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Logistics Management and Challenges of Infrastructure Development– An Operational Approach of A University

KEYWORDS: Logistics Management, Student Enrolment, University, Infrastructure

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ABSTRACT *Logistics Management is paramount for any types of organization. The development of the organization depends on logistics management. A study was done on logistics management of Periyar Maniammai University from 2007 to 2011. Time Series Analysis was used in this research to know the progress of the university verses the student enrolment. The result revealed that the university has planned its infrastructure in according with the students' population. It started off with three main buildings in 2007 and in 2011 eight buildings with essential supports for educational operations were constructed. The study shows that the university has adopted logistics management effectively to ensure that every infrastructure are well designed and facilitate the requirements for educational purpose, within the stipulated time.*

INTRODUCTION

Logistics has been playing a fundamental role in global development for almost 5,000 years now [see table 1-1]. Since the construction of the pyramids in ancient Egypt, logistics has made remarkable strides. Logistics is the management of the flow of goods between the point of origin and the point of destination in order to meet the requirements of customers or corporations. Logistics involves the integration of information, transportation, inventory, warehousing, material handling, and packaging, and often security The term logistics comes from the Greek meaning "speech, reason, ratio, rationality, language, phrase", and more specifically from the Greek word 'logistiki' meaning accounting and financial organization (Baziotopoulos, 2008).

Table 1-1 Revolution of logistics

YEARS	ACTIVITIES
Around 2700 B.C	Material handling technology in pyramid construction. Blocks of stone weighing several tons were transported and assembled at the construction site. -To build the Great Pyramid of Giza, which is 146 meters high and weighs 6 million tons, the Egyptians needed sophisticated material transport equipment capable of moving the massive building blocks and putting them into place. Even today, we still cannot fully explain how this level of precision was achieved using the hoisting equipment and means of transport available around 2700 B.C
Around 300 B.C	Revolutionary Greek rowing vessels – the new foundation of intercontinental trade. -The revolutionary invention of rowing vessels created the basis for rapid travel across the high seas. This invention formed the foundation for the creation of enormous logistics supply systems required by mobile army camps. Using these logistics capacities, Alexander the Great undertook campaigns with his troops, their families and their weapons of war that extended all the way to India
Around A.D. 700	Procurement logistics in the construction of the Mezquita Mosque – pillars came to Spain from all parts of the Islamic empire. - Construction of the famous Mezquita Mosque in Cordoba, Spain, began in 756 under the Caliph of Cordoba in the Umayyad dynasty. It is considered to be the largest mosque in Europe. Extraordinary procurement logistics was required to transport the pillars of the mosque from all parts of the Islamic empire
Around 1200	The international network known as the Hanseatic League – cooperation for transport bundling and international sea transport. - In 1188, the city of Hamburg, Germany, was founded as a base on the North Sea for the Hanseatic League to make travel on the sea more secure and to represent business interests abroad. Up to 200,000 fur pelts were transported by a single Hanseatic cog ship. Hanseatic trade extended from the Black Sea to Reval. From a modern-day vantage point, the league's cross-border trade bears strong similarities to the European Union
Around 1500	Progressive postal service in Europe – the first time-definite mail shipping service.- Under an agreement with Philipp of Burgundy, Franz von Taxis organized the first postal service with strictly defined transit times. Letters were delivered to places such as Paris, Ghent, Spain and the imperial court of Vienna. In view of the infrastructure of the times and the political fragmentation created by the array of small principalities, the mail reached its destination with very little delay
Around 1800	Discovery of new road conveyances and the railroad expansion of logistics tasks through new technologies and means of transport.- The practical use of the steam engine, the invention of vehicles, railroads and ships as well as the discovery of crude oil ushered in a new economic era that generated new missions, tools and opportunities for logistics
Around 1940	Military logistics during the world wars – transfer of military logistics concepts to the business world.- During World War I, military logistics was the vital link in the network that supplied troops with rations, weapons and equipment. With the onset of World War II, logistics was further refined. As a result, logistics gained an important place in the business world as well
1956	Invention of the sea container – structural evolution of world trade and the boom of international flows of goods. - The invention of the sea container by the American Malcom P. McLean changed production conditions for nearly all industries around the world and, as a result, altered people's consumption habits. Even today, the sea container continues to ensure that harbors gain major contracts, new countries and regions experience commercial booms, markets arise and products from all parts of the world can be bought and sold at reasonable prices. In this way, the container has significantly contributed to globalization.
Around 1970 – 1980	Kanban and just-in-time – logistics concepts with a special emphasis on procurement. - The Kanban and just-in-time (JIT) concepts were developed and introduced at Japan's Toyota Motor Co. by Taiichi Ohno – with the objective of effectively linking logistics to other operational functions. Special emphasis was placed on procurement.

