

Challenges of Building Construction in Mekelle city, Ethiopia: from Contractors' perspective

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Abstract—Building Construction in Mekelle city, Ethiopia is in a very fast growing in recent years than ever due to fast increase of population and the desire of better living standards. Even though it shows fast growth is faced by different challenges that retards from complete on time and on budget and quality. The objective of this study is to identify the challenges that impact building construction and giving recommendation to the most critical challenges. A structured questionnaire has been distributed to 50 engineers in the profession from contractor side. Among the 50 respondents data has been collected from 34 (68%) respondents. The responses was analyzed by relative importance index method (RII). The result shows that out of 25 factors the top five most are Delay in land acquisition, Lack of cost planning, Shifting of existing utilities, slow decision-making by owners, and Payment delays by owner. Hopefully, findings of this study will help contractors, clients, consultants and designers to avoid the challenges in their future works.

IndexTerms—Challenge, Mekelle, Ethiopia, RII.

I. INTRODUCTION

Building construction is defined as the process of constructing buildings for different purposes. Those can be for residential, commercial, instructional, and or warehouses. As development of one country increases the living standard of people also increases and demand for buildings for different purpose increases. Building plays an important role in any county's development from shelter to store. Building construction is a capital, labour, material and equipment intensive process to come into image. To get the desired result is very challenging it needs integration of the above resource. This integration is to require the clients satisfaction based on the specification, drawing, and contract that had stated. This construction plays avital role to the economic development of the country by creating job, fulfilling the people demand and standard of living. In Ethiopia, building construction is in a very fast growth that changes the image of the country especially in the two decades. The country gives attention to the construction industry, like bridges roads, airport terminals, dams and high-rise buildings.

1.1 Building construction in Mekelle City

Mekelle, the capital city of Tigray, Ethiopia is located 13.50 latitude and 39.48 longitude and 2068 and it is the largest city in the state. The construction development in the city is very fast and changing the city image and becomes the town as the center of economy and politics. Even though the construction sector development in the city is very fast than other construction sectors, it is challenged by different factors that retard its progress. To mention some of the problems are like ground condition, scarcity of water, lack of electric power, market inflation etc.



Fig. 1: Mekelle city map
(adopted:

https://www.google.co.in/search?dcr=0&source=hp&ei=Jhp9WvXoDIjavgS9v5LQAw&q=mekelle+map&oq=mekelle+map&gs_l=psyab.3..35i39k1j0j0i22i30k1i6.2248.10281.0.11228.15.12.2.0.0.292.2689.0j1j10.12.0...0...1c.1.64.psyab..1.14.3036.6.46j0i131k1j0i131i20i263k1j0i20i263k1j0i46k1j0i10k1j0i22i10i30k1.195.q6nCMmnFC4Q)[4].

1.2 Objective of the Study

The study has the following objectives:

1. To identify the challenges that impact building construction Mekelle city
2. To rank the identified factors that affects building construction.
3. To give recommendations for major challenges problems.

II. REVIEW OF LITERATURE

According to Tadesse A. et al. (2016)^[1], the construction practice in Ethiopia is poor and is faced to many challenges. He argue that the construction project management is unsatisfactory like, poor project management functions, techniques, and tools. Particularly, he found that safety time and risk were low. The time overrun and cost overrun and as risk, safety, resources utilization and quality ranges from 61-80% and 21-40% from originally estimated respectively.

K. S. Shobana and D. Ambika (2016)^[2], stated in their study on factors affecting quality in construction. Their research was carried out to identify the factors that have adverse effect on the construction projects. The main categories of factors that affect quality are: 1) Resources 2) Interaction and communication 3) Inventory and payment 4) Standards and experience 5) Labours 6) Inspection and monitoring and 7) Quality and risk.

