



**AGILE PROJECT MANAGEMENT AND PROJECT SUCCESS IN THE CONSTRUCTION OF COMMERCIAL PROPERTIES
IN NAIROBI COUNTY, KENYA**

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ABSTRACT

This paper presented the findings on the agile methodology and its implementation by professionals in the construction of commercial properties. This study used stratified random sampling technique to identify the contractors to survey for the study. All the companies selected were in the commercial real estate construction industry. The sample size of the study was 35 respondents. A structured questionnaire was used to obtain primary data as well as descriptive statistics to analyze data. As such, it utilized inferential analysis and Pearson's correlation analysis with the aim of determining the strength between the independent variable as well as dependent variables. The findings revealed that indeed agile project management contributed to a project success in the construction industry. The research found out that agile planning, iterative methods, close collaboration and continuous improvement is statistically significant to project success. The study concluded that agile planning, iterative methods, close collaboration and continuous improvement was positively related to project success. The study recommended that the project team should have the necessary skills and knowledge required for the project to ensure effective and efficient implementation. The team should ensure that the budget is well set before the start of the implementation. The stakeholders were therefore urged to consider the application of agile project management in its construction projects.

Key Words: Agile Planning, Iterative Methods, Continuous Improvement, Close Collaboration, Project Success

INTRODUCTION

According to Greer (2014), a project is successful if it satisfies all the three legs of the triple constraint namely performance, cost and time. Every organization exists to achieve specific organizational goals to which the management will be entrusted to come up with strategies on how to achieve them. After organization's set their strategy and vision on how to realize the same, the management develops individual projects or programmers, to deliver the business strategy. As Turner and Muller (2008) highlight, organizational projects are entities required to be organized to enable positive and evidently defined developments in the business and if properly implemented, it will lead to an increase in the organizational value. However, Amason (2015) note that companies do not have unlimited resources to put in on the set projects so they select those projects that have a higher chances of delivering the most significant results for the business strategy implementation in the most efficient and effective manner. Successful completion of projects will lead to increased chances of realizing organization goals and therefore, any move that will increase the success rate of projects before, during and implementation of the project program need to be supported by all organizational stakeholders.

For the past few years, agile methodologies have been hailed as the silver bullet which was successfully addressing the high project failure rate. Then the concept of Agile Project Management arises, as a new project management platform, which is applicable to volatile and challenging environment and subject to frequent changes in the prescriptive and standardized process that no longer fits (Chin, 2004; Highsmith, 2009).

Agile project management has its roots in the system development industry, and has developed and grown through empirical progress. This, however, does not mean that this methodology's uses are limited to that industry. The Agile methodology is a set of values, attitudes and principles, which can be embraced in

other industries as well. Furthermore, the methodology includes different methods and tools to use when conducting a project, which was aid in the mission to follow its values and principles. The Agile approach is suitable for complex projects where it is difficult to specify the product in advance. It is widely used in the software industry where the customer detects their needs through means of repeated tests and improvements to a prototype.

A project is generally considered to be successfully implemented if it comes in on-schedule, comes in on budget, and achieves basically all the goals originally set for it and is accepted and used by the clients for whom it is intended (Mbaluku & Bwisa, 2013). A construction project consists of several different phases. In the book Construction Project Management the authors explain that a construction project starts off with a feasibility analysis (Gould & Joyce, 2009). This phase is an investigation on an economic basis. The aspects that are most important to analysis is the cost, the time schedule, the budget and the market demand.

Commercial real estate is any property owned for the purpose of producing income. There is about \$6 trillion worth of commercial real estate in the United States. As a component of GDP, commercial real estate construction contributes 3 percent of U.S. economic output. In 2016, there was \$516 billion of commercial real estate construction, down from \$507 billion in 2015. The record high was \$586.3 billion in 2008. The low was \$376.3 billion in 2010. That represented a decline from 4.1 percent to 2.6 percent of GDP.

