

## Assessment of the Influence of Project Management Competence on the Triple Constraint in Projects in Nairobi

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### Abstract

This paper describes project management in terms of project scope, project time and project cost, the triple constraint. The authors contend that the ability to effectively manage the triple constraint determines whether a project succeeds or fails. Literature shows that projects carried out in Kenya have a dismal performance rate. The authors attempt to assess whether project management competence expressed as project management experience and project management professional certification has an influence on the project management triple constraint. Empirical evidence is presented that indicates that project managers with more years of experience do not manage the triple constraint better than their less experienced counterparts. Also, project managers with a professional certification do not manage the triple constraint better than their non-certificated counterparts.

**Keywords** Project management, triple constraint, Nairobi, project manager experience, Certification.

### Introduction

Generally, projects are undertaken because they are part of the plans to take organisations to new levels of performance and to meet business needs (Van Wayngaag, Pretorius, & Pretorius, 2011). Project management is planning, organizing, coordinating, leading and controlling resources to accomplish the project objective. The successful accomplishment of the project objective could be constrained by many factors, including scope, quality, schedule, budget, resources, risks, customer satisfaction, and stakeholder support (Gido & Clements, 2015).

The triple constraint is a triangle of time, cost and performance that bounds the universe within which every project must be achieved (Dobson M. S., 2004). Project managers must focus on three dimensions of success- completing all project deliverables on time, within budget and to the level of quality that is acceptable to sponsors and stakeholders (Greer, 2008). Although variations and different dimensions exist, these constraints are listed as

project scope, time and cost. Performance is sometimes referred as “scope” or “quality” and “cost” and “resources” are often listed separately (Dobson M. S., 2004).

The triple constraint is also referred to as the iron triangle (Atkinson, 1999) reflecting the fact that the three constraints are interrelated and involve trade-offs. Project quality takes root in all three variables of the triple constraint and is affected by balancing the three factors (Van Wayngaad, Pretorius, & Pretorius, 2012).

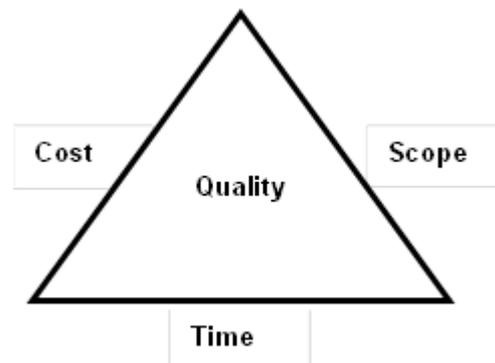


Figure i: Iron Triangle (Atkinson, 1999)

From the novice to the most experienced and senior project manager, triple constraint issues are at the core of the most crucial decisions about a project. Further, Dobson, (2014) tells us that the great secret of the triple constraint is that they are not equally constraining. They exist in a hierarchy of “driver”, “middle” and “weak” constraint. The driver being the constraint we have to meet or else the project fails. The weak constraint, at the other extreme, has the greatest flexibility and furnishes the opportunity that can be used creatively to ensure that the driver constraint does not fail.

Project management has spread in recent years from its traditional dominance of the fields of construction and engineering into sectors as diverse as education, IT, media, health care, and surgery (Hodgson, 2002). As the data proves, most projects fail to meet their goals. They do not meet time and budget goals, do not meet their business objectives, or both (Shenhar & Dvir, 2007). Time and cost performance of projects in Kenya are unacceptable with over 70% of initiated projects likely to escalate in time with a magnitude of over 50% and 50% of the projects likely to escalate in cost with a magnitude of over 20% (Mbatha, 1986; Talukhaba, 1988; Mbeche & Mwandali, 1996). Recently, Thika dam (Olima & K'akumu, 1999), Thika Road (The Kenya Alliance of Resident Associations, 2012), and Langata Road projects have finished late and over-budget.

The emphasis and project goals may differ from project to project, but the total responsibility for overall project success rests on the shoulders of the project manager, the one who is running the project day-to-day (Shenhar & Dvir, 2007). As such, the research aimed to seek views from project managers. In Kenya, there are two project management associations; The Kenya Association of Project Managers (KAPM) and the Project Management Institute, Kenya Chapter. The Kenya Association of Project Managers (KAPM) had 180 registered members while Project Management Institute; Kenya Chapter had 108 registered members with around 35 members having the professional certification of Project Management Professional (PMP) (Kititu, 2015) at the start of the study. As such, there were 288 registered by the Kenyan project management associations. This consisted of the target population for the study.

