

# Investigation of Major Success Factors on Building Construction: the Case of Bole Sub City, Addis Ababa

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**Abstract:**-The construction industry is one of the largest job creators in developing countries and is highly competitive. The high number of project failures suggests the existence of underlying major success factors which have not been identified. Major success factors are inputs to project management practice which can lead directly or indirectly to project success. Ethiopia is one of the developing countries which cannot accomplish its construction industry goals due to lack of identifying different major success factors. This is also true in Bole Sub City. The purpose of this study was to investigate and rank the major success factors in building construction projects of Bole Sub City.

This study was conducted in Addis Ababa Bole Sub City on investigating of major success factors based on selected respondents. The literature review was conducted and data collection about success factors on building projects was conducted by using questionnaire, desk review and interview. The collected data was analyzed up to end of December, 2015. The main sources of the information were, clients, contractors, consultants and others in building construction projects of Addis Ababa Bole Sub City. Respondents were purposively selected. 120 questionnaires were distributed to 7 contractors, 4 clients, 5 consultants and 2 others companies in order to identify types of success factors.

From the identified major success factors; Leadership skills of project manager; project clear objective, adequacy of funding, decision making effectiveness and project monitoring are the highest significant success factors according to their rank order which are evaluated based on their relative importance index.

Considering the obtained results of this research, in order to accomplish building construction projects successfully the contractor of the project should have an experienced leader of the project and effective decision maker project manager. Client should ensure adequate preparation for fund is made before projects are started and the objective of project should be clearly stated for constructing parties

**Keywords:** Success Criteria; Major Success Factors; Construction Industry

The construction industry is one of the most used examples of project based industries. It might be characterized as complex, cost and time consuming and risky.

However, construction projects are also dynamic and challenging which attracts capital, new technologies and brilliant brains. Housing building projects particularly represent one of the largest sectors of the construction industry in the most developing economies of the world [5].

The construction industry is an important sector of any economy and has multiple backward and forward linkages with other sectors [8]. Projects can be considered as a set of activities that must be completed in accordance to specific objectives which involve the utilization of a company's resources. The project management is coordinating a process of interrelated functions such as planning, organizing and controlling construction activities for getting successful outcomes. Project management concept and techniques can be applied to any project ranging from simple task, office renovations or refurbishment to complex and complicated projects like the design and construction of an airport or shopping center [3].

Consensus exists among researchers that most reasons for project success can be attributed to the presence or absence of certain project characteristics, referred to as major success factors. Major success factors require special attention from management owing to their impact on project performance [7]. A project, irrespective of its size or magnitude, must be completed under three constraints "Cost, Time and Scope" often referred to as the "Triple Constraints of Project Management" [8].

Completion of construction projects within the specified triple constraints and quality are signs of successful project management. It has been generally observed that in most of the public sector projects in developing countries, objectives and deliverables are not clearly defined which adversely affect the project planning, designing and execution, as a result, projects over run the triple constraints cost, time and scope. The degree of success of any project is therefore measured with reference to triple constraints of the projects [9].

*This study has focused to investigate the major success factors of the construction companies working in Addis*

Ababa Bole Sub City; therefore, this city forms the survey population area.

Thus investigating the major success factors, is the purpose of this study to give a solution for the executive planning of building project construction in Addis Ababa, Bole Sub City.

*Research questions*

- What are the types of success factors in building projects in Bole Sub City of Addis Ababa?
- What are top significant success factors in building construction projects of Bole Sub City from different stakeholder's point of view?

*Objective*

- The objective of this study was to investigate the major success factors in building construction projects of Addis Ababa Bole Sub City.

I. LITERATURE REVIEW

*A. Construction Industry*

The construction industry includes all companies primarily engaged in construction as general contractors, operator builders, heavy construction (airports, highways, and utility systems), and construction by specialty trades. Also included companies that engage in the preparation of sites for new construction and in subdividing land for building sites. Construction work may include new work, additions, alterations, or maintenance and repairs. Construction work is often described by either type, residential (home building) versus non-residential (commercial and government buildings and infrastructure projects), or by funding source, public versus private [8].

