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Original Research Article

Appraising Challenges of Cost Management Practice in Construction Projects of Tertiary Institutions of Kano State Nigeria

*M.A Mukarram[1], I. Mohammed[2], I. Rabi'u[3], N.S Alfa[4]

[1]Department of Civil Engineering, Bayero University, Kano Nigeria
[2]Department of Estate Management, Kano State Polytechnic, Kano Nigeria
[3]Department of Surveying and Geoinformatic, Kano State Polytechnic, Kano Nigeria
[4]Department of Architectural Technology, Kano State Polytechnic, Kano Nigeria

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***Corresponding author:** M.A Mukarram
Department of Civil Engineering, Bayero University, Kano Nigeria

Abstract

Cost Management is the controlling measure that can be taken to ensure that contract sums of projects are not exceeded as almost all organizations identify cost management as a goal and a practice. Despite the contractors' ability to pass on project costs to a clients, they remain the immediate victims of the consequences of poor cost management. The aim of the study is to assess the contractors' challenges of cost management practices in Kano state higher institutions projects. The study adopts descriptive and explorative design approach. Data were collected through administering eighty (80) questionnaire using purposive sampling techniques. Data analysis using percentages mean scores, severity index and ranking as well as spearman rho correlation. The study finds out that, most of the cost management practices were effective whereas the cost code system and by judgement with experience were averagely effective, hence all the practices were mostly used by the contractors in the study area. The severe challenges of cost management were; inaccuracy in cost planning and budgeting, poor cost control of site management. In addition, the effective mitigating measures were; effective budgeting, proper planning, adequate financial forecast, mediation and reconciliation etc. Study therefore concluded that there is strong relationship and agreement between the respondents, also to ensure a successful completion of project within the anticipated budget and within the predetermined standard quality, the study recommends that professionals should consider the implications of each practices as well as the challenges before adopting any of them.

Keywords: Cost management practice, construction project, Tertiary institutions.

1.1 Introduction

The construction industry is a key industry to economic growth of any nation providing shelter for economic and social activities for national growth. The industry does not only touch on the lives of virtually everyone on a daily basis; it occupies a fundamental national position in many national economies (Clough, Sears & Sears, 2020). As a result of the sizeable nature of projects executed; the industry requires substantive injection of capital, and any loss through failure or abandonment has a crippling effect on the investors and financiers (Nkwachukwu, Ibeawachi & Okoli, 2010). Notwithstanding, the complex nature of work undertaken by the construction industry, such as cost allocation, time schedules and quality monitoring of projects need to be effectively controlled if the anticipated profit margin will be realized for the contractor and for the project to be completed within budgeted cost of the client (Pilcher, 2012). According to Clough et al (2020), financiers and contractors of construction projects are bound to be cost conscious if their business objectives are to be realized from the project.

Oforeh (2017) opined that the Nigerian construction industry contributes at least 60% to the annual Nations Gross Domestic Products (GDP). So, construction industry is one of the major contributors to the economic growth of Nigeria

(Raymond, 2010). For example, Afeez and Maizon, (2013) found that, industry was accounted to have contributed about 1.3% of Gross Domestic Product (GDP) of Nigeria in 2011 to 2015.

Bustani and Izam, (1999) stated that cost is a vital factor in any construction project; many factors make cost to be major problem adversely affecting the construction industry mainly in terms of finishing a project behind the budgeted cost.

Raymond, (2010), observed that cost management of projects in Nigeria is poor and demands urgent attention. This is obvious from incessant abandonment of known capital projects such as Ajaokuta Steel Rolling Plant etc. Despite the contractors' ability to pass on project costs to clients, they remain the immediate victims of the consequences of poor cost management (Chigara, Moyo & Hamilton, 2013).

In Nigerian context, Agundu *et al.*(2000); Raymond (2010) has worked on cost management practices, but little research has have been conducted to address the challenges of cost management practices on contractors' perspective which motivated this study. Therefore, this paper assessed challenges of cost management practices in Kano State Higher Institutions' building projects with a view to improving the performance of contractors in the Nigerian construction industry.

2.0 Cost Management

Hanson (2014) defined cost as "the cost of producing a certain output of a commodity. It is the sum of all the payments to the factors of production engaged on the production of that commodity".