Throughout history, there has been a tendency for governments to centralize power. During the late 20th century, however, groups in both federal and unitary systems increasingly sought to reduce the power of central governments by devolving power to local or regional governments. For example, supporters of states' rights in the United States favored diffusing power away from Washington, D.C., toward state and local governments. This trend was

also experienced throughout the world, though perhaps the two most notable instances of devolution occurred in France in the 1980s and the United Kingdom in the late 1990s. In Kenya, power has been devolved into Counties. The country has 47 counties and Nairobi is one of them. Being the capital city of the country, Nairobi is the smallest yet the most populous of all the counties. It also generates more than 60% of the country's wealth.

Statement of the Problem

According to Kariuki (2015), contractors worldwide as well as Kenya have experienced cost overruns in projects leading to low profits, zero profits or even losses in some instances and some of the causes of cost overrun include sudden increase in materials prices and poor timing of resource procurement. Other studies which have been across the globe have indicated that most commercial construction projects fail to achieve their initial mission within cost constraints. Specifically, in the United Kingdom, it was demonstrated in 2010 that about 65 percent of all projects tend to have cost overruns in the excess of ten percent. Moreover, about 50 percent of all projects had time overruns of more than 25 percent. This trend has also been identified in other countries such as India where more than 56 percent of all projects had cost overruns of over 20 percent while another 49 Dollars had time overruns of more than one month.

It is also imperative to note that delays in projects have also been identified in such countries as Malaysia, Jordan, Saudi Arabia, Thailand and Hong Kong. However, it is also imperative to note that there are similarities and differences as to the various causes of delays in projects. According to Sambasivian and Soon (2014), project delays in the construction industry are a global phenomenon. Particularly in Kenya, it has been demonstrated that about 48 percent of all building projects tend to show poor performance such as in the completion time, client satisfaction and scope (Muchungu, 2012). Therefore,

the current study sought to demonstrate how agile project management framework is used in project management to facilitate the completion of projects within time, scope and budget.

Objectives of the Study

The general objective of the study is to analyze the effects of agile project management and project success in the construction of commercial properties in Nairobi County. The specific objectives were:-

- To describe the extent to which agile planning affects the project success in the construction of commercial properties in Nairobi County in Kenya.
- To establish the extent to which iterative methods affects the project success in the construction of commercial properties in Nairobi County in Kenya
- To determine the extent to which continuous improvement affects project success in the construction of commercial properties in Nairobi County in Kenya
- To define the extent to which close collaboration affects the project success in the construction of commercial properties in Nairobi County in Kenya

LITERATURE REVIEW

Theoretical Review

Mugenda & Mugenda (2003) define a theory as a system of explaining phenomena by stating constructs and the laws that interrelate these constructs to each other. A construct is a concept, abstraction or idea drawn from the specific. This study is guided by the evaluation and co-ordination model, the project management competency theory, and the project management competency theories. A theoretical review consists of concepts together with their definitions, and existing theories that were used for a particular study. The theoretical framework

must demonstrate an understanding of the theories and concepts that are relevant to the topic of the research papers.

The Evaluation and Co-Ordination Model

The model consists of conflicts identification and coordination, constructability improvement and continuous improvement tasks. Through those processes, construction plans are continuously subjected to constructability reviews, and project's requirements and constraints (cost, duration, quality, and so on) are regularly evaluated. If problems are found, the project team reconsiders the design and planning decisions made, and attempts to satisfy the project requirements and constraints.

This is achieved by revising the design drawings, re-examining the methods selected and the associated resources, and by rethinking the assemblies sequencing and relationships. If, after a reasonable number of iterations and trials to adjust the plans and to review constructability, project requirements and constraints are not met, further design modifications can help minimize construction problems that would be encountered in the field. Once problems are resolved, planning at this level is finalized. The planning tasks within this model are more concerned with the information collection and analysis.

Project Management Competency 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. Since then a number of competency frameworks have been developed by different project management institutes. Crawford (as cited in Boyatzis, 1982 & Spencer, 1993), puts a model of competence that integrates knowledge, skills, demonstrable performance, and core personality characteristics, noting the last, personality characteristics, as challenging to develop and assess

through training. She argues that two of the most influential project management standards, the PMBOK, address only the knowledge aspect of competence while a third, Australia's National Competency Standards, draws from knowledge but focuses only on demonstrable performance.