The construction industry is one of the largest job creators in developing countries and is highly competitive. The high number of project failures suggests the existence of underlying major success factors which have not been identified [6].

*B. Construction Industry in Ethiopia*

Ethiopia is the fastest-growing, non-oil driven economy among African countries. The country has showed a remarkable growth over the past ten years. The average annual growth is 10.9%. This figure is double of the Sub Sahara Africa and triple of the world average growths indicating that Ethiopia is one of the fastest economic growths in the world. As a result, the contribution of the industry against the general development program is only 3% and this is lower than the sub-Saharan African average which is 6%. The construction industry trend in the past 10 years shows a yearly growth rate of 12.43 and this shows a share of 5.3% of the country's general development program. Though the construction sector is given high prominence, several defects are being noted in the sectors that need immediate action. One significant problem is the fact that current infrastructure and construction projects show significant cost variation. This is occurring in spite of the fact that the Ethiopian Government played significant role in

assisting contractors by providing training, supplying machinery, and by developing supportive guidance [10].

*C. Success, Success Criteria and Major Success Factors*

*1) Success*

What is project success? How do we define project success and design performance measures that allow us to recognize the degree of success attained? Success on a project means that certain expectations for a given participant were met, whether owner, planner, engineer, contractor or operator. However, these expectations may be different for each participant and the study of project success and major success factors is often considered as one of the vital ways to improve the effectiveness of project delivery (Chan et al., 2004) as cited on [2].

*2) Success Criteria*

Success criteria are "measures by which success or failure of a project or business will be judged". Early main criteria for success were assumed to be cost, schedule and quality [4].

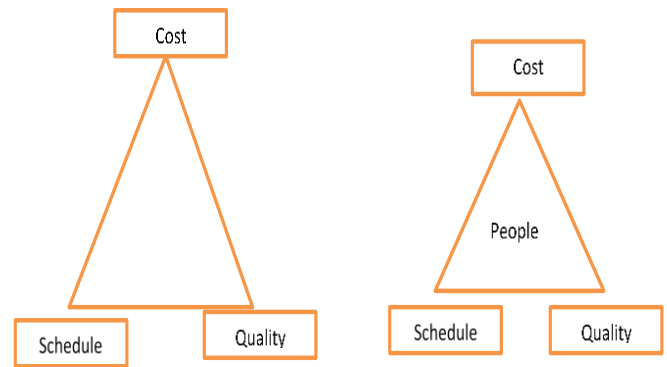


Figure 1 Golden Vs Iron triangle of project management

The iron triangle of project management emphasizes the relationships among cost, schedule and quality. The golden triangle of project management emphasizes the relationships among cost, schedule, quality and people by placing people at the center of the iron triangle (Figure 1). People are the one element that ties the other elements together. Mostly emphasis will be given to iron triangle. The emphasis on people in the golden triangle helps maintain a balance among cost, schedule and quality.

Later more potentially competing criteria like "the satisfaction of all stakeholders" were defined. Researches on project success show that it is impossible to generate a universal checklist of project success criteria suitable for all projects. Success criteria will differ from project to project depending on participants, scope of services, project size, and sophistication of the owner related to the design of facilities, technological implications, and a variety of other factors. On the other hand, common threads relating to success criteria often develop not only with an individual project but across the industry as we relate success to the perceptions and expectations of the owner, designer, or contractor [3].