2.1 Cost Management Objectives

There are four objectives in cost management as follows:

i. Spending timely: ensure that money or resources are expended in accordance with the project or corporate capital expenditure plan,
ii. Spending wisely: ensure that monies are well-spent, i.e. that a planned unit of gain is achieved for each unit of expenditure,
iii. Spending correctly: ensure expenditures only for those things for which we are obligated,
iv. Spending perceptively: ensure that spending versus achievement variances are identified, analyzed, corrected or trended so that early warnings can enable timely actions.

2.1.2 Effectiveness of Cost Management

Inuwa and Kunya, (2015) stated that the basis for effective cost management is to understand cost structure and to analyze the costs flowing through that structure. While stating the six steps to effective cost management namely:

i. Understand what causes the cost and revenue structure of the business,
ii. Understand and reduce inter-functional complexity,
iii. provide the tools to manage costs,
iv. Involve employees in decisions,
v. Increase effectiveness and continuously improve costs,
vi. Measure decisions against the strategic business plan

2.1.3 Theory of Cost Management

Idoro, (2011) states that cost management varies from cost control, in that case it is a pro-active way that focuses on the elimination of waste in business processes and procedures. Cost management, as much, is a strategic process that stresses the optimization of efficiency and focuses on the customer and profitability. According to Inuwa and Kunya, (2015), Cost Management is "a philosophy", "an attitude" and "a set of techniques" to create more value at lower cost.

Cost management as the name implies is the totality of all the process required in cost planning, controlling and monitoring of a project cost from inception/conceptualization stages to completion and commissioning stages with a view to staying within the budgeted figure for the works and to pro-actively make provision for handling changes that may occur in course of profit implementation.

Perera and Imriyas, (2020) also stated that: Project cost management includes the process required to ensure that the project is completed within the approved budget and it includes the followings:

i. Resource planning-determining what resources (people, equipment and materials.
ii. Cost estimating-developing an approximation (estimate, on the costs of the resources needed to complete project activities
iii. Cost budgeting-allocating the overall cost estimate to individual work activities
iv. Cost control-controlling changes to project budget

2.1.4 Benefits of Cost Management

Construction, one of the major industries, is vulnerable to all kind of internality and externality crash and which has been noted by most researchers implicitly for its dynamic and complicated nature. Within the theme of construction management, construction targets to achieve the goal of having the building completed on time, within budget and attainment of the highest quality.

Time, cost and quality are located at each corner of a triangle, which means that each shares the importance toward the success of the project. The weighting of each may vary from project to project and depends on the client's brief. However, it seems that, usually, cost is the most concern of the promoter. Time, cost and quality management are the core elements of construction management. Construction cost management is one of the most important tools sought by main contractor.

2.2 Cost Management Practices

Cost management practices from the perspective of a main contractor were identified by different researchers includes; Chigara,(2012) pointed out variance analysis, cost value reconciliation, earned value analysis, cash flow forecasting, the plan and schedule, combination of estimate and schedule, project status report, monthly cost report and profit and loss at valuation dates or overall.

2.2.1 Cost Planning and Control

Samuel, (2015) states that cost planning in any real sense starts with a cost appraisal of the project in order to establish its overall cost limit, the total budget used at cost plan preparation stage for the purpose of fixing cost targets.
All forms of cost planning have three phases:
Phase 1 – The estimate or establishing the target cost
Phase 2 – the cost plan
Phase 3 – the cost checking

2.2.2 Budgeting

Ismail et al., (2020) defined that a budget is a detailed plan, expressed in quantitative terms, that specifies how an organization will acquire and use resources during a particular period of time.
Pilcher (2015) defined that budget is a statement of future activity, either intended or desirable, in either quantitative or financial terms, for a specified period of time. He has also pointed out the aim of budgetary control listed as followings:

i. To set out, in quantitative terms, the objective of a firm, a department, a project, or some other subdivision of a business,
ii. To enable comparison to be made between alternative plans for achieving differing objectives, the subsequent analysis resulting in the choice of the most expedient and satisfactory plan making the best use of the resources which are available,
iii. To facilitate the coordination of the activities of a number of different sections making up the whole of an organization, in order to make the most efficient use of limited resources, for example working capital.
iv. Subsequently, to allow measurement of the achievement against the standard set,
v. To provide a plan as to the level of achievement which is feasible for the organization when actual performance is measured against the target set,
vi. To provide a plan against which the effects of action to correct adverse trends, or to take advantages of beneficial ones, can be measured both in performance and cost

2.2.3 Cash Flow Forecast

Cash is a major resource in construction and its use must be anticipated and managed. PMI, (2000) noted that cash flow forecast is the models of the flow of money in the project. The time frame is in the monthly basis so as to coincide with the normal business accounting cycle. The cast flow statement is the main item of a business plan, as it will show the bank manager or lender how much you need, when you need it and most importantly when you will pay it back.