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Around 1990	QR and ECR technologies – logistics concepts with a special emphasis on distribution. - The quick response and efficient consumer response (ECR) technologies were developed during the 1990s and applied by many retail and wholesale companies. These technologies had a major impact on logistics. As a result of this technology, distribution centers are tasked with moving goods instead of storing them. This allows companies to accelerate reaction times to market developments and to set up efficient goods-supply systems.
Today	Supply chain management – a look at the entire logistics chain from the vendor's supplier to the end customer. - Supply chain management is a term that has grown enormously in use and significance since the late 1980s. Today, supply chain management is viewed as a holistic consideration of key business processes that extend from the vendor's supplier to the end user. Accordingly, supply chain management is an extremely interactive, complex system requiring simultaneous monitoring of many conflicting objectives.

Source: Discovery Logistics (2008), 'DHL Logbook in corporation with Technische Universitat Damstadt'http://www.dhl-discoverlogistics.com/cms/en/course/origin/historical_development.jsp retrieved on 9th April 2012

As far as Educational Institution concern, logistics are referred as classroom availability, supply of teaching staff and non-teaching staff, infrastructures, continuous electricity and water supply, transportation of students, classroom furniture, computers, various laboratories, teaching aids, stationeries, library books and basic facilities i.e. hospital, gyms, post-office, bank etc. Accounting and financing the logistics supply for an educational institute is very tedious operations. It needs précised planning as prevent waste of material and unnecessary expenses. Logistics approaches were set of physical assets, knowledge, technology, organisational and people skill (Gammblegaard and Larson, 2001). Gunasekaran and Ngai (2003) mentioned that the logistics encompasses all of the information and material flows throughout an organisation p 823. A number of researchers have examined logistics issues namely, Fawcett et al. (1993), Gary and Davies (1991), Quinn and Hilmer (1994), Welch and Nayak (1992) and Wyatt (1992). However, they were none have integrated logistics management with a university. As such we made an attempt to study on logistics management of a university and we have chosen Periyar Maniammai University which is 5 years old as our sampling.

In today's highly competitive environment among the educational institutions the logistics management becomes part of the institution competency. Good facilities like modern class rooms with modernized table and chairs, computer labs with high end computers, spacious classrooms with training aids were considered by the parents before they admit their son or daughter into the institution. As such, many institutions are aiming to gain confident of the parents by exhibiting the spectrum of infrastructure; so that they may admit their wards into institutions. However, to build-up the infrastructure is not an easy task. Sum and co-researchers shared their views that a key determinant of business performance is the role of the "logistics function" in ensuring the smooth flow of materials, products and information throughout a company's supply chains (Sum et al., 2001). The study was attempted to know the logistics management and operations of infrastructure progression, which was under taken by Periyar Manniammai University to accommodate student enrolment. The University is situated at Vallam-Thanjavur District of Tamil Nadu, India. Periyar Maniammai University was elevated from a college to university in the year 2007 with 1500 students. Today the university houses more than 4500 students across three schools, namely School of Computing and Science, School of Architecture Engineering and Technology and School of Humanities Science and Management. Initially, the university started-off with three buildings in 2007 with floor area 64,541 sq.m. The university has projected to enroll 10,000 students. The study explains the university is progress in their infrastructure projection as per the plan and monitoring report 2008, which states their 10 years planning for infrastructure constructions.

2. LOGISTICS MANAGEMENT OF PERIYAR MANIAMMAI UNIVERSITY

The aim of the university was provide an opportunity for rural based student to pursue engineering, science and management related courses. Thus, providing them jobs in multi-national industries which is a dream of every rural student. The process of infrastructure building needs careful planning and monitoring to accommodate the arrival of students. According to Fredrik and Jonas , the process of planning and controlling has to be balanced by considerations to emergent phenomena and the processes of self-organization (Fredrik N. and Jonas W., 2002*)*. Likewise, Periyar Maniammai University has considerate space management that involved in expanding their infrastructures which is coinciding with Fredrik and Jonas findings. Shankar (2001) said that the importance of logistics is to predict the demands and to have the ability to adjust procurement, production, and transportation which is essential in future business environments.

Logistics management is defined by the Council of Logistics Management (CLM) as:
"The process of planning, implementing and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements."

(Lambert, Stock & Ellram 1998, cited Fredrick & Nelson 2002)
Kova´cs and Spens, (2011) mentioned that logistics management can be considered for development and reconstruction operations, service and technology providers, product and service development for humanitarian purposes, and most importantly, strategic considerations in the humanitarian supports. Similarly, Periyar Maniammai University has planned their development and constructions to cater better services to students especially those who come from rural area, who wish to pursue their higher education with them. Using the resources available within the university i.e. building material, manpower and engineering staff was an advantage for the university in developing and construction of infrastructure. Olavarrieta and Ellnger (1997) said that resource acquiring is a key strategic resource for logistics competency approach. Barney (1991) mentioned that valuable resources can be exploited to reduce the threats in a firm's envorinment and enhancing efficiency and effectiveness. As per Barney (1991) explanation the university has used its resources wisely, in turn it has enhanced efficiency and effectiveness of the construction.