*Major Success Factors*

Cooke-Davies, (2002) eliminates a conceptual difference between ‘success criteria’ and ‘success factors’. He stresses that success criteria belong to specific measurement which needs to be formulated in order to conclude whether project succeeds or fails. However, success factors are more about particular levers that can be used by project manager to increase a probability of successful outcome of a project. Project success factors are the elements of a project that can be influenced to increase the likelihood of success; these are independent variable that makes success more likely. Project success criteria are the measures by which judge the successful outcome of a project; these are dependent variable which measure project success. Success factors are those inputs to the management system that lead directly or indirectly to the success of the project or business. Project success factors are not universal for all projects since different projects and different people prioritize different sets of success factors. Project success criteria also vary from project to project and what is acceptable in one project without impact on perceived success is deemed an abject failure in another project. For instance, taking a week delay in an IT project to ensure the objectives are achieved may have a minor impact for this project in terms of success. However, this delay might be a disaster in building a function center, which is supposed to be undertaken before its opening day. The project implementation process is complex. It usually involves attention to a broad variety of human, budgetary, and technical variables. From project management perspective, major success factors are characteristics, conditions, or variables that can have a significant impact on the success of the project when properly sustained, maintained, or managed. There is a very close link between the type and scope of projects and respective Major Success Factors [3].

*Major Success Factors Investigation and Analysis*

In order to investigate major success factors, this study was performed with two stages. At the first stage to investigate the major success factors questionnaires and interviews were prepared and the questioners distributed among the selected projects. The interview was interviewed to some of the client. Then data obtain from the distributed questionnaires and interviewed were analyzed by using the statistical package for social science (SPSS) version 20 and Excel. According to SPSS analysis the largest relative importance index would be had the first rank and this indicate us that factor is the first major success factor.

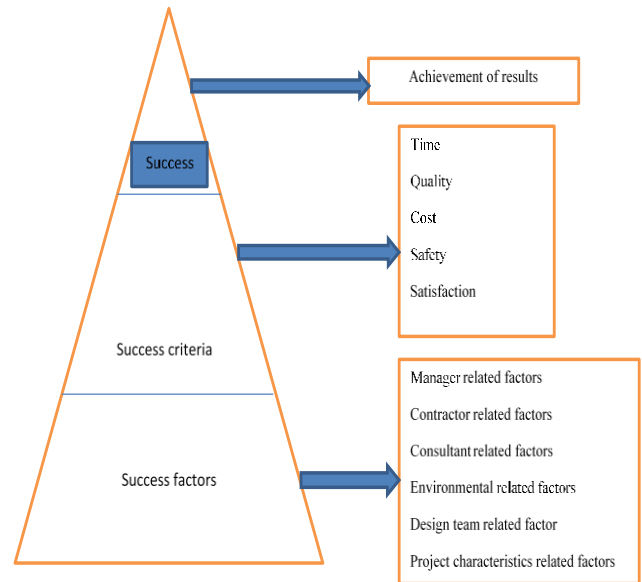


Figure 2. Conceptual model of major success factors [1].

**II. RESULT AND DISCUSSION**

*A. Types of success factors*

A total of 79 factors has been identified from literature review and around 19 factors from questionnaires and presented in table 1 and 2 respectively as shown below:

TABLE 1. SUCCESS FACTORS IDENTIFIED THROUGH LITERATURE REVIEW

S.NO	Types of Success Factors
1	Communication system
2	Control mechanism
3	Feedback capabilities
4	Troubleshooting (sudden problem solving ability)
5	Planning effort
6	Coordination effectiveness
7	Decision making effectiveness
8	Project monitoring
9	Developing an appropriate organization structure
10	Implementing an effective safety program
11	Implementing an effective quality assurance program
12	Control of sub-contractors' work
13	Prior project management experience
14	Risk identification and allocation
15	Formal dispute resolution process
16	Motivation/ Incentives
17	Constructability program
18	Training the HR in the skill demanded by project
19	Project delivery system (e.g. design-bid-build, design build)
20	Project bidding method (e.g. price based competitive bidding, negotiated bidding, best value bidding)
21	Project contract mechanism (e.g. lump sum, unit price, cost plus, etc.)
22	Influence of client/ client's representative
23	Client's experience
24	Nature of client (privately funded vs. publicly funded)
25	Size of client's organization
26	Client's knowledge of construction project organization
27	Client's confidence in construction team
28	Owner's construction sophistication
29	Owner's clear and precise definition of project scope & objectives