They identified 52 factors (13 on cost, 31 on time, 5 quality and 3 on leadership) building construction projects case. Finally they found that time performance were delay to furnish deliver the site (Right of way problem), financial problems and improper planning. Whereas the extremely significant factors affecting cost performance were design changes, fluctuations in the cost of most significant factors affecting quality performance were construction project educated personnel, relevant work experienced personnel, quality of materials and equipment used in the project construction and conformance to specification. The most significant factors affecting the leadership performance were leader's professional education, leader's relevant work experience and training (Abera Legesse Yada and Fekadu Takele Yadeta, 2016)^[9].

In Ethiopia there is high development in infrastructure and housing it covers the land scape. Due to its economic rise the country becomes destination of investors from around the globe. Mostly the projects are around or at the capital, Addis Ababa. The construction demand creates good opportunities for Chinese and European companies around the world. Even though there is high development of infrastructures in the country, there are challenges that retard achievements. These are the following (<https://www.allianceexperts.com/en/knowledge/countries/africa/business-opportunities-in-the-ethiopia-construction-sector/>)^[3].

- o "Construction inputs are costly due to import fees.
- o High rates of foreign exchange require further funding in Ethiopia's private and public sectors.
- o Ethiopia's project managers are not as adept as other European or Chinese managers; thus, making project management a hassle.

Despite these inefficiencies, business opportunities in the Ethiopian construction sector have been emerging for some time now. The country has opened its doors to more foreign investors. In turn, opening opportunities for European, Chinese and other companies all over the globe, to expand their businesses and increasing the country's employment rate [3]."

Source:<https://www.allianceexperts.com/en/knowledge/countries/africa/business-opportunities-in-the-ethiopia-construction-sector/>

Addis M. (2014)^[6], on his study, "A Study on Construction Contract Risk Management Practices in Ethiopian Building Construction Projects", has studied the test the level of awareness, and use dealing with the construction risk management and identify causes. Different literatures were assessed to show that risk management is a very important management process that helps in making projects successful. He was used questionnaire survey for collecting the data on randomly selected construction companies to observe their awareness and how they deal with risks in their projects and analyzed the collected data using mean score. His study reveals that peoples in the industry have no knowledge about risk management, being dependent on individual's judgment and past experience, Poor contract management and always it is exposed to the risk of delay, over budget.

Desai Megha and Dr. Bhatt Rajiv (2013)^[7], there study was based on 59 causes of delay in Indian residential construction. He studied that as delays are the bottle necks of construction success and creates bad image on the industry and adversarial relationships between the stakeholders like exaggerated prices, loss of productivity and revenue, and contract termination. Delays are unique one in every of the largest issues construction companies are facing today. Those this problem is caused by different sources. This is common phenomenon in every project and have unique causes. He classified the identified causes in to nine classes according their sources. And he had applied RII method to analyses to know the importance of those causes.

Temitope D. and Timothy Oyedotun (2017)^[5], there has studied water supply challenges of Mekelle city. His study was initiated by the problem observed in the city and he gives own suggestion based on the real situation of the area and since water is the lifeline of any activity so that problem of water supply cannot be tolerated. . He also explained that this problem is not exception in the city rather it tis the problem of all developing countries. Demonstration according to his study in the area. His study was conducted based on interviewing with the concerned bodies. In the city both all the state/ city bureau federal government and world bank rea participating to avoid the challenges. even though many efforts has been done and is doing but it can't meet the demand of the residents because of many problems like: 1) limited capacity of human capital and expertise that will ensure the proper management of borehole interventions; 2) insufficient cost recovery for proper operation and maintenance of the projects; 3) loss of land and farmlands and lack of compensations because of the projects which affect the livelihood. Finally he his recommendations are 1) sufficient allocation of budget to the project by the state and central gov't 2) retain and give capacity building to the staffs 3) donor organizations should follow up the project implementation.

Summary:

Literature review is the key thing situation in research work, it gives in sight about the project area and overviews. So, challenges of construction projects are similar everywhere but their source may be unique to every given projects according the

nature and complexity of the project. Because of the stated reasons once the factors are harvested and consult with the experts in the profession and based on their suggestions and comments the questionnaire survey has developed.