3. METHODOLOGY

The time series analysis was used in evaluating Periyar Maniammai University's logistics management. The data from year 2007 to 2011 was collected from the Estate Office of the University.

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4. FINDINGS

Table 2-1 Built-up of Infrastructure

Infrastructure	2007 (a)	2008 (b)	2009 (c)	2010(d)	2011 (e)
Technology Block I (3612.22 sq. m)	Re-Construction of Conference Hall (800 sitting cap.) construction of Academic Hall (100 sitting cap.)+ Conference Hall (50 sitting cap.)	Construction of COE office Construction of Digital Lab ECE	Upgrading of Seminar hall		
Technology Block II (2525.60 sq m)	Construction of Foundation (2525.60 sq. m)	Construction of 1st Floor completed and 2nd floor undergoing construction	Construction of 2nd Floor completed and 3rd floor under construction	Construction of 3rd Floor completed and 4th floor under construction	Construction of 4rd Floor completed
Technology Block II (annex) (2525.60 sq m)			Construction of Ground Floor completed and 1st floor under construction (2525.60 sq m)	Construction of 1st Floor completed and 2nd floor under construction	Construction of 2nd & 3rd Floor completed
Periyar Knowledge Centre (2410 sq. m)	Construction of 1st Floor completed and 2nd floor under construction	Construction of 2nd Floor completed and 3rd floor under construction	Construction of 3rd Floor completed and 4th floor under construction	Construction of 4rd Floor completed	
Periyar Knowledge Centre (annex building) (1782.13 sq.m)		Construction of Ground Floor completed and 1st floor under construction	Construction of 1st Floor completed and 2nd floor under construction	Construction of 2nd Floor completed and 3rd floor under construction	Construction of 3rd and 4th floor completed
Architecture Building (1001.42 Sq.m)	Construction of AV Hall, and additional 2nd floor	Construction of 2nd Floor and completed in the same year			
B.Ed building (2669 Sq. m)			Construction of Foundation	Construction of Ground Floor completed and 1st floor under construction	Construction of 1st Floor completed and 2nd floor under construction
Periyar Technology Business Incubator (756.43 sq. m)	Construction of Ground Floor completed and 1st floor under construction	Construction of 1st Floor completed and 2nd floor under construction	Construction of 2nd Floor completed and 3rd floor under construction	Construction of 3rd and 4th Floor completed	
Build-up Floor Area in Sq. M	64541.25	31202.58	58122.76	58122.76	54956.33
Student	117	1100	1800	2300	3500

Source: Annual Reports of Estate Office. PMU 2012

Table 2-2 – Build-up Area for the period of 5 Years

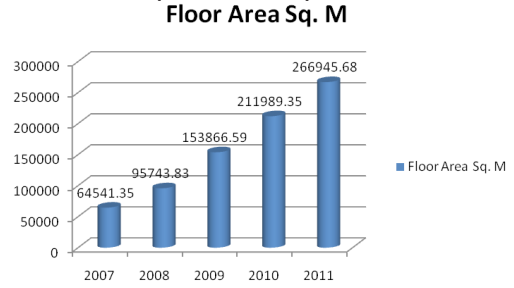
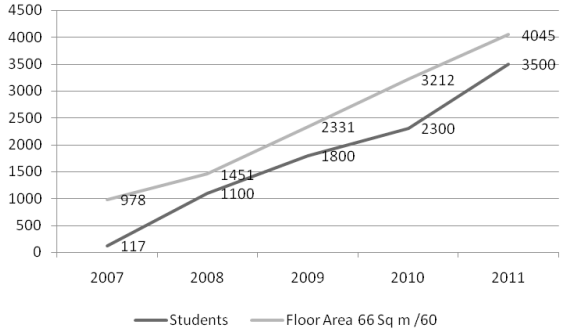


Figure 2-3 Build up Area



As from the above chart Table 2-2, constructions area of 266945.7 sq m which has the capacity of holding 4045 students[see table 2-3] were erected to accommodate the student intake within period of 5 years.

Floor Area = Total Area of Construction
***AICTE Norms per 60 Students**
= 266945 Sq.m.
66
= 4044 Students

***Source: All India Council Technical Education, 2011-2012 Handbook, pg 94**

This indicates that Periyar Maniammai University has a strong logistics management that it could build the required infrastructures within a stipulated time.

5. CONCLUSION

An attempt has been made to confer the experiences of a university which managing the logistics within it means. According to the, Dr.N. Ramachandran (2012), Honourable Vice-Chancellor of the University, who is also a practicing civil engineer, mentioned that the success of the logistics management depends upon the following factors:

- Knowing the technical aspects of constructions
- Planning and Monitoring of the raw material availability
- Utilization of Manpower
- Continuous Training for Staff on Logistics Management
- Knowing the student enrolment in advance

This research study on the logistics of university revealed that the logistics management plays an important role in the operational activities of a university.

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