S.NO	Types of Success Factors
30	Timely decision by owner/ owner's representative
31	Owner's risk attitude (willingness to take risk)
32	Client's emphasis on low construction cost
33	Client's emphasis on high quality of construction
34	Client's emphasis of quick construction
35	Client's project management
36	Client's ability to brief
37	Client's ability to make decision
38	Client's ability to define roles
39	Design team experience
40	Project design complexity
41	Mistakes/ delays in producing design documents
42	Design team's contribution to construction (constructability review, value engineering, etc.)
43	Adequacy of plans and specifications
44	Contractor experience
45	Site management
46	Supervision of the project
47	Extent (Involvement) of Subcontracting
48	Contractor's cash flow
49	Effectiveness of cost control system
50	Speed of information flow
51	Project Manager's competence
52	Project Manager's experience
53	Project Manager's authority to take day-to-day decisions
54	Project Manager's authority to take financial decision, selecting key team members, etc.
55	Technical capability of project manager
56	Leadership skills of project manager
57	Organizing skills of project manager
58	Coordinating ability and rapport of project manager with contractors/ subcontractors
59	Coordinating ability and rapport of project manager with owner/ owner representatives
60	Motivating skills of project manager
61	Project manager's commitment to meet quality, cost & time
62	Project manager's early & continued involvement in project
63	Project manager's adaptability to changes in project plan
64	Project manager's ability to delegate authority
65	Construction control meetings
66	Economic environment
67	Social environment
68	Weather condition (rainy, hot, cold...)
69	Political environment
70	Physical work environment
71	Industrial relations environment
72	Administrative approvals environment
73	Commitment of all parties to the project
74	Adequacy of funding
75	Technology availability
76	Human Skill availability
77	fraudulent practices, corruption, favoritism, lack of ethics,
78	project scope/size
79	project clear objective

In addition to success factors which were mentioned in different literatures the following success factors were identified through the questionnaires in Bole Sub City building construction projects.

TABLE 2. SUCCESS FACTORS IDENTIFIED THROUGH QUESTIONNAIRE

S.No	Types of success factors
1	Fairly allocation and controlling of resources
2	Age, skill and experience of worker
3	Judgment
4	Interpersonal skill
5	Coordination between workers
6	Good safety measures
7	Handling of time and finance
8	Availability of materials
9	Fairness in any activity
10	Good head office support
11	Applicable standard bidding document
12	Design clarity; readiness & response time
13	Completed design
14	Allocation of the right persons at the right place
15	Project planning
16	Project scheduling
17	Fairness and communication capacity
18	Human skill
19	Timely advanced and in term payment

*B. Investigating Major Success Factors of Building Projects in Bole Sub City*

*1) Relative importance index*

The Relative Importance Index (RII) is a statistical method which is used to determine the ranking of different project success factors. As this survey was designed to investigate the relative importance of various major success factors, the method was adopted in this study within various groups. The RII five-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree) was adopted and transformed the relative importance indices for each success factors as follows;

$$RII = \frac{\sum W}{A * N} = \frac{1 * n_1 + 2 * n_2 + 3 * n_3 + 4 * n_4 + 5 * n_5}{5 * N} \dots [1]$$

Where w is weighting given to each factor by respondents ranging from 1 to 5. (n<sub>1</sub> = number of respondents for strongly disagree, n<sub>2</sub> = number of respondents for disagree, n<sub>3</sub> = number of respondents for neutral, n<sub>4</sub> = number of respondents for agree, n<sub>5</sub> = number of respondents for strongly agree). "A" is the highest weight (that is 5 in this case), and N is the total number of respondents. The RII value had a range between 0 < RII ≤ 1. The highest value of RII, the more important success factor and it is the major success factors.