III. METHODOLOGY

To meet objectives, it is necessarily that to apply methodology. Methodology is an approach in which applied to proposed objective. To conduct this study different literatures has been thoroughly reviewed, like books, articles, conference papers, understanding the reality in the area and internet sources. Based on the reviewed papers factors which are causes challenge to the industry has identified. Based on that 25 factors were identified. Based on the identified factors a structured questionnaire survey was prepared because this tool is applicable method of data collection adopted by researchers like (Desai Megha and Dr. Bhatt Rajiv, 2013^[7], Addis Mesfin, 2014^[6], Fetene N., 2008^[8]). The prepared questions has sent to the engineers in who are working in contractors' side. Five point Likert scale is adopted in the questionnaire survey (1' strongly disagree to 5' strongly agree, so respondents' are requested to rate based on experience and knowledge. The respondents' are requested to fill based on their experience and knowledge. After collecting the data, statistical software (MS Excel 2013) was used to calculate RII value of the factors to rank and know their importance of the identified factors.

Graphically,

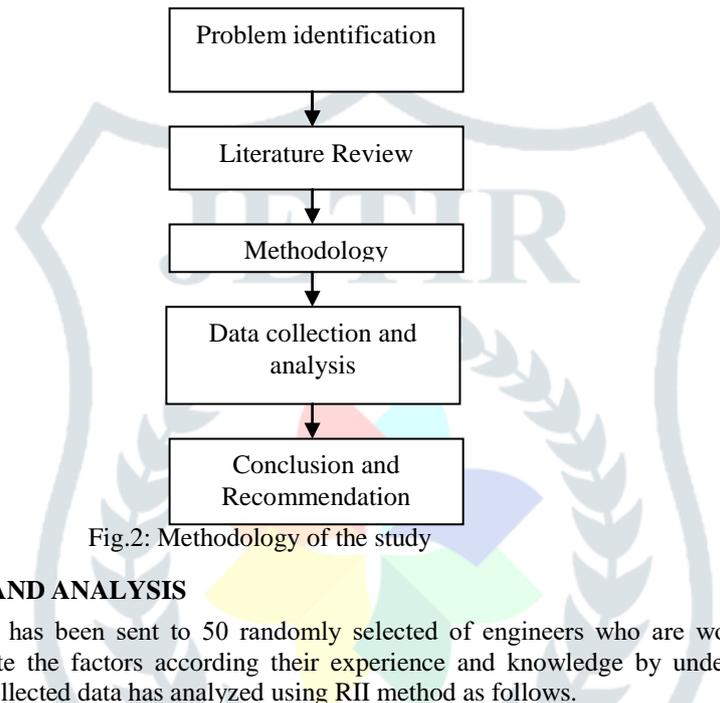


Fig.2: Methodology of the study

IV. DATA COLLECTION AND ANALYSIS

A structured questionnaire has been sent to 50 randomly selected of engineers who are working in contractor's side. The Engineers are requested to rate the factors according their experience and knowledge by understanding responsibility and 34 responses has returned. The collected data has analyzed using RII method as follows.