**Problem Statement**

Despite the much acquired knowledge in project management, history shows a pattern of project underperformance, with most projects not meeting one or more of these expectations (Thompson, 2012). Delay and cost overrun are an inherent part of most projects (Ambituuni, 2011). They are the rule rather than the exception in construction, defence, power generation, aerospace, product development, software and other areas (Sterman, 1992). In a 2008 IBM survey on change management projects, only 40% of projects met schedule, budget and quality goals (IBM, 2008). One in six of the 1,471 IT projects studied had an average cost overrun of 200% and a schedule overrun of 70% (Flyvbjerg & Budzier, 2011). The Standish Group in 2012 found that 43% of projects were challenged (late, over budget and/or with less than the required features); and 18% failed (cancelled prior to completion or delivered and never used) (The Standish Group, 2013). In a study of 5400 large IT projects, on average run 45% over budget and 7% over time, while delivering 56% less value than predicted (Bloch, Blumberg, & Laartz, 2012). In their survey of projects in 34 industries across 38 countries, Price Waterhouse Coopers (PwC) (2012), found that 86% of projects fail to deliver against their budget, schedule, scope, quality and benefits baseline. Of these, more than 60% of the project failed to deliver against their budget and schedule and less than 10% failed to deliver on their quality and scope against each criterion.

In Kenya, Gwaya, Wanyona, and Masu, 2014 suggested the need for Kenya to adopt a different approach in the application of project management, in its construction industries. This is due to research indicating ridiculous cost and time overruns in projects undertaken in Kenya, (Mbatha, 1986; Talukhaba, 1988; Mbeche & Mwandali, 1996; Olima & K'akumu, 1999; The Kenya Alliance of Resident Associations, 2012). Need therefore arises to assess the influence of project management competence on the ability of the project manager to manage the triple constraint in projects carried out in Nairobi.

**Objective**

The objective of this study was to assess the influence of the project manager's project management competence on the ability to manage project management triple constraint in projects carried out in Nairobi.

**Literature Review**

This chapter contains literature revealed from a number of published journals and project management books.

**Theoretical Review**

This study was based on the competence theory.

**Competence Theory**

The work of McClelland & McBer in the 1980s established the competence theory. The authors defined competency as the underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or situation (Githenya & Ngugi, 2014). A competence articulates the expected outcome or performance standard that is achieved as a result of applying a combination of knowledge, personal attitude, and skills and experience in a certain function (APM, 2008). A competent project manager implements proper project management techniques, avoids misuse of management techniques, ensures commitment to the project, spends time to define the project, correctly

plans activities in the project, ensures correct and adequate information flows, changes activities to accommodate frequent changes, accommodates employees' personal goals with performance and rewards and makes a fresh start when mistakes in implementation are identified (Natchayangkun, 2014). While experience is considered the best teacher Carbone & Gholston, 2004 as cited in McHenry (2008), argue that organizations must recognize the need to improve on-the-job project management training with more formal education and training.

In contrast, (Sandberg, 2000) found that human competence is not primarily a specific set of attributes. Instead, workers' knowledge, skills, and other attributes used in accomplishing work are preceded by and based upon their conceptions of work. The basic meaning structure of workers' conceptions of their work constitutes human competence. It is the workers' ways of conceiving work that make up, form, and organize their knowledge and skills into distinctive competence in performing their work.

### **Conceptual Framework**

The conceptual framework for this research was the working hypothesis. The research was exploratory and linked with the micro-conceptual framework "working hypothesis," which signalled that conceptualization was in its preliminary stages (Shields & Tajalli, 2006). Working hypotheses are statements of expectations with tremendous capacity for variation and are flexible enough to contain both relational and non-relational expectations (Shields & Rangarajan, 2013). The working hypotheses were developed after reviewing theoretical and empirical literature on the concepts of the research objective.

### **Project Management Competence**

Until now practitioners have generally attained explicit project management competences through participation in vocational and tertiary education programs, as well as through experience-based professional accreditation in addition to practice experience (Sense & Kiridena, 2014). Gideon & Bwisa, (2013) Indicate that professionalism is key during project implementation while Project Management Information Software (PMIS) helps project managers perform their tasks in a much professional manner and hence project success (Kahura & Bwisa, 2013).