The RII was used to rank the relative importance index of the different major success factors. These ranking made it possible to cross compare the relative importance of the factors as perceived by the group of respondents (that is owners, contractors and consultants). Each individual success's RII, as perceived by all respondent was used to assess the general and an overall ranking in order to give an overall picture of major success factors of building construction in Addis Ababa Bole Sub City.

*Relative Importance Index Analysis and Ranking Success Factors*

The Relative Importance Index (RII) is a statistical method which is used to determine the ranking of different

project success factors. Table 3 shows the relative importance index and ranking of success factors from client, consultants, contractors, others and overall perspectives. The values of these relative importance index were calculated using equation [1] from client view, contractors view, consultants view; others view and from the overall view. The prime benefit of this index was to take a consideration to the success factors that were important for building construction successful accomplishment.

TABLE 3: RANKING OF SUCCESS FACTORS FROM DIFFERENT PERSPECTIVES BASED ON RELATIVE IMPORTANCE INDEX

Types of success factors	contract or Rank	consult ant Rank	client Rank	other Rank	over all Rank
1	3	8	2	14	1
2	11	17	2	8	2
3	2	4	2	35	2
4	20	1	10	14	2
5	20	12	15	5	3
6	5	12	7	35	4
7	16	12	7	23	5
8	23	22	30	3	6
9	1	34	15	23	7
10	5	34	21	14	8
11	35	8	7	23	9
12	8	17	30	23	10
13	11	6	46	23	11
14	46	12	15	8	12
15	16	4	42	35	13
16	16	26	42	14	14
17	23	55	7	14	15
18	23	34	11	27	16
19	43	22	30	3	16
20	29	64	15	3	17
21	46	51	7	3	18
22	29	6	21	46	19
23	6	46	21	35	20
24	11	44	30	35	21
25	29	39	15	35	21
26	29	43	15	35	22
27	29	39	7	53	23
28	16	29	30	53	24
29	16	39	37	46	24
30	39	2	42	49	25
31	43	55	30	8	26
32	25	51	30	35	26
33	16	26	57	35	26
34	35	17	21	59	27
35	46	29	15	35	27
36	29	60	30	35	28
37	35	43	51	23	28
38	66	12	42	14	29
39	20	26	30	62	29
40	55	29	60	8	30
41	54	39	51	14	31
42	41	56	51	14	32
43	32	57	60	23	32
44	8	8	30	74	33
45	68	34	30	46	34
46	53	26	65	35	35
47	37	67	21	59	36
48	69	19	37	53	36
49	46	46	62	35	36
50	40	70	51	35	37
51	8	22	58	74	38
52	46	64	67	23	39
53	35	20	65	68	40

Types of success factors	contract or Rank	consult ant Rank	client Rank	other Rank	over all Rank
54	58	64	51	46	41
55	50	61	51	59	42
56	61	53	63	46	42
57	75	34	42	46	42
58	50	17	42	78	43
59	73	48	69	18	44
60	53	59	42	68	44
61	63	76	37	35	45
62	58	39	51	71	46
63	58	66	55	64	47
64	71	72	47	56	48
65	71	34	72	59	49
66	58	51	75	68	50
67	68	46	69	68	50
68	76	75	24	53	51
69	65	69	62	64	51
70	38	64	72	74	51
71	63	51	75	68	52
72	61	72	78	53	52
73	65	59	76	64	53
74	72	73	70	53	54
75	50	77	65	74	55
76	78	69	57	74	56
77	74	78	77	62	57
78	78	74	72	78	58
79	79	79	79	79	59

*B. Major Success Factors from Overall Ranking*

As we have seen from table 4.5 below the rank of success factors based on relative importance index using Excel and statistical package for social science v 20 from constructions parties’ perspectives. According to group of contractors response on building construction projects of Bole Sub City was: site management; adequacy of funding; leadership skills of project manager takes the first three ranks. The consultants gave a priority to decision making effectiveness; adequacy of funding; control mechanism. According to clients: leadership skills of project manager; project clear objective; adequacy of funding. Other respondents ranked the success factors one up to three as follow: contractor’s cash flow; planning effort; technology availability; training the human resource in the skill demanded by project.

