

**PROMOTING MULTIDISCIPLINARY TEAMWORK IN PROJECT
DEVELOPMENT IN KENYA**

BY

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Declaration

This thesis is my original work and has not been submitted for a degree to any other institution, college or university.

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Abstract

In today's construction sector, collaboration between multidisciplinary teams is becoming a standard practice worldwide. However, in Kenya, Architectural, Engineering and Interior Design professionals seldom have a chance to collaborate with each other. To gain insight into these issues, the study aimed at examining promotion of multidisciplinary teamwork in project development in Kenya. Key objectives included examining; benchmarks of a successful teamwork; conflicts that exists, if any among Architects, Engineers and Interior Designers, their role in project development and aspects that could promote multidisciplinary teamwork. The findings of this study may contribute to further understanding and be beneficial to the government in reviewing policies to counter the unethical practices. The study geographically focused on Nairobi County as the case study. Descriptive survey design was employed. The study population comprised of professionals including Architects, Engineers and Designers, as well as University lecturers and contractors within Nairobi County. A sample was selected for the study using stratified sampling, purposive sampling and simple random sampling techniques. Questionnaire, interview schedules and focus group discussions were used to collect data. Data were analyzed through quantitative and qualitative techniques and results presented using frequency and percentage tables and charts. The study established that market demands are the guide principle that impact on the extent of teamwork among architects, engineers and interior designers. Architects, Engineers and Interior Designers, their engage occasionally, and not many firms had teamwork strategies. It was also established that collaboration among Architects, Engineers and Interior Designers has not

improved. The study found out that meeting client needs was the most critical success strategies for many firms. Early team formation starting at tertiary level education and recognizing the role of interior designers is critical. The study concluded that the most prevalent cases of conflicts involve issues related to lack of proper communication, poor leadership and lack of professional ethics. The study recommended the need for the government to implement a more holistic approach to building awareness and more collaborative initiatives within the Architectural, Engineering and Interior Design disciplines to deal with existing and emerging conflicts. The thesis is organized into six chapters. Chapter one outlines the introduction while chapter two describes the literature review. The research methodology is discussed under chapter three, followed by chapter four which presents the results and findings from the field. Analysis and synthesis of results are discussed in chapter five. Finally, chapter six contains the study's conclusion, recommendation and areas for further research.

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Acronyms

AED: - Architects, Engineers and Interior Designers

ASCE:-American Society of Civil Engineers

ERB: - Engineers Registration Board

QS; - Quantity Surveyors

UAE:-United Arab Emirates

UoN: - University of Nairobi

USA: - United States of America

CHAPTER 1: INTRODUCTION

1.1 Background to the Study

In today's construction sector, collaboration between multidisciplinary teams is becoming a standard practice worldwide. Currently, there is an increasing understanding by business of the role that interior design can play in enhancing competitiveness and innovation performance. There is also a growing recognition by governments and business community of the value that design can add to the economy (Stone, 2010). Globally, the potential for future development of the construction industry is significant and there are important opportunities on the horizon (Whyte & Bessanr, 2007). However, despite the vast number of literature available on this subject matter, there is a lack of effort to contextualize the findings into local context. Therefore, exploring the factors essential to the success of the local construction project is one of the prerequisites to integrate teamwork into local setting. The current study focused on promoting multidisciplinary teamwork in project development in Kenya.

According to Bowen (2007), Architecture, Engineering and Interior Design (AED) professions have direct effect on the lives of people; these professionals owe special moral responsibility. However, it has been suggested that professionals in general tend to believe that their obligations to their clients far outweigh their responsibility to others, such as public (Fan et al., 2001). AED seldom work as a team from onset of a project to completion, focusing on individual projects with few opportunities instead of building teamwork and communication skills. The American Society of Civil Engineers (ASCE) requires construction engineers to design systems for execution of the construction

process (Hinze, 2001b). For example, the design-build process requires a construction professional within the construction organization to monitor and coordinate the construction work (Hinze, 2001). Despite the existence of ethical codes and professional associations' regulations, the Kenyan public domain continues to observe clear cases of collapsing buildings, unfinished and substandard constructed roads, uninspected houses by those trained and entrusted in this noble profession.