2.2.4 Financial Report and Cost Report

Edmonds, (2019) noted that financial report and cost report is to record all the financial transactions, payments in and out, together with amounts owed and owing. This kind of information is essential for the top management in decision making and also for the financing of the project, as noted by Burgess (2012) that it is an obvious need of senior management to know the followings: Financial performance to date, anticipated financial performance of current year and anticipated financial performance at the end of the project.

2.2.5 Cost Code System

The purpose of the cost code system is to enable the cost data to be identified and coded for the most efficient application of cost management throughout the contract period. ASCE (2021) stated that cost coding in common use varies widely in type and scope and defined the objectives of cost code system as follows:

i. To provide traceable or reproducible information about the specific performance of a work activity,
ii. To provide a mechanism to combine data via sorting capabilities on different characters of this cost code,
iii. To provides basis for parameter estimating,
iv. To provide the capabilities of performance value engineering analysis,
v. To provide trades-oriented sorting of cost.

2.2.6 Value Management

The characteristics of value management are identified by Barazza et al. (2018) in the followings:

i. Systematic approach,
ii. Multi-disciplined team-oriented process,
iii. Stress on value and function,
iv. Concerned with both construction and life cycle costs

Momon, et al., (2019) defined that value management is the systematic application of recognized techniques which identify the function of a product or service, establish a monetary value for that function, and provide the necessary function reliably at the lowest overall cost.

2.2.6 Judgment

Ahsan and Gunawan, (2010) pointed out that a good price forecasting technique needs to include both historical trend-based data and competent "judgments" based on construction experience and knowledge. Turner, (2013) opined that the exercise of judgment is the responsibility of the expert construction professional involved in making the strategic cost forecast rather than the model itself.
The relationship can be summarized as follows:
[Technique] + [Judgment] = [Advice]

2.3 Challenges of Cost Management Practices

The challenges of cost management practices has been identified by different researchers were; wrong method of estimation, supplier manipulation, supplier and cultural impacts, social and cultural impacts, relationship between management and Labour, poor financial control on site, political interferences, previous experience of contractor, number of construction going on at the same time, number of competitors, mode of financing bond and payments, long period between design and tendering time, level of competitors, lack of productivity standard, lack of coordination between designers and contractors, Labour nationality, insurance cost, incorrect planning, inadequate production of raw materials, inadequate Labour availability, high interest rates charged by banks, high cost of transportation, high cost of machinery maintenance, high cost of machinery, high cost of labour, government policies, frequent design changes, fraudulent practices and kickbacks, fluctuation of prices of materials, economics stability, duration of contract period, dispute on site, currency exchange, cost of materials, contractual procedures, contract management, contractors' cartel, bureaucy in tendering method, additional work and absence of construction cost data Usman, et al., (2012).

While White, D. & Fortune, J. (2002).Afeez,(2013) identified these challenges; improper contract document, engagement of inexperience staff, unstable market condition, complexity of the project, unstable government regulations, choice of procurement method and lack of research and development.

Based on the aforementioned reviews of cost management challenges, it has revealed to the followings in Table one (1) shown below;

Table 1: Challenges of Cost Management Practices

S/N	Challenges of cost Management Practices
1	Dispute on site
2	Government policies
3	Inaccuracy material estimating
4	Insufficient time for estimating
5	Lack of understanding of project requirements
6	Poor communication between project team
7	Low participation in estimating by site team
8	Poor feedback on accuracy of previous estimates

9	Lack of diligence by estimators
10	Lack of historical data on past estimate
11	Poor cost control of site management
12	Lack of expenditure control
13	Inaccuracy in cost planning and budgeting
14	Unrealistic cost plan and tender budget
15	Lack of resource and manpower for cost management

