but the

idea of use them interchangeably is not rejected totally because sometimes same tasks are done by both branches and that because logistics itself considered as a part of supply chain.

Logistics Planning:

Logistics Planning has been defined by ASEAN (2014 p.2) as: “Logistics planning is the process that creates value by timing and positioning inventory; it is the combination of a firm’s order management, inventory, transportation, warehousing, materials handling, and packaging as integrated throughout a facility network.”

Logistics planning process:

Hackenberger (2016) describes the logistics planning process by saying: “Logistics process planning starts with the supplier and takes into consideration the entire logistical chain, all the way up to handover of the final product to the customer. Both the complete material flow and the flow of information are planned logistically. This includes upstream logistics functions such as distribution center management, WOW (warehouse on wheels), container yards, trailer yards, consignment stores, transshipment points, hubs, and consolidation centers as well as all stages of the material flow — from warehouse planning, picking, and sequencing to intra-company transportation, production supply, packaging, and shipping."

In addition, Tony Jaecques, (2002) argued the logistics planning process by saying that: “Companies have two philosophical approaches in developing a plan for their distribution centers – biased and unbiased. The biased approach refers to using a supplier that represents specific equipment or systems. With this approach, the solution is based on the resources available to that supplier, and can result in a solution that may not maximize available universal resources.

Developing an efficient and effective unbiased logistics plan involves developing what Saenz calls “best-practice solutions” and defining detailed future planning requirements. “The result of this approach is a future distribution center logistics plan that considers the full facility expansion capability on your available site, which maximizes your space, equipment, and labor resources.” The unbiased approach is available through consulting firms that do not have exclusive alliances with suppliers. Regardless of the approach used by a company, developing a logistics plan is a critical first step to design and build an efficient distribution center.”

It is clear that both of these opinions ensure the importance of creating plans for the whole journey of products from the point of origin (supplier) until the point of delivering (customer) passing by the point of operator (store). And, each of these points needs to be identified clearly. And, any work during these operations should be previously identified and planned. For example, the tool and time of acquiring products from supplier should be known in details and even there must be an emergency plan to face unexpected situations. Also, the storing point must be developed in this phase in order to guarantee the best flow and distribution of the products. Finally, the time and tools of distributing the products should also be identified in order to the best customers’ services; and during all these processes, the mechanism of information flow should be well considered.

Logistics Planning Levels:

There are three levels of logistics planning according to Ballou (2009, p.56) who said that: “Logistics planning occurs at three levels: strategic, tactics and operation. The main difference between these tree types of planning is time framework of planning operation. Strategic planning is considered as the long-time planning which plans for a period of time always take more than one year, while the tactics planning is concerning with a period of less than year, and finally the operation planning that concern basically with daily decision making.”

In addition, (Farahani, et al., 2011. p. 47) identify logistics planning level as: “Logistics planning for any business is based on the three levels of decisions. Logistics planning starts from

strategic decision making and hierarchically covers tactical and operational decisions."

(Farahani, et al., 2011. p. 47) point out that logistics planning scope changes regarding the nature of the business as: "Remember that the scope and structure of logistics planning can change from one business to another based on its nature and size, and the strategies it uses. Factors such as the time frame, resources required, and level of managerial responsibilities affect this difference. For example, distribution planning may be a part of the strategic decision making of one firm but be a tactical plan in another firm. What is clear is that these decisions overlap and are interrelated."

Moreover, (Farahani, et al., 2011. p. 48) state the key inputs to develop logistics plan as: "The key inputs in developing an effective logistics plan are the following.

1. Marketing inputs: knowledge of products, pricing programs, sales programs and forecasts, and customer-service policies

2. Manufacturing inputs: manufacturing capabilities and locations

3. Purchasing inputs: new sources, materials, services, and technologies

4. Financial inputs: the source of the cost data and the availability of capital

5. Logistics inputs: location of current logistics facilities

Finally, (Farahani, et al., 2011. p. 48) explain the work done to implement logistics plan as: "Finally, strategic decisions determine what our distribution system should be, tactical decisions are how the distribution system can be utilized, and operational decisions implement action—"Let's get the goods out." In the managerial hierarchy of a logistics system, strategic decisions are made by top managers, tactical decisions are made by middle managers, and operational ones are made by supervisory personnel.

A logistics plan is about implementing the logistics strategy, so this strategy should be translatable to both tactical aims and operational actions. An organization will not achieve its goals with a badly designed strategy or an inappropriate execution plan."

Scope of Logistics Planning:

According to Ballou (2009, p.57 and 58): "Logistics planning focuses on four main problems: customer service, location decisions, storing decisions, and transport decisions. And, customer service is the result of planning of other three scopes. The level of customer service logistics affects more than other elements on the system designing. Because the poor level of service means less stores at less locations and uses of cheap tools of transport. While, high service requires the opposite. So, the first interesting of logistics planning should be customer service. Then, the geographic location of Stocking points and sourcing points create the framework of logistics planning. Furthermore, the storing decisions refer to tool of managing stores. And, finally, the transportation decision includes: choosing transportation tool, size of shipment, path of shipment and scheduling."