According to Takim (2010), project effectiveness measures are normally used by most researchers and practitioners to judge project performance and project success. Criteria such as meeting project time, budget, technical specification and mission to be performed are the top priorities of project objectives. More specifically, the concept of success in a construction project is correspondent to the efficiency and effectiveness measures (Crawford & Bryce, 2003). On the same note, Prah (2002) defines construction defects as work performed that falls below the expected standards by the client or purchaser of the work or services. Therefore, meeting the strategic objectives of construction clients is paramount in construction project.

In the developed economies such as United States of America (USA), most firms have well integrated teams that collaborate in project development and hence achieve the most effective outcomes. Similarly, construction industry in Malaysia has been increasingly recognizing the need for teamwork in relationship-based project development. In the United Arab Emirates (UAE), construction industry underestimate the importance of team building in their projects and believe that if they can control time, cost, and quality in a project, then the success of the project is guaranteed. Prior to 2007, project teams in the building sector in the UAE were over-burdened with the workload, with none or very

little efforts made for team building. This caused a low morale in teams, which ultimately led to reduced efficiency. Many projects were delayed and later put on hold as the economy shrank. As such, team building is essential to successful project delivery and long-term sustainable buildings.

In project development, professionals and professional associations have a major role to play in restoring professionalism in all spheres of the Society. Therefore, collaboration among these teams is important to ensure buildings in Kenya are constructed well and according to the laid down standards. The existence of entire estates like Zimmerman in Nairobi which are monuments of the absence of planning is an indictment of the professionals and hence the need for clear benchmarks in the construction industry. In Kenya, the Engineers Registration Board (ERB) has likewise issued strict and professional stipulations for engineers, consultants, contractors and other stakeholders in this field, but in practice these are rarely followed to the letter. The existing standards coupled with our socio- cultural traditions and with ethical standards and practices of developed countries are critical (Mathenge, 2012). Against this background, the need for teamwork in project development among the various disciplines is essential to provide professionals with a holistic knowledge base to meet the demand through shared knowledge and more research in the field.

1.2 Problem Statement

AED professionals seldom have a chance to collaborate with each other due to lack of multidisciplinary teamwork in project development. Project development requires early team formation that enhances multidisciplinary teamwork. However, clear benchmarks of

a successful teamwork in project development and the role played by AED professionals in enhancing competitiveness and innovation performance has not been fully achieved. Responsibilities across these disciplines may conflict with each other, creating a battle for professional duties. According to Momanyi (2012) the quality of this work “demeans the advances made in the architectural, engineering and design professions through this iconic symbol of incompetence and greed.” The ambiguity in the borders of the definitions of AED disciplines and the overlapping of the tasks aid in the formation of problems related to task and responsibility distribution. Furthermore, multidisciplinary teamwork in project development is generally under researched in the developing world, Kenya included. It is because of these concerns that this study sought to focus on promoting multidisciplinary teamwork in project development in Kenya.

1.3 Objectives

The following were the objectives of the study:

- (i) To examine the benchmarks of successful teamwork in project development.
- (ii) To investigate the conflicts that may exist among Architects, Designers, Engineers and related disciplines in project development.
- (iii) To determine the role of AED in project development.
- (iv) To propose aspects that could promote multidisciplinary teamwork in project development in Kenya.

1.4 Research Questions

- i. What are the benchmarks of successful teamwork in project development?
- ii. What conflicts, if any, exist among Architects, Engineers and Interior Designers in project development?
- iii. What is the role of AED in project development?
- iv. Are there aspects that can promote multidisciplinary teamwork in project development in Kenya?

1.5 Justification

AED seldom work as a team from onset of a project to completion, focusing on working on projects as individuals; with few opportunities instead of building teamwork and communication skills. The findings of this study may contribute to further understanding of the need for an intensified collaboration of interdisciplinary expert teams. Effective interdisciplinary work demands that the different competencies that are expected to contribute to the overall success of the project are clearly demarcated. Therefore, the study may provide meaningful information to help Architects, Engineers, Designers, Contractors and other professionals with a holistic knowledge base in project development. In the long run, this may help produce quality projects. Policy makers would be able to put programs in place that can benefit those in related fields. Ultimately, scholars doing research in related areas may borrow from the findings of this study.