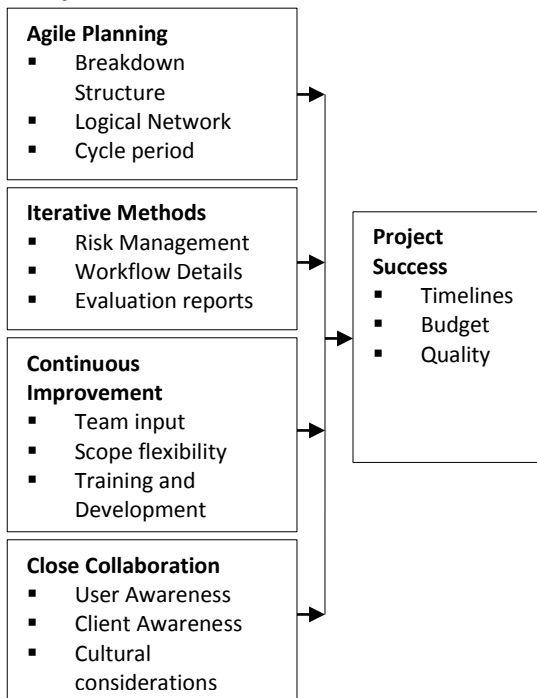
The Theory of Performance (ToP)

The Theory of Performance (ToP) develops and relates six foundational concepts to form a framework that can be used to explain performance as well as performance improvements. To perform is to produce valued results. A performer can be an individual or a group of people engaging in a collaborative effort. Developing performance is a journey, and level of performance describes location in the journey. Current level of performance depends holistically on 6 components: context, level of knowledge, levels of skills, level of identity, personal factors, and fixed factors. Three axioms are proposed for effective performance improvements. These involve a performer's mindset, immersion in an enriching environment, and engagement in reflective practice.

Conceptual Framework

A conceptual framework is a tool researchers use to guide their inquiry; it is a set of ideas used to structure the research (Marshall & Rossman, 2006). The major function of a conceptual framework is to enable the researcher to find links between the existing literature and his own research goals (Greener, 2008). The conceptual framework in this study shows the link between the variables of study; agile planning, iterative methods, continuous improvement, close collaboration. The conceptual framework outlines the dependent and the independent variables as discussed in the literature review and elaborated in the Figure 2.2. It helps one to understand the relationship between the variables of the study.

Conceptual Framework



Independent Variable **Dependent Variable**

Figure 1: Conceptual Framework

Source: Author (2018)

Empirical Literature Review

Agile planning

A study on Agile planning in the construction industry - An inquiry of the opportunities in construction projects by (Mattias, 2012) on how projects within the construction industry are managed noted it has not changed significantly during the last decades. The construction market, the number of different actors and the way that projects are procured today has however changed. This has led to a gap between the managerial view on how construction projects should be conducted today and how they actually are executed. This is reason enough to question this conservative industry and look into what possibilities there might be in the future. The study concludes the agile approach almost forces the client to increase their participation in the project compared to the

situation today. It can also decrease uncertainty and improve risk management. By the use of time management and specific meetings it was also be beneficial for keeping track of the project's progression and status.

Iterative methods

A study by Vaasa, 2017 on New born project management philosophies (lean & agile) in construction industry Case: Construction Company x plumbing renovation projects. The object for the research was to find project management a success factors on construction industry and in Finnish plumbing renovation projects. Secondary empirical study opened key factors in construction business and case study how the projects are managed at the moment, and how the project management could be developed in the future. The study concluded that the perception that the traditional project management methods in construction industry should soon be buried, and replaced more on date managerial philosophies and methodologies.

Continuous improvement

A study by Auma, 2014) on Factors Affecting the Performance of Construction Projects in Kenya: A Survey of Low-Rise Buildings in Nairobi Central Business District showed that The result shows that the majority of projects executed had a higher percentage of cost overrun, were delayed in time and client were sometimes satisfied with the project. Higher percentage of respondents agreed that the cost of equipment and materials, cost of variation orders, cost of rework and escalation of material prices are the cost factors that affect the performance of construction project. Percentage of orders delivered late, delay in claim approval and delay of payment from client to contractor are time factors that affect the performance of construction project. Qualification and experience of staffs, quality of equipment and materials, conformance to specification are quality factors while leadership

factors are staff training and leader's professional qualification are factors that affect the performance of construction projects. From these findings, performance of construction project is influenced by the cost of materials, time management, quality management and the leadership style adopted on site. Therefore, the contractors should take precautions on all matters that might affect the project performance.