Moreover, (Farahani, et al., 2011. p. 45) agree with this concept as: "Logistics is the entire process of planning, implementing, and controlling the efficient flow and storage of materials and products, services, information, energy, people, and other resources that move into, through, and out of a firm (in both the public and private sectors) from the point of origin to the point of consumption and with the purpose of meeting customer requirements."

Definition of Project:

The word "Project" is defined by Oxford Dictionary (2006, P.1162) to explain and describe different situations. It is defined in term of (planned work) as: "A planned piece of work that is designed to find information about something, to produce something new, or improve something." It is also defined in term of (school, college work) and this as: "A piece of work involving careful study of a subject over a period of time, done by school or college

students." There is another definition for the word "Project" in Oxford Dictionary concerns with the set of aims or activities: "Project is a set of aims, ideas or activities that somebody is interested in or wants to bring to people's attention."

Furthermore, Project Management Institution (PMI) (2008, P.5) has defined project as: "Project is temporary endeavor undertaken to create a unique product, service, or result."

This Definition is not more differ than that developed by the Association for Project Management (APM) who defined Projects as: "Projects are unique, transient endeavors undertaken to achieve a desired outcome."

There is another definition of project developed by Meredith, and Mantel (2009, p.9) which as: "A project is a specific, finite task to be accomplished."

Also, Wysoki and McGray (2003, p.3) defined project as: "A project is a sequence of unique, complex, and connected activities having one goal or purpose and that must be completed by a specific time, within budget, and according to specification."

Definition of Project Management:

Association for Project Management (APM) defined project management as: "Project management is the process by which projects are defined, planned, monitored, controlled and delivered such that the agreed benefits are realized." (APM Body of Knowledge, 2006, P.2)

Furthermore, Project Management Institute (PMI) defined project management as: "Project management is the application of knowledge, skills, tools and techniques to project activities to meet the project requirement." (PMI Body of Knowledge, 2008, P.5)

Both of these definitions are considered as references for the term Project Management in The United State and Europe. And most project scholars build their concept of understanding project management from these definitions.

Also, (Anderson, Grude, and Haug, 2009, P.14) described project management as: "Project management establishes the foundation for project. It plans, organizes and controls it."

Project Management has, also, defined by Cleland and Ireland (2002, p.39) as: "Project management is a series of activities embodied in a process of getting things done on a project working with project team members and other stakeholders to attain project schedule, cost, and technical performance objectives."

In addition, (Dennis Lock 2007, p.1) defines project management as: "Project management has evolved to plan, coordinate and control the complex and diverse activities of modern industrial, commercial and management change and Information Technology Projects."

Importance of Project Management:

(Kerzner, 2001, p.1 and 2) describes the importance of project management by saying: "Project management came to be recognized as a process that would increase organization value. It allows organizations to lower their cost of operation by accomplishing more work in less time and within fewer resources without any scarify in quality. And, also, it increases profitability."

Project management is important because it ensures what is being delivered, is right, and will deliver real value against the business opportunity. (Aston, 2021)

The importance of project management in organizations can't be overstated. When it's done right, it helps every part of the business run more smoothly. It allows your team to focus on the work that matters, free from the distractions caused by tasks going off track or budgets spinning out of control. It empowers them to deliver results that actually impact the business's bottom line. And it enables your employees to see how their work contributes to the company's strategic goals. (Teamwork, 2021)

Project Life Cycle:

Project life cycle has been defined by (PMI, 2008, P15) as: "A project life cycle is a collection of generally sequential and sometimes

overlapping project phases whose name and number are determined by the management and control needs of the organization or organizations involved in the project, the nature of project itself, and its area of application."

(PMI, 2008, P15), also, identified the process of determining the project life cycle and the output of that process as: "The project life cycle can be documented with a methodology. The life cycle can be determined or shaped by the unique aspects of the organization, industry or technology employed. While every project has a definite start and a definite end, the specific deliverables and activities that take place in between will vary widely with the project. The life cycle provides the basic frame work for managing project, regardless of the specific work involved."

This idea has been strongly supported by (APM, p.80) which explains project life cycle as: "Project life cycle consists of number of distinct phases. All projects follow a life cycle and life cycle differs across industries and business sectors. A life cycle allows the project to be considered as a sequence of phases which provides the structure and approach for progressively delivered and require work."

In addition to that, (APM, p.80) divided project life cycle into different phases as: "The project life cycle phases will follow a similar high-level generic sequence: concept, definition, implementation and handover and close out."

(APM, p.80), also, affirmed that there is other two phases may be added to project life cycle in specific circumstances, (APM) explains that as**:** "In specific circumstances the project life cycle is replaced by an extended form. This extended life cycle includes two further phases: operations and termination."

(PMI, 2008, p.16) does not much differ from this concept of the idea of dividing project life cycle. It expresses its particular phases of project life cycle as: "Starting the project, organizing and preparing, carrying out the project work, and closing the project."

Furthermore, Dennis Lock (2007, P.7) is briefly described project life cycle as**:** "The period between the beginning and end of a project is usually referred to as project life cycle."