1.6 Scope and Limitation of the Study

The study geographically focused on Nairobi County as the case study, and specifically looked at promoting multidisciplinary teamwork in project development. The study specifically targeted professionals including Architects, Engineers and Designers, who were expected to be a rich source of information. The study was carried out between August 2012 and April 2013.

The intrusive nature of the study across the different disciplines was an area of concern for the respondents. However, the researcher sought the support of research assistants to help collect data in good time. Moreover, this research was carried out based on a Kenyan perspective and only applicable to its culture and way of life of her citizens. Therefore, a major limitation was that the study was not applicable to other countries due to cultural differences and background.

1.7 Assumptions of the Study

The study was based on the following assumptions:

- i. AED professionals seldom work as a team during project development in Kenya.
- ii. Conflicts exist among Architects, Engineers, Interior Designers and related disciplines in project development.

1.8 Definition of Terms

Architect: A person professionally and academically qualified to practice architecture in the jurisdiction in which he or she practices and is responsible for advocating the fair and sustainable project development (IUA, 1998).

Architectural Education: Education that ensures all graduates have knowledge and ability in architectural design. Depend on a cultivated, analytical and creative mind (IUA, 1998).

Interior Architecture: Profession that provides services encompassing research, development, and implementation of plans and designs of interior environments to improve the quality of life, increase productivity, and protect the health, safety, and welfare of the public (Environmental Building News, 2004).

Interior Designer: A person, qualified by education, experience and recognized skills, who identifies, researches and creatively solves problems pertaining to the function and quality of the interior environment; and performs services relative to interior spaces.

Multidisciplinary teamwork: A group of professionals (AED, Quantity Surveyors (QS), with varied but complimentary experience, qualifications and skills that contribute to the achievement of specific objectives in project development (Morrogh, 2003).

Project: Is the task, often a large or major undertaking that involves architects, engineers, interior designers, Quantity Surveyors (QS), contractors and clients especially one involving considerable money, personnel, and equipment (Batley, 2007).

Project development: Refers to the overall planning, coordination, and control of a project from inception to completion aimed at meeting a client's requirements in order to produce a functionally and financially viable project in the construction sector (Batley, 2007).

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter discusses the relevant literature on promoting multidisciplinary teamwork in project development in Kenya. The chapter is presented under the following subtopics; benchmarks of project success; external challenges and conflicts among Architecture, Engineering and Interior Design disciplines; role of architects, engineers and interior designers; strategies and aspects for succeeding with multidisciplinary teamwork; The concept of collaboration in project development; collaboration and risk management in project development; a model of multidisciplinary teamwork plan in project development; empirical studies; and a summary of reviewed literature.

2.1 Benchmarks of Project Success

The construction industry largely attracts most attention as compared to other industries. Construction projects are naturally complex due to the wide divergence of project sites, high pressure on demanding construction time and cost as well as increasing complexity on construction techniques (Han, 2012).¹ In a construction project context, research into project success generally falls into either one of the avenues that examine project success factors or deal with success criteria (Ika, 2009).² Additionally, the emergence of project success factors and success criteria as a prerequisite to the study of project success is

¹ Han, W.S. (2012). Han, W. S. (2012). Reviewing the Notions of Construction Project Success. Faculty of Civil Engineering, University of Technology Malaysia, Johor Bahru, Malaysia.

² Ika, L.A (2009). RBM: A shift to managing development project objectives in Canada. *Journal of Global Business Administration* 1 (1), 55–76.

agreed upon across literature in the world (Ika, 2009).³ On the other hand, El-Saboni (2011)⁴ asserts that the measurement of project success in the construction industry has traditionally been grounded in the industry-accepted classic objective success metrics: cost, schedule, performance, and safety. It was therefore important to identify ways of promoting multidisciplinary teamwork in project development in the Kenyan context. This may provide a platform to give AED a chance to exploit their full potential in their profession and assure safe standards in the construction industry.