Close collaboration

Sohi et.al, (2016) researched the question of lean and agile in construction industries. They gathered information from 67 respondents and they found out eight significant statistical correlations between the agile and lean and the project success factors in the construction industry. Their research shows that the combination of lean and agile gives a competitive advantage on every other criterion than in the stakeholder complexity. This might be consequence of a typical construction project, which do involve several stakeholders with different project objects. So lean and agile may request more time from the stakeholders, which may show itself as a negative in one perspective, but positive on other criteria's. In succeeding on large construction project with lean and agile, the collaboration between the stakeholders may be at the level they haven't used to before. This may cause some growing pains amongst the stakeholders.

Project Success

Success factors in commercial property projects: the contractor's perspective by (Liljedahl & Möller, 2014). Many projects in the construction industry can be considered a success in terms of quality and time. This study investigates factors that affect profitability in commercial property projects, by taking the contractors perspective and only focusing on the profitability. Literature supports that there are four main categories that affect profitability: project related factors, external related factors, human

related factors and project management related factors. Key players in the construction project are project managers and production managers, therefore we have chosen to interview people in those roles connected to 20 projects during 16 interviews.

METHODOLOGY

The study adopted descriptive research design in investigating the relationship between agile project management and project success in the construction of commercial properties in Nairobi. Descriptive research design allowed the researcher to study the elements in their natural form without making any alterations to them. The study targeted construction projects in the county of Nairobi. There were a total 115 construction projects that the researcher managed to study. Key informants of the project were interviewed and provided the data required. There was no sampling for this project. Census was instead applied. Census as defined by (Sarrador et.al, 2015) as the study of a whole population. Therefore, in this study, the whole population comprising the 115 Projects was studied. The study used primary data. Both qualitative and quantitative primary data were used for the study. Primary data are information gathered directly from the respondents (Kothari, 1990). Questionnaires were used to collect the data. Questions in the questionnaire comprised of closed and open ended.

RESULTS

Agile planning

The first objective of the study was to investigate agile planning and its relation to project success in the construction of commercial properties in Nairobi County. The results revealed that a majority of the projects applied breakdown structure during the project planning phase. Agile planning is concerned with allocating of resources, both time and people to

the projects. The study found that when undertaking the commercial projects, the project team emphasize on a clear planning of the projects. This was identified as a key step in project implementation by Mauricas (2013) when he noted that agile planning acts to facilitate the actual strategy of a company that is evident via introduction of new processes, products, services and achievement of a particular level of outcomes in which resources are channeled. Agile planning was found by Chan and Chan (2004) to have a significant effect on project as measured by time, cost and safety. The results agree with the statement of Müller, R., & Turner, R. (2010), who explains that the use of work breakdown structure is beneficial to the project success. The study also reported a 40% application of logical network on the projects understudy. The findings were similar to Larson, E. W., & Gray, C. (2013), in the statement that the use of logical networks is on the rise in the construction industry.

Iterative methods

The second objective of the study was to investigate how iterative methods had an influence on project success in the construction of commercial properties in Nairobi County. The results showed that the application of iterative methods in the construction of commercial projects was used to enhance the rate of project success.

Table 1: Continuous improvement and its influence on project success

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
Team input is encouraged	45.2	16.9	12.7	12.3
There is scope flexibility	11.2	24.1	25.6	32.1
Project staff are trained	27.0	7.8	35.2	4.6

Close collaboration

The fourth objective of the study was to investigate close collaboration and its relation to project success in the construction of commercial properties in Nairobi County. The results revealed that a majority of the respondents representing 78.7% agreed that

Application of risk management in relation to iterative methods was found to be popular among the commercial projects. . Further, the results showed detailed work flows was used in the implementation phase of project evaluation. The adoption of evaluation reports in project management within the commercial projects in Nairobi is in line with the findings by Milika (2011) who found that evaluation reports facilitates analysis of current circumstance such as, recognition of the needs of stakeholders and the definition of associated objectives, determine a causal relationship between activities, inputs and outcomes.