In addition to that, Meredith, and Mantel (2009, p.14) explain this view as: "Most projects go through similar stages on the bath from origin to completion. We define these stages as project life cycles. The project is born (its start-up phase) and a manager is selected. The project team and initial resources are assembled, and the work program is organized. Then work goes under way and momentum quickly build progress is made. This continues until the end is in sight."

Moreover, Cleland, and Ireland (2002, p.44) have made a very detailed explanation for project life cycle; they expressed it as: "Project management is a continuing process. New demands always are put on the project team and have to be coordinated by project manager through a process of planning, organizing, motivating, directing, and controlling. As new needs come up before the project, someone has to satisfy these needs, solve the problem, and exploit the opportunities. The project originates as an idea in someone's mind, take a conceptual form, and eventually have enough substance so that key decision makers in the organization select the project as a means of executing elements of strategy in the organization. In practice, the project manager must learn to deal with a wide range of problems and opportunities, each in different stage of evolution and each having different relationship with evolving project. This continuing flow of problems and opportunities, in continuous life-cycle mode, underscores the need to comprehend a project management process which, if effectively and efficiently planned for and executed, result in the creation of project results that complement the organization strategy."

The simplest and clearest description of the project life cycle has been made by Williams, (2008, p. 3), who describes it as: "The generic project life cycle is fairly simple- first you start the

project (called the initiating), then you go on to actually do the project (through the planning, executing, and controlling phases, which form a loop), and finally you finish with everyone happy, a strategy for future, idea in place, and check in your hand (closing)."

So, we can deduce that each project passes through an identified life cycle. That life cycle consists different phases starting from a specific idea in someone mind and develops to be a plan for a needed project and then progresses until become a successfully executed project.

Khartoum State:

Pantuliano (2011, p.3) states: "Khartoum was established as an outpost of the Egyptian army and as a regional trading post in 1821, and was proclaimed the capital of the Anglo-Egyptian Condominium in 1899. Khartoum is Sudan's primary city, not only in terms of absolute population, but also politically, economically and socially. Greater Khartoum today consists of three cities in one: Khartoum, Omdurman and Khartoum North (Bahri). Khartoum, south of the Blue Nile, is often identified as the commercial hub, while Bahri, on the northern bank, is traditionally considered the industrial centre; Omdurman, to the west of the White Nile, is known for its political history and agricultural links. Khartoum's downtown centre, characterised by its colonial architecture, has until recently been the commercial heart of the city. The recent relocation of the central bus station and associated markets further out has diminished its importance and resulted in changing market habits and greater commercial competition in upper-class areas of Amarat and Al Riyadh, as well as in Mayo, El- Salama and Haj Yousif. Omdurman and Bahri are both expanding, with low-level housing, infrastructure development and associated planning challenges. The old Mahdist capital, Omdurman, with a UNESCO world heritage site marketplace at its centre, retains its traditional character, with narrower streets and houses built with local materials."

Moreover, Pantuliano (2011, p.7) adds "Specific urban development plans for Khartoum have also been developed, with the first dating from the early years of the twentieth century, during the British colonial administration. The first post-independence master plan was drawn up in 1960 by an international agency, Dioxidais, which later became involved in the third master plan in collaboration with Abdelmoneim Mustafa Associates. The intervening master plan of 1975 was written by the Italian company MEFFIT, and another master plan was drawn up in 2000. None of these different plans has been implemented. A fragile economy, ineffective government institutions, environmental problems, conflict and vested economic and political interests are among the key factors behind their failure. The inability to implement plans has led to uncontrolled urban sprawl and land misuse. A former State Governor of Khartoum, Ismail Al-Mutaafi, tried to develop a new plan to put an end to irregularities in land use in Khartoum, the Khartoum Structural Plan (2007–2033). The MPPPU was entrusted with the preparation of the plan, which was designed by MEFFIT between 2007 and 2010. The plan was developed on the basis of wide consultations and in collaboration with academic institutions in Sudan. The main aim of the plan is to integrate different neighbourhoods by connecting the various parts of the city with road networks and transport systems. A key government aim is also to ensure that current patterns of ethnic concentration in the city are broken up. The plan's main objective is to ease congestion in the centre, remove squatter settlements and replace them with so-called 'popular housing', and relocate government institutions, military barracks and educational institutions to the city's periphery."

Conclusion and Recommendations:

Khartoum is the capital of Sudan and it faces a huge need for the urban development. And, in the recent year, many housing and residence projects had been implemented whether by the

public or private sector. Therefore, we can conclude with the following:

1- Project management skill is very vital for those taking care of implementation the construction projects in Khartoum State.
2- Logistics planning plays a significant role in achieving the over all aims of implementing construction projects.
3- Khartoum State is a huge promised market of construction industry.

Therefore, we recommend the following:

1- Enhancing the project management processes in all implemented construction projects in Khartoum State, and ensure all personnel in the management level of these projects have the skills and trained to execute project management.
2- Giving logistics planning the deserved consideration during the planning phase of the projects, and ensure it achieves the required objectives.
3- Encourage the private section and financial institutions to invest in residential and housing section in Khartoum State and provide them with all needed facilities.

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