Initial research has indicated that there are more subjective considerations that, while being difficult to quantify, can have an important impact on perceptions of project success. According to Shakeel and Monir (2006)⁵, construction delay is considered one of the most recurring problems in the construction industry. Delays have an adverse impact on project success in terms of time, cost, quality and safety. The effects of construction delays are not confined to the construction industry only, but influence the overall economy of a country like UAE, where construction plays a major role in its development and contributes 14% to the GDP. Thus, it is essential to define the most significant causes of delay in order to avoid or minimize their impact on construction projects.

For building and designing professions, the incalculable value of human life demands nothing less than the highest moral considerations from those who might risk it otherwise

³ See Han W. S. (2012).

⁴ *El-Saboni, M. A. (2011). Interaction between electronic communication and perceived success in UAE construction projects. Salford : University of Salford.*

⁵ Shakeel A.S. & Monir, S. E. (2006). Significant factors causing delay in the UAE construction industry. *Construction Management and Economics* 24:11, 1167-1176.

(Bowen et al, 2007)⁶. Since the engineering profession has direct effect on the lives of people, these professionals owe special moral responsibility. However, it has been suggested that professionals in general tend to believe that their obligations to their clients far outweigh their responsibility to others, such as public (Fan et al., 2001)⁷. For example, the design-build process requires a construction professional within the construction organization to monitor and coordinate the construction work (Hinze 2001)⁸.

The Kenyan public domain continues to observe clear cases of collapsing buildings, unfinished and substandard constructed roads, uninspected houses by those trained and entrusted in this noble profession. As a result, lives has been lost and resources gone to waste in a country which has an ambitious vision which aims to make the nation a medium level industrial country by the year 2030. Some may validly argue that these are only isolated cases and the excellent constructions works done within our borders speak volumes.

The relationship between the contractor and the client is governed by the contract itself, and thus both play a critical role in project development. The client ensures there are suitable management arrangements for the project including welfare facilities.; allow

⁶ Bowen, ET AL., (2007). Professional ethics in the South African construction. *Building Res.Information*. 35 (2): 189-205.

⁷ Fan, et al., (2001). Effect of professional socialization on quantity surveyors' ethical perceptions in Hong Kong. *Engineering, Construction and Architectural Management*. 8(4): 304-312.

⁸ Hinze, J. (2001). Owner's Role in Construction Safety. *J. Constr. Eng. Manage.*, 132(2), 164–173. School of Building Construction, College of Design, Construction and Planning, Univ. of Florida, Gainesville, FL 32611-5703.

sufficient time and resources for all stages; provide pre-construction information to designers and contractors. The client plans, manages and monitors construction phase in liaison with contractor. Additionally, the client is involved in preparing, developing and implementing a written plan and site rules. The contractor is in the driver 's seat during all phases of sustainable construction projects, including pre-design and design, construction and closeout. The contractor is involved before the race starts and continues driving sustainability through to operational training. The contractor provides the necessary input on the feasibility of implementing proposed design ideas (Nguyen, 2004)⁹,

Professional ethics is a set of standards adopted by a professional community. Professional ethics are regulated by standards, which are often referred to as codes of ethics. The code of ethics is very important because it gives us boundaries that we have to stay within in our professional careers (Vee & Skitmore, 2003)¹⁰. For example, the American National Society of Professional Engineers (NSPE: 2009) note that “engineers, in the fulfillment of their professional duties, shall hold paramount the safety, health, and welfare of the public.” In professional ethics, professional obligations are usually summed up in a professional code of ethics. The task of a code of ethics is not to derive obligations from first principles, but to spell out what the public expects from the profession.

⁹ Nguyen, L. D. (2004). A study on project success factors in large construction projects in Vietnam", *Engineering, Construction and Architectural Management*, Vol. 11 Iss: 6, pp.404 – 413.

¹⁰ Vee, C. & Skitmore, M. (2003). Professional ethics in the construction industry-Malaysia. *Engineering, Construction and Architectural Management*. 10(2), pp 117-127.

2.2 External Challenges and Conflicts Among AED Disciplines

The public's confusion over the role of AED has been exacerbated by the criteria outlined by professionalization theory as steps necessary to move from a practice to a profession (Skirtmore, 2001)¹¹. The professionalization theory asserts that intelligence, imagination, and integrity would serve the public's interests just as well. The theory proposes various pathways of entry into the profession. Many people can acquire the necessary skills through extended work experience or through shorter degree programs combined with other education. There is no doubt that progress with continuously increasing performance in relation to the built environment as well as elsewhere in society. This implies the need for an intensified collaboration of interdisciplinary expert teams.

