



Article Title: Logistics Management in Construction Industry

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ABSTRACT

Planning, transporting, and controlling the process of acquiring and managing resources is known as logistics in construction management. It is impossible to ignore the importance of logistics in construction management. With the right logistics, a challenging construction project can become a well-organized activity with reduced costs and improved procedures. Construction logistics main goal is to facilitate the hiring of laborers, the transportation of materials, and other resources needed during the construction process. This project focuses on researching factors influencing logistical management in the construction sector and putting appropriate solutions in place. For this purpose, initially nineteen Literatures are studied based on construction logistics management. From the literatures it was studied that statistical analysis is better way to analyze Logistics management in construction industry and important factors that are affecting in construction logistics is identified from the literatures. Questionnaire regarding the factors affecting construction logistics is also prepared. Then, data was gathered from various construction companies. The data are then ranked using the relative importance index method. The Microsoft Excel software is used to analyse this data and identify the key variables that have an impact on logistics management in the construction sector. The Microsoft Excel software is used to analyse this data, and Anova one-way test is used to identify the important factors that influence logistics management in the construction industry.

Keywords: Logistics management, Construction logistics, Construction logistics plan

1 Introduction

Logistics in construction management is the process of planning, executing, and controlling procurement, transportation, workers, and resources. Some construction logistics managers refer to logistics as inventory management at motion and rest. Effective logistics management can increase efficiency and productivity while lowering costs and saving time. Construction logistics encompasses a wide range of activities, from determining the most efficient route for deliveries to ensuring that materials are stored safely and securely on-site. Construction logistics must also consider the possibility of disruptions, such as bad weather or strikes, and plan accordingly. Construction logistics is a complex and difficult field, but it is an essential component of any successful construction project. Construction logistics can help ensure that a project runs smoothly and efficiently from start to finish by carefully planning and coordinating the transportation, storage, and distribution of materials and equipment.



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2 Literature Review

Tewodrosteklay (2021): This study assesses construction industry stakeholders' perceptions of the need for and importance of logistics management on selected urban building construction projects, as well as identifies and analyses current practices and challenges in the construction logistics management process. The study employed descriptive research designs based on data from primary and secondary sources. The study subjects are currently active Addis Abeba urban projects overseen by the Addis Abeba Housing Development Agency.

Abdul Mohsen Almohsen and Janaka Ruwanpura (2013): The primary goal of this paper is to introduce mobile-based application technologies into the construction industry, which will improve construction productivity by improving logistics management practices. The use of this model will not only help increase productivity in the construction industry, but it will also make this industry more competitive with other industries. A computerized logistical management model was created to investigate how to increase construction productivity and improve logistics management practices.

Tsionregassa (2015): This research focuses on logistics management in construction projects. Most construction projects suffer from poor logistics management, indicating the need for improved construction logistics. As a result, the purpose of this paper was to investigate, through site observations and interviews, the current logistics situation on the construction site and to propose possible solutions for improving construction logistics in one of the country's megaprojects, Addis Abeba Housing Development Project Office.

Yuan Fang and S. Thomas Ng (2011): The purpose of this paper is to investigate whether the development of logistics cost analysis can aid in the determination of appropriate logistics strategies for a project involving the use of bulky components such as precast concrete units. The activity-based costing (ABC) approach is used to identify the cost elements incurred during the logistics process of precast components from the supplier's yard to the construction site.

3 Methodology

The review of literature demonstrates the importance of logistics management in the construction industry. In addition, the questionnaire was designed with an understanding of the factors influencing logistics management in mind. Data is gathered by visiting various construction companies. Questionnaires are used to collect information. The site supervisors, engineers, and project managers are surveyed using a questionnaire. These work management approaches are all about determining the best way to initiate, methodically plan, and execute the project depicted in figure 1.



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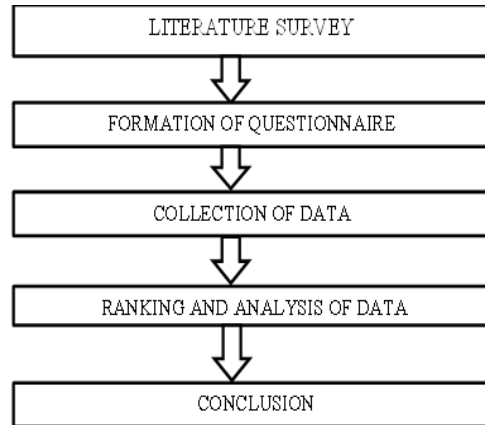


Figure 1: Flow chart of Methodology

4 Ranking

This section discusses the findings of the data collection for factors influencing Logistics in the construction industry. It is done to determine the position of a specific variable within a group of variables. The data was ranked using the Relative important index method.