Continuous Improvement

The third objective of the study was to investigate continuous improvement and its relation to project success in the construction of commercial properties in Nairobi County. The results revealed that a majority of the respondents representing 79.2% agreed with the statement that team input is encouraged. Another higher percentage of respondents representing 68.9% agreed that staff were trained. The other 58% also were in agreement with the statement that there is scope flexibility. The findings were supported by the study conducted by Hass, (2007) which states that team efforts are an ingredient for the success of a project.

indeed close collaboration influences the success of construction projects. The results further revealed that majority of the respondents who represented 68.9% agreed with that statement that user awareness is implemented. A further 58.7% agreed with the statement that the client is always informed.

According to Karlesky, & Voord, (2008), user awareness helps mitigate unseen risks in a project.

The importance of close collaboration in the project success is based on the realization that the success of a project is not a simple unitary concept to be undertaken by a firm but rather depends on the stakeholder who is assessing that success (Baccarini, 2009). In recognition of the importance of close collaboration, different groups of stakeholders were

identified in the project. These included government institutions, local communities and opinion leaders in the locality. The results shows that with regard to stakeholder evaluation, the contractors identify all the stakeholders especially the key ones that affect the success of the projects and are incorporated in the project implementation with their opinion being considered.

Table 2: Close collaboration and its influence on project success

Statement	Very extent	High	High Extent	Moderate high	Low	Very low	Mean	Std Dev
User awareness is implemented	14.2		6.9	11.6	50.4	16.9	3.58	1.0
The client is always informed	19.4		14.3	5.6	50.1	26.8	3.89	1.0
Cultural considerations are implemented	7.0		9.9	4.2	53.5	25.4	3.8	1.1

Project Success

The respondents were asked to indicate the number of projects completed within budget. The results revealed that in the year 2012, the number of complete projects within budget were 32%, in the year 2013 they were 50%, 63% in the year 2014, 69% in 2015 and those in 2016 were 72%. This implied that the numbers of completed projects within budget were increasing over the years. The results of these findings are in line with those of Briscoe, (2011) who states that the number of project success has been on the rise continuously in the construction industry.

The respondents were asked to indicate the number of projects completed within the set time. The results revealed that in the year 2012, the number of complete projects within budget were 25%, in the year 2013 they were 42%, 59% in the year 2014, 62% in 2015 and those in 2016 were 69%. This implied

that the numbers of completed projects within the planned time were increasing over the years.

The respondents were asked to indicate the number of projects completed within budget. The results revealed that in the year 2012, the number of complete projects within budget were 40%, in the year 2013 they were 65%, 63% in the year 2014, 65% in 2015 and those in 2016 were 70%. This implied that the numbers of completed projects within budget were increasing over the years.

Inferential Statistics

Correlation Analysis

Table 3 below showed the correlation analysis results. These results showed that agile planning and project success are significantly related and have a positive correlation ($r=0.593$, $p=0.000$). The table also showed that iterative methods and project success are significantly related and have a moderately strong positive correlation ($r= 0.508$, $p=0.000$)

Table 3: Correlation Analysis

		Project success	Agile planning	Iterative methods	Continuous improvement	Close collaboration
Project Success	Pearson correlation Sig. (2-tailed)	1.000				
Agile planning	Pearson correlation Sig. (2-tailed)	.593	1.000			
Iterative methods	Pearson correlation Sig. (2-tailed)	.508	.406	1.000		
Continuous Improvement	Pearson correlation Sig. (2-tailed)	.611	.500	.394	1.000	
Close collaboration	Pearson correlation Sig. (2-tailed)	.615	.540	.389	.627	1.000

**Correlation is significant at the 0.01 level (2-tailed).

Table 4: Model fitness

Indicator	Coefficient
R	0.747
R Square	0.558
Adjusted R Square	0.531
Std Error of the Estimate	0.440991

Table 5: Analysis of Variance

	Sum of squares	df	Mean Square	F	Sig
Regression	15.973	4	3.993	20.534	0.000
Residual	12.641	65	0.194		
Total	28.614	69			

The results presented the fitness of model of regression used in explaining the study phenomena. Agile planning, iterative methods, continuous improvement and close collaboration were found to be satisfactory variables in the success of construction projects. This was supported by coefficient of determination also known as the R Square of 55.8%. This means that agile planning, iterative methods, continuous improvement and close collaboration explain 55.8% of the variations in

the dependent variable which was project success. The results further meant that the model applied to link the relationship of the variables was satisfactory.