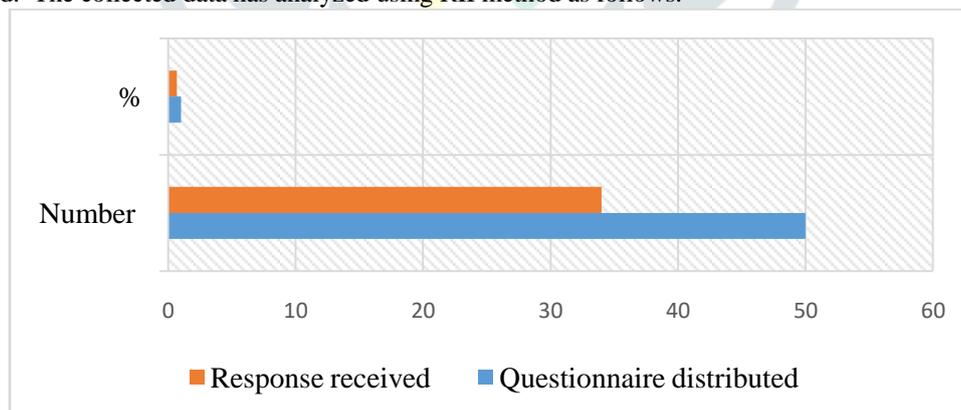


Fig. 3: Response distributed and received

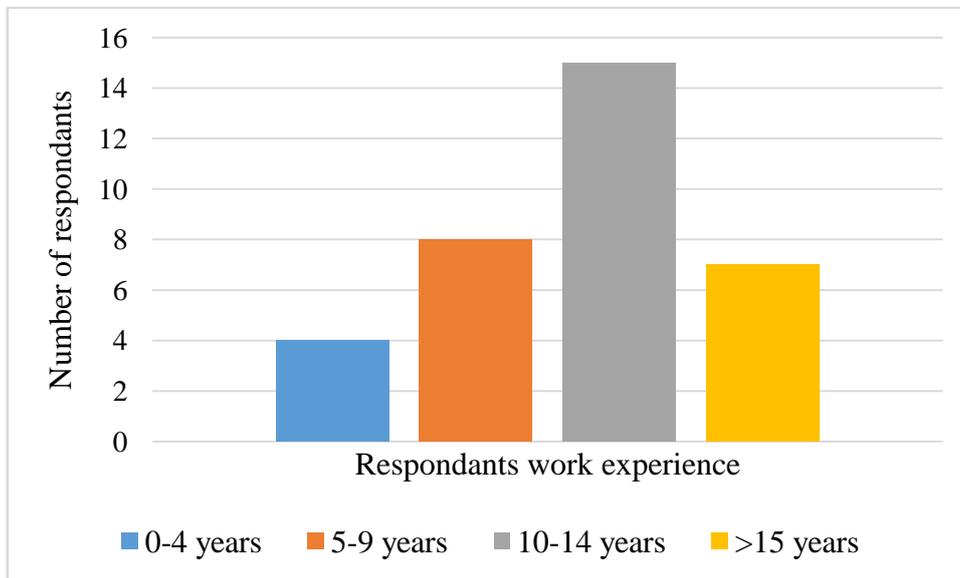


Fig.4: Respondent’s work experience

To determine the rank of each identified RII was adopted used.

$$RII = \frac{\sum (5n_1 + 4n_2 + 3n_3 + 2n_4 + 1n_5)}{A * N}$$

Where, RII= relative importance index

5 to 1 weight given to each factor (5’ strongly agree and 1’ strongly disagree)

A= Highest weight (in this case 5’) and N= total number of respondents.

Using the above formula, RII value of all factors were calculated and results shows that Delay in land acquisition (RII=0.888), Lack of cost planning (RII=0.865), Shifting of existing utilities (RII=0.835), Slow decision-making by owners (0.829), and Payment delays by owner (0.818).