### **Project Management Experience**

Project management experience is gained through practice with older project managers having more experience through longer practice as compared to younger project managers. In their study, Skitmore and Seng Lei (2004) found that in terms of skills, older project managers, had a greater degree of project management skills than their younger counterparts. Muller and Turner (2007) found that different project managers attach different levels of importance to success criteria according to their traits with older project managers assigning higher importance to team building than their younger counterparts which indicated learning by experience. In their study, Langer, Slaughter, and Mukhopadhyay (2008), found evidence that the project manager's task familiarity (gained with experience) improves cost performance, client satisfaction and manages client expectations better in IT outsourcing. In their analysis Catanio, Armstrong and Tucker (2013), found no significant difference between experienced project managers and inexperienced project managers in their ability to increase likelihood of successful projects in terms of meeting the triple

constraint. There was no statistically significant relationship between project managers' years of experience and project success, although the effect was positive (Bond, 2015). Based on this research, the following hypothesis, assessing project management experience of the project manager and management of the triple constraint, was developed;

**Working Hypothesis 1 (WH1)**

**The level of project management experience of the project manager influences the management of the triple constraint.**

**Project Management Certification**

Professional certification is a designation earned by an individual identifying that they have demonstrated a standard level of skills, experience and expertise within their field. They are earned from professional societies with a certifying body. The process of developing, administering and maintaining the certification is done to international standards (IIBA, 2015). According to IPMA (2006), the certification programmes is an incentive for the managers of projects to expand and improve their knowledge and experience, continue their education and training, improve the quality of project management and achieve the project objectives more effectively. Certifications for project managers were identified as one strategy to improve project success rates since efficient and effective project management is critical for project success. This is because certifications are believed to improve the focus of project managers on project success factors to improve project performance leading to project success (Natchayangkun, 2014).

Of the 57 construction project managers interviewed in Australia, 36.84% believe it is of medium importance for a project manager to have a professional certification, while 29.82% believed it to be of high importance (Ma, Luong, & Zuo, 2014). In a 2006 survey, PWC found that "Higher-performing projects are significantly more likely to be staffed with certified project managers. In fact, 80% of projects classified as high-performing use a certified project manager". Certification makes a difference in high performing projects indicating that the best project managers are certificated, but poor certificated project managers perform as badly as poor non-certificated project managers (Muller & Turner, 2007). In comparing the difference between certified and uncertified project managers in their likelihood of project success in terms of meeting the triple constraint (Catania, Armstrong & Tucker, 2013), found no significant difference between the two.

Based on this research, the following hypothesis, assessing project management professional certification status of the project manager and management of the triple constraint, was developed:

**Working Hypothesis 2 (WH2)**

**Project management professional certification of the project manager influences the management of the triple constraint.**

**Research Methodology**

The study adopted an exploratory approach using a descriptive survey design. Descriptive research focuses on *what* questions (de Vaus, 2001). Descriptive research studies are those studies which are concerned with describing the characteristics of a particular individual, or of a group (Kothari, 2004). The said design can also be appropriately referred to as a survey design. When the term survey is used, it usually refers to a sample survey, meaning that information is gathered from only a part of the population (Vogt, Gardener, & Haeffel, 2012).

The study adopted purposive sampling which is a non-probabilistic technique where the participants will be self-selected. This is because; project managers registered under the associations would provide unique and rich information of value to the study (Suen, Huang, & Lee, 2014). Study participants completed an online survey using Survey Monkey®. The survey web link and a letter of introduction from the university were sent to the presidents of the KAPM and PMI, Kenya chapter who then forward the web link to its members.

**Research Findings**

A total of 40 people started the survey with 29 of the targeted 30 completing the survey. 3 surveys were discarded due to the participants not working in the capacity of project manager. This constitutes a response rate of 86.67%.

**Reliability**

A Cronbach alpha was performed on the triple constraint measures. The Cronbach alpha is a number that ranges from 0 to 1; a value of 1 indicates that the measure has perfect reliability, while a value of zero indicates that the measure is not reliable and variations are due to random errors. In general, an alpha value of 0.9 is required for practical decision making situations, whereas a value of 0.7 is considered to be sufficient for research purposes (Nunnally, 1978 as cited in (Serrador & Turner, 2015)). The Cronbach alpha was 0.759 and thus the instruments were reliable for research purposes.