In statistics significance testing the p-value indicates the level of relation of the independent variable to the dependent variable. If the significance number found is less than the critical value also known as the probability value (P) which is statistically set at 0.05, then the conclusion would be that the model is

significant in explaining the relationship; else the model would be regarded as non-significant.

Table 5 provided the results on the analysis of the variance (ANOVA). The results indicated that the overall model was statistically significant. Further, the

Table 6: Regression of Co-efficient

	B	Std Error	t	Sig
Constant	-0.476	0.501	-0.95	0.346
Agile planning	0.263	0.108	2.431	0.018
Iterative methods	0.306	0.134	2.28	0.026
Continuous improvement	0.262	0.115	2.273	0.026
Close collaboration	0.273	0.129	2.112	0.039

Thus the optimal model for the study was:

$$\text{Project Success} = -0.476 + 0.263 \text{ agile planning} + 0.306 \text{ iterative methods} + 0.262 \text{ continuous improvement} + 0.273 \text{ close collaboration}$$

CONCLUSIONS

The success of commercial projects, just like all other projects is of importance to a contractor and therefore, the understanding of the factors that influence the success of the projects is of importance to a contractor. The study findings established that project success is influenced by among other the agile project management. In conclusions, it was identified in the study that agile project management is still a field of active research. The use of this important aspect in construction industries is something that needs to be considered. Just as agile project management does so well in the software industries, the study reveals that even in the construction industry the same or even better results can be achieved. The findings of other researchers in this field have also been presented and therefore the team in the construction industry just need to employ agility and discover its benefits. This field remains a field of active research and therefore more aspects of agile are still under study.

results implied that the independent variables are good predictors of project success. This was supported by an F statistic of 20.534 which was greater than F critical ($F_{\alpha}=2.31$) and therefore the null hypothesis was rejected.

RECOMMENDATION

Based on the findings of the study, the following recommendations were suggested. From the initial stages of the project, agile planning should never be ignored. It is a very powerful tool that should be flouted but which must be prudently applied in every construction project. This is majorly because it enhances the success of the project. Through agile planning, there is a great chance of identifying any unforeseen risks on the project. This will help the project team to come up with clear means of risks mitigation.

The other recommendation was that for every project, the team needs to clearly come up with a good designing phase. The project initiation phase is the most important one in every project. It is therefore an advice to the team members to be very keen at this phase. Through agile planning, this can be achieved easily.

In this research it was discovered that the projects that had detailed work flows reported a great chance of success rate. Therefore, as recommendation to the project team is to have a detailed work flows. This

would ensure that no missing information. It also helps the team in having a continuous uninterrupted work.

The other recommendation was in the evaluation reports. All projects need to be constantly evaluated. After the evaluation, the results of the findings need to be implemented as soon as possible. The study therefore recommends that this should be employed in every project

The study recommended that the project team should be encouraged to give their inputs. Input from the project team is very vital to the success of a project. It also builds cohesion in a team. Through team input there is a high chance that all issues will be properly addresses. From the findings of the study, it is highly recommended that the project team implements close collaboration. This is in ensuring

the client is informed of every progress of the projects.

Areas for Further Research

The results of this study would be valuable to researchers and scholars, as it would form a basis for further research. Scholars would use this study as a basis for discussions on agile project management in the construction industry. It will provide scholars with empirical data that they will use in their studies.

The study found that to a moderate extent, agile project management in general affect the success of the commercial projects in Nairobi County. Future research should seek to determine whether what moderating or mediating factors influence the relationship between agile project management practices and the success of projects.

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