Table 1: Relative important index of factors influencing equipment management in construction

Rank	Factors	R11	Standard Deviation
1	Cost	0.83	2.380
2	Safety	0.81	2.368
3	Locality	0.72	2.108
4	Contractor	0.69	1.929
5	Serviceability	0.72	2.108
6	Environment	0.44	1.247

Table 2: Relative important index of factors influencing material management in construction

Rank	Factors	R11	Standard Deviation
1	Planning	0.92	2.614
2	Cost	0.89	2.539
3	Storage	0.69	2.055
4	Supplier	0.67	1.957
5	Waste	0.64	1.900



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Table 3: *Relative important index of factors influencing in transportation management*

Rank	Factors	R11	Standard Deviation
1	Cost	0.89	2.539
2	Time	0.75	2.198
3	Duration	0.69	1.972
4	Climate	0.64	1.764
5	Safety	0.58	1.683
6	Route	0.53	1.491
7	Physiography	0.45	1.279

Table 4: *Relative important index of factors influencing in documentation in labor management processes*

Rank	Factors	R11	Standard Deviation
1	Drawing	0.97	2.759
2	Delay in approval of permission	0.92	2.614
3	Changes in permission drawing	0.89	2.571
4	Site inspection	0.86	2.528

Table 5: *Relative important index of factors influencing in Technical parameter in labor management processes*

Rank	Factors	R11	Standard Deviation
1	Lack of experience	0.83	2.415
2	Drawing errors	0.81	2.297
3	Lack of construction knowledge	0.75	2.198
4	Construction methods adopted	0.69	1.929

Table 6: *Relative important index of factors influencing in Management in labor management processes*

Rank	Factors	R11	Standard Deviation
1	Improper resource allocation	0.89	2.571
2	Improper planning	0.83	2.380
3	Improper work schedule	0.81	2.297

Table 7: *Relative important index of factors influencing in Resources in labor management processes*

Rank	Factors	R11	Standard Deviation
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1	Increase in the price of materials	0.86	2.461
2	Increase in the price of materials	0.83	2.380
3	Tools and equipment shortages	0.69	1.929

Table 8: *Relative important index of factors influencing wages in labor management processes*

Rank	Factors	R11	Standard Deviation
1	Payment delay	0.86	2.461
2	Lower wages	0.75	2.121
3	Difference in pay scales	0.67	1.826

Table 9: *Relative important index of factors influencing time management in construction*

Rank	Factors	R11	Standard Deviation
1	Lack of material	1.00	2.828
2	Plan schedule management	0.86	2.461
3	Supervision delay	0.83	2.415
4	Equipment	0.72	2.068
5	Cost of design	0.64	1.810
6	Nature of site	0.58	1.633

Table 10: *Relative important index of factors influencing cost management in construction*

Rank	Factors	R11	Standard Deviation
1	Cost of design	0.94	2.687
2	Priorities of client	0.92	2.614
3	Legislative constraint	0.83	2.415
4	Method of construction	0.81	2.297
5	Nature of the project	0.69	1.972

Table 11: *Relative important index of factors influencing risk management in construction*

Rank	Factors	R11	Standard Deviation
1	Effort in managing risk in projects	0.89	2.539
2	Rush design	0.86	2.461
3	Unmanaged cash flow	0.83	2.380
4	Improper site investigation	0.81	2.297
5	Resource management	0.78	2.285
6	Poor communication	0.69	1.972
7	Unstable security circumstances	0.67	1.871



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8	Environmental factors	0.53	1.491
9	Cultural custom	0.50	1.414

Table 12: *Relative important index of factors influencing in safety management in construction*

Rank	Factors	R11	Standard Deviation
1	Effort in managing safety in projects	1.00	2.828
2	Safety audit	0.92	2.614
3	Safety monitoring	0.86	2.527
4	Safety training	0.81	2.369
5	Environmental factors	0.69	2.014
6	Psychological	0.58	1.614
7	Cultural custom	0.58	1.633