Source: Aibinu and Jagboro, (2012) Pp.56

3.0 RESEARCH METHODOLOGY

The study adopted a mixed design approach in this research using survey approach in collecting data from respondents, the participants where construction project managers with vast knowledge on construction cost management practice in Kano State, North-western part of Nigeria. This state was chosen because of high rates of construction activities within the state, high number of construction professionals. The population are professionals within construction industry which includes Architects, Builders and Quantity surveyors etc. that are practicing as construction managers in contracting and consultancy firms within the said location. The study used purposive sampling to select samples from the identified population of construction contractors/professionals for the survey. These groups were chosen because of their significance in terms of executing and operation of construction works and they are involved almost in all day-to-day activities of construction works on sites. Therefore, they deemed the best groups to fulfill the objectives of this study.

4.0 RESULT

The study administered 80 questionnaires to construction contractors and professionals within construction industry in Kano University of science and Technology (KUST) Wudil, Kano State Polytechnic (KSP) and Sa'Adatu Rimi College of Education, (SRCOE) Kumbotso, Kano State of Nigeria, 30 questionnaires were distributed to KUST representing 38%, 25 questionnaires distributed in KSP representing 31% and 25 questionnaires distributed in SRCOE representing 31% of questionnaire distributions and Yusuf Maitama Sule University, (YMSU), Kano respectively.

Table 4.1: Questionnaires Distribution and response rate

Locations	Distribution	Frequency	Percentage (%)
KUST, Wudil	Questionnaires distributed	25	100
	Retrieved	20	80.0
	Not responded	5	20.0
KSP, Kano	Questionnaires distributed	20	100
	Retrieved	14	70.0
	Not responded	6	30.0
SRCOE, Kumbotso	Questionnaires distributed	20	100
	Retrieved	15	75.0
	Not responded	5	25.0
YMSU, Kano	Distributions	15	100
	Retrieved	9	60.0
	Not responded	6	40.0

Source: Field survey, 2021

Table 4.2: Area of Specialization of Respondents

Specialization	**Frequency**	**Percentage (%)**
Architects	9	17.0
Builders	8	15.0
Engineers	10	19.0
Quantity Surveyors	9	17.0
Urban and Regional Planners	6	11.0
Estate Valuers	4	7.0
Land Surveyors	5	9.0
Others	3	5.0
Total	54	100.0

Source: Field survey, 2021

4.3 Effectiveness of Cost Management Practices

Table 3 below shows the mean values in maximum of 3.9630 and minimum of 2.7963 for the effectiveness of cost management practices. The implication of these values shows that the assessment was above a score of three in the five-point Likert scale. This vindicated that, the practices in the study area generally recognized and admitted the practices as effective in building projects. The top three ranked from the assessment of cost management practices in table 9 below are;

i. Tender budgeting (3.9630)
ii. Working budgeting (3.9630)
iii. Elemental cost plan (3.7407)

While the least three ranked from the practices of cost management in Table 9 below are;

i. Cost code system (2.7963)
ii. By judgement with experience (3.3889)
iii. Cash flow forecasting (3.6481) respectively.

Table 4.3: Evaluation of Cost Management Practices

Cost Management Practices	N	MIS	Stand Dev. (S.D)	Level of Effectiveness
Working Budgeting	54	3.9630	1.0087	Effective
Tender budgeting	54	3.9630	0.93087	Effective
Financial and cost report	54	3.7407	1.0848	Effective
Element cost plan	54	3.7407	1.0313	Effective
Value Management	54	3.6667	1.0461	Effective
Cash flow forecasting	54	3.6296	0.9770	Effective
By judgment with experience	54	3.3889	0.9400	Average Effective
Cost code system	54	2.7963	0.9190	Average Effective

Source: Field survey, 2021

Note, Scale: 1.00–1.80 = very ineffective, 1.81–2.60 =ineffective, 2.61-3.40 =averagely effective, 3.41-4.20=effective, 4.21-5.00=very effective.

4.4 Challenges of Cost Management Practices

Table 4 below shows that the five most challenges encountered during the implementation of cost management practices in the study area. These are; inaccuracy in cost planning and budgeting, poor cost control of site management, unrealistic cost plan and tender budget, poor communication between project team, and lack of expenditure control based on descriptive statistics using severity index and almost all the challenges were agreed by contractors that are very severe but only the Inadequate labour availability and Low participation in estimating by site team were just severe. This shows that careful attention needs to be pay on those particular ones. But disagreed with Raymond (2015) whom reported that; inaccurate material estimate, lack of experience of project type, delay of work, frequency of construction variation and tight programme while agreed with (Otim *et al.*, 2021).