Interdisciplinary efforts do not run counter to the principle of functional differentiation (division of labour), they rather constitute the necessary complement of an intensifying functional differentiation, especially if expectations demand an ever accelerating innovation (Skirtmore, 2001). Interdisciplinary work does not promote the dissolution of disciplinary boundaries. Effective interdisciplinary work demands that the different competencies that are expected to contribute to the overall success of the project are clearly demarcated (Schumacher, 2010).

¹¹ Skitmore, R.M. and Ng, T. (2001) Australian Project Time-Cost Analysis: Statistical Analysis of Intertemporal Trends. *Construction Management and Economics*. 19(5), 455-458.

According to Nguyen (2004)¹², the unique internal features and different boundary conditions of every construction project mainly cause the disagreement on the list of success factors. Though a number of common variables contributing to project success have been proposed, specific variables that are unique to the local construction industry have yet to be defined.

Since most of the studies on construction projects are context specific, their implementation, implications are usually limited to countries, and the operating environment where these studies were conducted (Toor & Ogunlana, 2008)¹³. In addition, Toor and Ogunlana (2006)¹⁴ argue that in order to understand the factors critical to the success of the construction project, studies should consider the nature and structure of the local industry, type and scale of projects, procurement procedures, local working culture, maturity of the organization involved as well as society norms. Even though several studies have been conducted within the same research boundary, the rapid changes happening in the socio-economic landscapes in Kenya reflect the need for more research in this field. According to Olsen and Namara (2010)¹⁵, it appears as though architects are continually pushing the limits of construction through the use of advanced digital design techniques, thereby increasing the dependence on their structural engineering collaborators in order to realize their designs.

¹² Nguyen, L. D. (2004). A study on project success factors in large construction projects in Vietnam", *Engineering, Construction and Architectural Management*, Vol. 11 Iss: 6, pp.404 – 413.

¹³ Toor, S. and Ogunlana, S.O. (2008). Problems causing delays in major construction projects in Thailand. *Construction Management and Economics* 26: pp. 395-408.

¹⁴ See 12 above.

¹⁵ The Value of Collaborative Design Education for Structural Engineers and Architects. Syracuse University, Syracuse, NY

Although architects and structural engineers collaborate closely in the professional world, students from the disciplines rarely mingle. This has partly been due to the fact that there are vastly different pedagogical approaches to teaching architecture, engineering and interior design. Olsen and Namara (2010)¹⁶ argue that architectural educators value and promote creativity by assigning open-ended problems with numerous possible solutions, whereas structural engineering students, who must grapple with much more extensive technical knowledge, are rarely asked to push the limits of their discipline.

A critical need in AED disciplines is to realize that their roles, methodologies, and service expectations are continually evolving within a shifting social, economic, and political culture (Hildebrandt, 2004)¹⁷. Traditionally, the disciplines of architecture and interior design view themselves as distinctive and singular; being both boundary-tied by professional legislation as well as seeing themselves as offering specialized service roles. According to Hildebrandt (2004)¹⁸, this is reinforced by a protective “turf mentality” advanced and guarded by their respective professional and licensure organizations. While the line between services appears simplistically clear to the public-architecture is about mostly the outside of buildings, interior design directs itself to the inside-the complexity of an in-between ‘interior architecture’ obscures this view. But the need for clarity on what differentiates interior design from interior architecture is a critical question to avoid confusion and misrepresentation in professional roles and academic curricula structures.

¹⁶ See 14 above.

¹⁷ Hildebrandt, H. (2004). *The Gaps between interior design and architecture*. School of Architecture and Interior Design in the College of Design, Architecture and Planning at the University of Cincinnati: Ohio, USA.

¹⁸ See Hildebrandt, H. (2004).

In contrast, interior design is grounded in the condition of additive assemblies and separate contracted services. While the design processes of architecture and interior design share the same procedural sequence and a core discipline vocabulary, interior design, both as a discipline and in its product, is (or can be) free of the weight of the architecture. Additive assemblies within the ‘interior’ may establish an independent language, often very different and removed from the architecture that houses it. Materials, finishes, details, stylistic motifs, architectural elements, and spaces may be free from the architectural language of the building. The AED disciplines all carry the ethical and legal responsibility of health, safety, and welfare as well as special needs and sustainability (Nguyen, 2004).