Table i:  
Alpha Coefficients

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.759	0.759	3

**Working Hypothesis 1: Project Management Experience**

The first hypothesis dealt with project management experience and the ability to manage the triple constraint. As such, it sought to establish whether statistical differences are indicated in managing the triple constraint. To facilitate analysis of hypothesis one, project scope, project time and project cost mean was taken as a summated scale (Serrador & Turner, 2015): Triple constraints= mean of the following three responses as a summated scale:

1. Triple constraint: meeting project scope goals
2. Triple constraint: meeting project time goals
3. Triple constraint: meeting project cost goals

Results shown in the descriptives table ii indicate there is no evidence (F-value= 1.017, p-value= 0.421 at  $\alpha=0.05$ ) that experience indicated a statistical difference in the ability to manage the triple constraints. This corresponds to (Catania, Armstrong, & Tucker, 2013) and (Bond, 2015) although there is a positive influence with project managers with 7 to 9 years' experience performing slightly better. Thus, the data does not support working hypothesis one; that the level of project management experience influences the management of the triple constraint. The relatively small cell sizes may have contributed to the results of the analysis.

Table ii:

Descriptives by Project Management Experience

Experience	Triple constraint mean	Valid N
Less than one year	2.8333	2
1 to 3 years	2.4074	9
4 to 6 years	2.9167	4
7 to 9 years	3.7619	7
More than 10 years	2.9167	4

**Working Hypothesis 2: Project Management Certification**

The second hypothesis dealt with project management certification and the ability to manage the triple constraint. As such, it sought to establish whether statistical differences are indicated in managing the triple constraint. To facilitate analysis of hypothesis two, project scope, project time and project cost mean was taken as a summated scale.

A two independent samples means t-test was used to determine if certificated project managers are better in managing the triple constraints than non-certificated project managers. The sample consisted of 73% (50% male and 23% female) certificated and 27% (23% male and 4% female) non-certificated project managers. Below is a table on their experience distribution;

Table iii:

Distribution of Project Managers by Experience and Certification

Experience	Certification Status			
	Certificated (%)		Non-Certificated (%)	
	M (%)	F (%)	M (%)	F (%)
Less than one year	0	8	4	0
1 to 3 years	23	4	0	4
4 to 6 years	4	4	8	0
7 to 9 years	15	8	4	0
More than 10 years	8	0	8	0
<b>Total % (M,F)</b>	<b>50</b>	<b>23</b>	<b>23</b>	<b>4</b>
<b>Total % (M+F)</b>	<b>73</b>		<b>27</b>	
<b>Total % (status)</b>	<b>100</b>			

Key: M- Male, F- Female

From the results, there was no statistically significant difference in the ability to manage the triple constraint between certificated and non-certificated project managers (t-value= -0.837, p-value= 0.411). This is in line with Catanio, Armstrong, and Tucker (2013) and Muller and

Turner (2007) that certification does not make a difference in the ability to manage projects. Thus, the data does not support working hypothesis two; that professional project management certification influences the management of the triple constraint. The relatively small cell sizes may have contributed to the results of the analysis.

## **Conclusion and Recommendations**

### **Conclusion of the Study**

The goal of any project manager or indeed stakeholders in a project is to complete it successfully within the triple constraint. The study sought to assess the influence of the project manager's project management competence on the ability to manage project management triple constraint in projects carried out in Nairobi by taking the perspectives of the project manager. We found that the project manager's experience and professional project manager's certification do not influence his/her ability to manage the triple constraint.

The results revealed no difference attributed to years of experience in managing projects on the ability to manage the triple constraint. Thus, research hypothesis one; the level of project management experience of the project manager influences the management of the triple constraint, is not supported by the results of this study. Hence, experience gained by the number of years of practice of project management is too small a component to judge whether a project manager will be successful in managing a project. This study proposes that, the numbers of years practised by the project manager are not sufficient to guarantee successful management of the triple constraint objectives.

Professional project management certification is too small a component of the knowledge dimension to have a significant influence on the ability to manage the triple constraint. The data does not support hypothesis two that project management certification of the project manager influences the management of the triple constraint. As such, the research proposes that, professional project management certification of the project manager is not sufficient to guarantee successful management of the triple constraint.

To quote previous researchers, the authors do not want to undervalue the importance of core competency training offered by certification programs and believe that it is necessary for a project manager to possess these hard-skills of the profession. However, possessing these hard-skills are not enough to improve effectiveness or ensure project success, but offer a starting point of the skills required by the discipline (Catania, Armstrong, & Tucker, 2013).

### **Recommendations of the Study**

The results of this study reinforce previous findings that focus on knowledge and experience dimensions that indicate that these two dimensions do not significantly influence the likelihood of successful projects in terms of meeting the project management triple constraint. Other factors must be influencing the ability to successfully manage the triple constraint. The study recommends that, further studies should be undertaken to concretely identify and document factors that positively influence successful management of the triple constraint.

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