Table 4.4: Challenges of Cost Management Practices

Cost Management Challenges	**N**	**Severity Index**	**Severity Level**
Inaccuracy in cost planning and budgeting	54	0.8000	Very Severe
Poor cost control of site management	54	0.7888	Very Severe
Unrealistic cost plan and tender budget	54	0.7741	Very Severe
Poor communication between project team	54	0.7666	Very Severe
Lack of expenditure control	54	0.7556	Very Severe
Inaccuracy material estimating	54	0.7407	Very Severe
Lack of diligent by estimators	54	0.7407	Very Severe
Government policy	54	0.7377	Very Severe
Disputes on site	54	0.7185	Very Severe
Lack of understanding of project requirement	54	0.7037	Very Severe
Poor feedback on accuracy of previous estimate	54	0.6963	Very Severe
Insufficient time for estimating	54	0.6852	Very Severe
Lack of historical data on past estimate	54	0.6815	Very Severe
Inadequate labour availability	54	0.6630	Severe
Low participation in estimating by site team	54	0.6556	Severe

Source: Field survey, 2021

4.5 Relationship between the Cost Management Practices and their Challenges

The bivariate correlation coefficient in reference with table 6 reveals that the negative value occurs when there is relationship between the variables. Meaning that if the contractor is adopting a particular cost management practice having a negative value across its cost management challenges will reduce the particular challenge as in the case where value management will reduce inaccuracy in cost planning and budgeting, lack of diligent by estimators, the use of tender budget will reduce the lack of historical data on past estimate, the use of cost code system will reduce dispute on site, unrealistic cost plan and tender budget, lack of historical data on past estimate, low participation in estimate by site team, insufficient time for estimating, inaccurate material estimating and inadequate labour availability. And the use of judgment with experience will also reduce the dispute on site, unrealistic cost plan and tender budget, the lack of historical data on past estimate, Low participation in estimate by site team, Insufficient time for estimating, Inaccurate material estimating as well as Inadequate labour availability. This shown that there is a strong relationship between the cost management practices and cost management challenges.

5.1 Summary

The study employed the use of literatures in achieving the stated objective one, where eight (8) practices were finalized out of twenty four (24) which shows that most of them were effective with the exception of Cost Code System and Judgement with experience using descriptive statistics (Mean-Score and Ranking) based on the responses of the respondents. The study also finds out that most of the challenges of cost management identified were highly severe by the use of mean score based on descriptive statistics. Moreover, the mitigating measures of challenges of cost management recognized and admitted by the contractors in the study area were important except the few among them which were less important in minimizing the cost in building projects. Therefore, the findings revealed that the use of cost management practices reduces the challenges encountered during its implementation by building contractors in Kano state higher institutions and there is strong relationship along with the negative (-ve) values. This is evidenced by the spearman-rho-correlation coefficient.

5.2 Conclusion

This study used mixed design method using literature search and questionnaires survey approach to achieve the stated objectives. According to respondent opinions, the study concludes that cost management practices still exist in building projects and generates researchers' interest globally to provide solution to the problems. Moreover, the entire respondent strongly admitted and recognized that the mitigating measures against the challenges of cost management practices are all effective and can be used in Kano state, Nigeria to minimize the cost management challenges in the study area. Finally, study concludes that, those practices identified can be adapted and implemented in Kano state, Nigeria why because the study found that almost all as effective measures from Nigerian contractors' perspectives.

5.3 Recommendations

The study recommends the following;

i. Government and stakeholders in construction industry should compile the various studies carried out in cost management practices and comes up with the possible solution to the challenges as well as enforcing it as policy in construction projects.
ii. Government and stakeholders in construction industry should adopt the effective cost management practices in order to minimize the challenges.
iii. To effectively mitigate inaccurate material estimating, the estimator should be adequately trained and be developed by an experience cost manager through incorporating inputs from design teams.