The top ten major success factors from overall ranking success factors as we have seen from table 3 were: leadership skills of project manager; project clear objective; adequacy of funding ; decision making effectiveness; project monitoring; project manager’s commitment to meet quality, cost &time; project manager’s early & continued involvement in project; contractor’s cash flow; Site management; coordinating ability and rapport of project manager with contractors/ sub-contractors; project manager’s authority to take financial decision, selecting key team members; organizing skills of project manager are the top ten major success factors according to their significant on building project in Bole Sub City in order to accomplished projects successfully.

IV. CONCLUSIONS

A number of literatures had been reviewed; a desk review and an interview were conducted to identify success factors of building construction projects in Bole Sub City.

## REFERANCES

The first objective of this study was to investigate the types of success factors on governmental building construction projects. Due to this by conducting literatures review, desk review and interview; around 98 types of success factors were identified in Bole Sub City building construction projects. These factors were originated from different eight categories of success factors, namely management, procurement, client, consultants (designer), contractors, managerial, project characteristics and environmental group.

Secondly the aim of this study was to rank the types of success factors which were identified under objective one based on their relative importance index. Therefore; from identified 98 types of success factors, 79 were collected from literature review and a further analysis were performed on this 79 success factors by using excel and statistical package for social science v 20 to rank them according to their high significant effect on building projects. The ranking result indicates that (1). Leadership skills of project manager; (2) project clear objective, adequacy of funding, decision making effectiveness, (3) project monitoring; (4) project manager's commitment to meet quality, cost & time; (5) project manager's early & continued involvement in project; (6) contractor's cash flow; (7) site management; (8) coordinating ability and rapport of project manager with contractors/subcontractors; (9) project manager's authority to take financial decision, selecting key team members; (10) organizing skills of project manager were the twelve top ten major success factor according to their high significance order.

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- [1] Alexandrova, M. (2000). Critical Success Factors of Project Management: Empirical Evidence from Projects Supported by EU Programmes. 9th International Asecu Conference On "Systemic Economic Crisis: Current Issues and Perspectives" (Pp. 1-9). Sofia, Bulgaria: University of National and World Economy.
- [2] Alias, Z., Zawawi, E., Yusof, K., & Aris. (2014). Determining Critical Success Factors of Project Management. AMER International Conference on Quality of Life (pp. 61 – 69). Malaysia: Centre of Studies for Construction, Faculty of Architecture Planning & Surveying, Universiti Teknologi MARA, 40450, Shah Alam.
- [3] Babu, S. S., & Sudhakar. (2015). Critical Success Factors Influencing Performance of Construction Projects. International Journal of Innovative Research in Science, Engineering and Technology, 4 (5), 3285-3292.
- [4] Babu, S. S., & Sudhakar. (2015). Critical Success Factors Influencing. International Journal of Innovative Research in Science, 4 (5), 3285-3291.
- [4] Didenko, I. (2008). Success Factors in Construction. Ukraine: Umea School of Business.
- [5] Garbharran, H., & Govender, J. Critical success factors influencing project. Review articles. Acta Structilia, Structilia.
- [6] Inayat, A., Hani Melhem, F., & Asad Esmaily, M. (2015). Critical Success Factors in an Agency Construction. ASCE, 1-7.
- [7] Mahmood, S., & Shahrukh, P. s. (2012). Exploring the Critical Success Factors of Construction Companies of Developing Countries. Research journals of social science and management, 8-16.
- [8] Sanvido, V. (1992). CRITICAL SUCCESS FACTORS FOR. ASCE.
- [9] Zewdu, Z. T., & Aregaw, G. T. (2015). Causes of Contractor Cost Overrun in Construction. International Journal of Business and Economics Research, 4, 180-191.