4.1 Multiple Choice Question Analysis

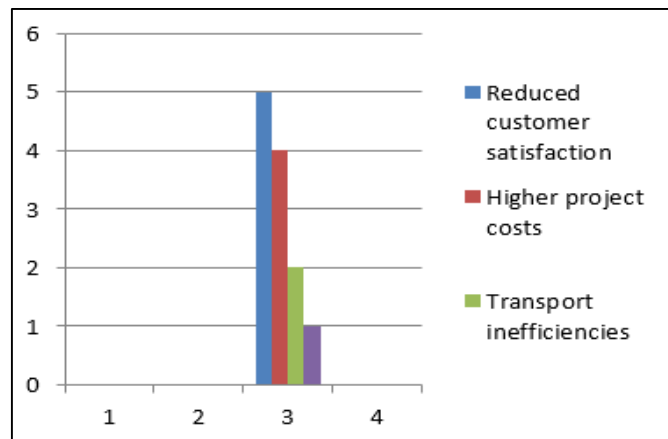


Figure 2: *Effects of poor logistics management*



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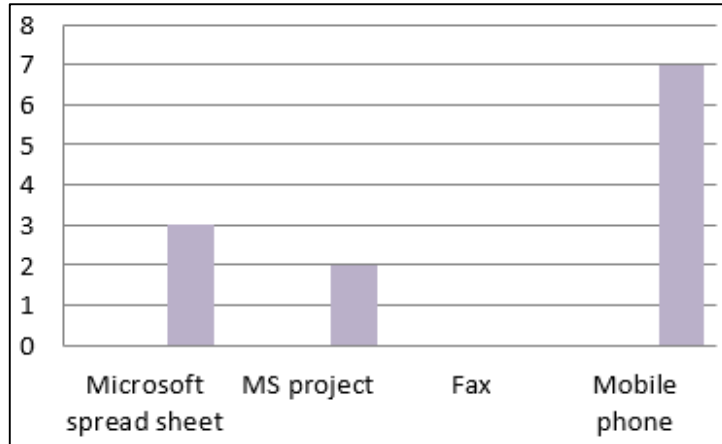


Figure 3: Information Communications Technology (ICT) tools mostly used in construction companies

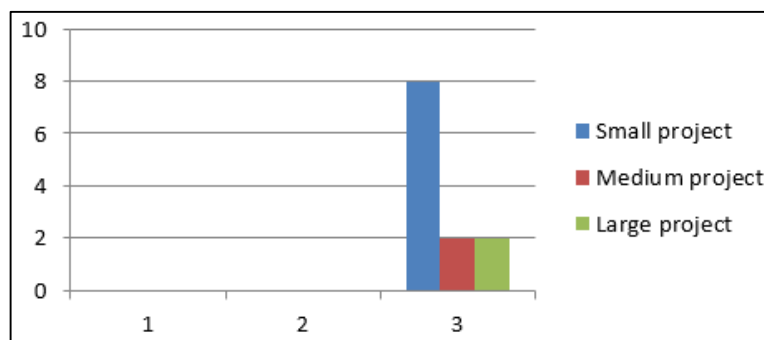


Figure 4: Types of projects usually undertaken by companies

5 Results

The current work's findings are based on a survey of construction companies. Poor customer satisfaction is one of the effects of poor logistics management, as shown in Fig. 2 Customers' satisfaction and customer relationships continue to receive more attention as construction companies contend with escalating competition. The construction industry could benefit from improved logistics. According to Fig. 4, the majority of the respondent companies are able to take on small projects, and the majority of the companies rely on mobile phones as their primary ICT tool from fig 3 one of the fundamental prerequisites for the development of logistics processes is the existence of logistics subsystems and the exchange of accurate and timely information.

The results obtained are:

1. As it can be observed from the Table-1 from the perspective of Project manager and engineers cost is ranked first major factor that influence construction logistics management in Equipment sector, with (RII=0.83).



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2. Planning has a significant impact on maintenance management, as shown in table 2 with (RII=0.92).
3. The cost has a major effect on transportation management, as shown in table 3, with (RII=0.89).
4. As shown in table 4 (RII=0.97), drawing has an important influence on documentation parameters in labour management.
5. Lack of experience has an enormous effect on technical parameters in labour management, as shown in table 5 with (RII=0.83).
6. Improper resource allocation has an enormous effect on Management parameters in labour management, as shown in table 6 with (RII=0.89).
7. As in 7 table Material price increases have a significant impact on the resources parameter in logistics in laboratory management (RII=0.86).
8. As shown in table 8 with (RII=0.86), payment delay has an effect on wage parameters in labour management.
9. As shown in table 9 with (RII=1.00), a lack of materials has a significant impact on technical parameters in time management.
10. The cost of design has a huge impact on management parameters in cost management, as shown in table 10 with (RII=0.94).
11. Risk management efforts in projects have a significant impact on risk management, as shown in table 11 (RII=0.89).
12. The logistics of safety management are significantly impacted by efforts in managing safety management, as shown in table 12 with (RII=1.00).

6 Suggestions

1. Preventative maintenance is to ensure that equipment always performs optimally. Maintenance is carried out before it is strictly necessary, ensuring equipment never becomes unusable due to component failure.
2. A comprehensive strategy helps to prevent these problems, resulting in more accurate budgeting and forecasting.
3. Transportation solutions include selecting suppliers from surrounding areas, proper packing systems, selecting the best transportation route, and transportation at night.
4. One of the more obvious ways to save money is to use cheaper, alternate building materials that are either more effective or more widely available.

7 Conclusions

According to the data analysis, certain factors, including cost, inadequate planning, inexperience, improper resource allocation, and efforts to manage risk and safety in projects all have a significant impact on logistics management in the construction industry. Based on the analysis of the data, it was determined that poor logistic management results in delays and



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cost overruns, which are primarily caused by insufficient materials on the job site, late drawing submission, poor planning, etc. The unneeded effects that inadequate logistics management has on the construction industry can be reduced with the addition of construction logistics technologies. It is clear from this study that developing a construction logistics plan necessitates close attention to detail, professional experience, team member communication, and a flexible mindset. An effective logistics strategy can transform a challenging construction project into a well-organized event with reduced costs and improved procedures.

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