REFERENCES

1. Afeez, O.S., Maizon, H., (2013). Assessing the Challenges of Cost Control Practices in Nigerian Construction Industry; Interdisciplinary Journal of Contemporary Research in Business. 4(9), 34-39.
2. Agundu, P. U. C. (2000).Finance Finesse, Port Harcourt: Outreach Publications.
3. Ahsan, K. and Gunawan, I. (2010). Analysis of cost and schedule performance of international Development projects. International Journal of Project Management, 28 (1), 68-78.
4. Aibinu, A.A. and Jagboro, G.O. (2012) The Effect of Construction Delays on Project Delivery in the Nigeria Construction Industry. International Journal of Project Management.20, 533-591.
5. American Society of Civil Engineers (2021), Construction Cost Control, ASCE Manuals and Report of Engineering Practice No.65, America.
6. A.H.Momon, I.S. Rahman and A.A.A. Azis (2011).“Preliminary study on causative factors leading to Construction Cost Overrun; International Journalof Sustainable Construction Engineering and Technology. 2(1), 23-34.
7. Barazza, G. A., Back, W. E. and Mata, F. (2004). “Probabilistic Forecasting of Project Performance Using Stochastic S Curves” Journal of Construction Engineering and Management, ASCE, 130(1), 25-32.

8. Burgess, R. A. (2012). Construction Projects: Their Financial Policy and Control, Construction Press, UK.
9. Bustani, S. A. and Izam, Y. D. (1999).Predictive Duration Models for Building Construction Project in Nigerian. Journal of Environmental Science, University of Jos, Nigeria. 3(2), 131-135.
10. Chigara, B. and Mangore, E. (2012).An analysis of the implications of resources management on building projects in Zimbabwe. International Journal of Marketing and Technology. 2(9), 20-25.
11. Clough, R. H., Sears, G. A. & Sears, S. K. (2020).Construction Project Management. John Wily and Sons, USA.
12. Edmonds, G. A. (1979). Macro firms: Construction firms for the computer age. Journal of Construction Engineering and Management 109(1), 13-24.
13. Hanson (2004): A Dictionary of Economics and Commerce, Fourth Edition, Mcdonald and Evans Ltd, London.
14. Idoro, G. I. (2011). Comparing Occupational Health and Safety Management Efforts and Performance of Nigerian Construction Contractors. Journal of Construction in Developing Countries. 5(3), 23-32.
15. Inuwa, I. I. &Kunya S. U. (2015).Project Management Theory Exploration for Indigenous Contractors' Project Planning in Nigeria. International Journal of Applied Science and Technology 5(3).
16. Ismail A. R, Ade A., Aftab H. M., & Abdul A. (2020). Time and Cost Performance in Construction Projects in Southern and Central Regions of Peninsular Malaysia. International Journal of Advances in Applied Sciences 1(1).
17. Nkwachukwu, C. C., Ibeawachi, E. &Okoli, M. N. (2010)."Project Management Factor Indexes: A Constraint to Project Implementation Success in the Construction Sector of a Developing Economy," European Journal of Scientific Research.43 (3): 392-405.
18. Oforeh, E.C (2017). Cost Management of Heavy Capital Project, Lagos: Cosines Nigeria Limited.
19. Otim, G., Nakacwa, F. &Kyakula, M. (2021). "Cost control techniques used on building projects in Uganda," Second International Conference in Engineering and Technology, January 2021.
20. Perera, A. A. D. A. J. &Imriyas, K. (2004). An Integrated construction project cost information system using MS Access and MS Project. Construction Management and Economics.22, 203 – 211.
21. Pilcher, R. (2015). "Project Cost Control in Construction," 2nd ed., Oxford Blackwell Science.
22. Raymond, E.O., (2010). An Appraisal of the Cost Management Practices in the Delivery of Capital Projects in Nigeria.Unpublished Msc. Thesis, Department of Building, Faculty of Environmental Science, NnamdiAzikwe University, Awka, Anambara state, Nigeria.
23. Usman, N. A., Inuwa, I. I., Iro, A. I. &Dantong, J. S. (2012). Training of Contractors Craftsmen for Productivity Improvement in the Nigerian Construction Industry. Journal of Engineering and Applied Sciences, 4, 1-12.
24. White, D. & Fortune, J. (2002).Current practice in project management – An empirical Study. International journal of project management, 20 (1), 1 – 11.

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