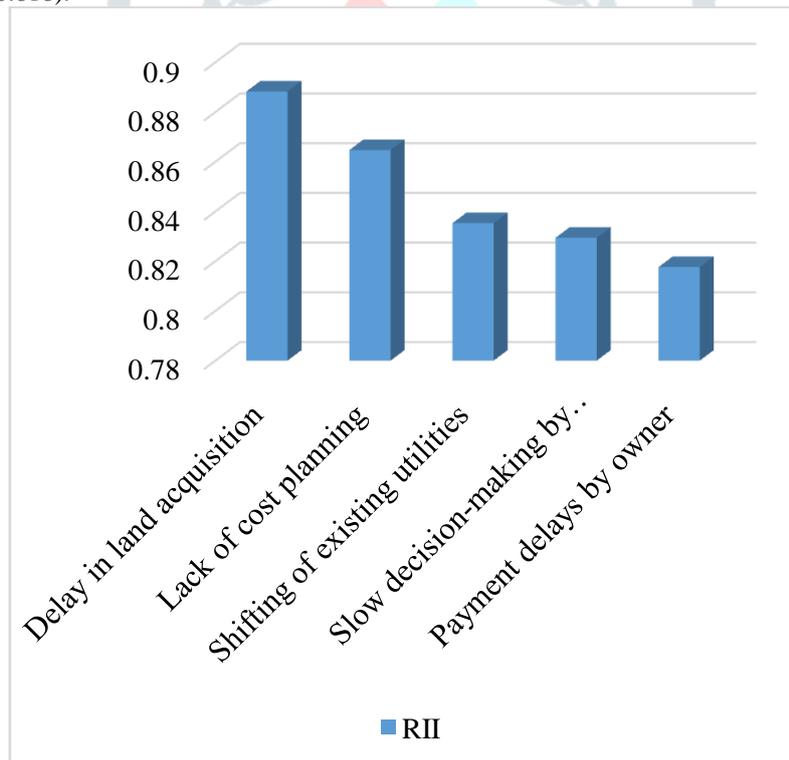


Fig. 5: Top most factors affecting building construction in Mekelle city

V. CONCLUSION AND RECOMMENDATIONS

Building construction is the process of constructing buildings for different purposes. Those can be for residential, commercial, instructional, and or warehouses. As development of one country increases the living standard of people also increases and demand for buildings for different purpose increases. Building plays an important role in any county’s development from shelter to store. In Ethiopia the construction sector is in fast track, but it is not as much as its expectation because of different challenges and it is not expected in Mekelle city. To identify these problems and gives recommendations this study is being studied. By assessing the collecting data results shows that Delay in land acquisition, Lack of cost planning, Shifting of existing utilities, slow decision-making by owners, and Payment delays by owner are the critical challenges that affect the industry in Mekelle city.

To solve the above problems, here are respective recommendations.

1. Delay in land acquisition (RII= 0.888): this factor ranks the in the first. Land acquisition is a big problem and very challenging effect to the success of construction industry. In this case all respected bodies has to fist clear the land related problem prior to commence the work. Concerned authorities have to prepare masterplan and give enough compensation to the late owner of the land and make them free and can easily transfer to the new owner so that delay to acquisition will eliminate.
2. Lack of cost planning (RII=0.865): this is the second factor in which it challenges building construction in Mekelle city. This problem is happen due to poor or improper determination of cost in pre- on and post construction stages. So it is recommended that proper, right and detailed cost planning should be prior to commencing the work.
3. Shifting of existing utilities (RII=0.835): this is the third challenge in the city. Existing utilities are facilities which has been placed or pass through the area. It is recommended that the municipality of the city or any concerned body has to prepare shifting areas for the displaced facilities and use of proper masterplan to overcome such kind of problems.
4. Slow decision-making by owners (RII=0.829412): this is the 4th challenge to the industry in which slowness of decision making is there so that owners should be positive and try to solve any complain raised by the contractor or otherwise hire representative that can deal and follow ups instead of him.
5. Payment delays by owner (RII=0.817): this is the common head ache of construction industry. Is it the delay of payment by the owner for completed work so that contractor cannot go ahead because he is not sure whether the owner can cover the expenditure or not. It also cause by financial insecurities of in the owner this is mostly happen and weak estimations in private owners. In case of public owner the process of payment is very slow because of accountability and process of checking by concerned bodies. To avoid/ minimize this problem it is recommended that irrespective of ownership owners financially secured based on detailed project prices and motivate contractors by paying on time for completed works or as per their agreement.

VI. ACKNOWLEDGEMENT

I would like to thank to Mr. Gebreselama Gebreegziabher (Civil Engineer at commercial bank of Ethiopia, Mekelle branch) for collecting the data and for his valuable suggestions.

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