2.3 The Role of Architects, Engineers and Interior Designers (AED)

For the past several years, there has been continuing discussion over the professional use of the name interior design versus interior architecture.. Friend (2009)¹⁹ notes that all these professionals has so many task to share for the project to be a dream come true: Leaving it all to the architect specially in those high rise structures could lead to a problem in the structural side. Pile (2003) points out that Interior design projects involve a number of steps in a logical order. Although systematic methods are already in use, the practice of design as a formal process can be made stronger if teamwork is emphasized.

Architecture might temporarily fuse with interior design and furniture design, which in turn might morph into product and fashion design. Here demarcations are a matter of degree and individual emphasis. The key concepts and values are basically the same. The

¹⁹ Friend, S. (2009, May). If you’ve got it, flaunt it. *Interiors & Sources*, 16, 110.

same overlap condition applies to the distinction of e.g. structural and facade engineering, or between services engineering and sustainability engineering. Again, the concepts and values are basically the same in all engineering disciplines. In contrast, the demarcation between architecture/design versus engineering/science is sharply drawn and ultra-stable. For instance, in recent years the engineering support also routinely involves façade engineering. Engineers now also get involved in the technical detailing of the interior surfaces. These aspects had some years ago still resided in the domain of the architect's expertise. This demonstrates that the distillation of architecture's inalienable core competency continues (Schumacher, 2010).

On the other hand, Bayazit (2004)²⁰ observes that the profession of Interior design is a process planned to yield interiors that function well and that are aesthetically pleasing. The tools used by interior designers generally fall into the same two categories as those used by other design disciplines based on the fundamental design methodological principle common to all design disciplines. As interior designers encounter new and more specialized problems, they find it necessary to develop tools unique to their field's highly specialized requirements. As such, it is important to establish ways of promoting their profession in the local context. Friend emphasizes that in order for AD professionals to function properly, they must give a lot of respect from each other. Similarly, Waxman and Clemons (2007)²¹ point out that the Engineers will rely on interior design decisions

²⁰ Bayazit, N. (2004). Investigating design: a review of forty years of design research. *Design Issues*, 20(1), 16-29.

²¹ Waxman, L. K., & Clemons, S. (2007) Student perceptions: Debunking television's portrayal of interior design. *Journal of Interior Design*, 32(2), 5-11.

and would do the computations structurally. On this note, collaboration is critical in ensuring that the design of the Architects is followed accordingly during construction.

The engineer recognizes that the greatest merit is the work, so exercise their profession committed to serving society, attending to the welfare and progress of the majority. By transforming nature for the benefit of mankind, the engineers must increase their awareness of the world is the abode of man and his interest in the universe is a guarantee of overcoming their spirit and knowledge of reality to make it fairer and happier (Fan et al., 2001)²². The engineer should reject papers that are intended to harm the general interest, in this way avoid situations involving hazards or constitute a threat to the environment, life, health and other rights of human beings.

2.4 Strategies and aspects for Succeeding with multidisciplinary teamwork

According to Environmental Building News Report (EBN, 2004), promoting multidisciplinary teamwork in design profession calls for all designers to understand their work, at least to some extent, as an interactive process. In most cases, however architectural and interior design projects are often done separately within each area of expertise: the architect works out the massing, layout, and facades of the building.

Integrated process in project development: Atwood, McCain and Williams (2002) point out that an integrated process where the D&A team works as a collective to understand and develop all aspects of the design is critical. The design can then emerge

²² See Fan, et al., (2001).

successfully with the full benefit of each expert's input. However, despite such recommendations, teamwork among AED in Kenya is still a work in progress and most institutions have not formed a strong framework to solve the problem. Therefore, an opportunity for recognition of the role of AED can be enhanced through further investigation on promoting AED teamwork in project development.

With the complexity of modern buildings and the tremendous breadth of knowledge needed to design and build them, Reed (2000)²³ argues that project development involving AED require a “composite master builder” in the form of a highly collaborative and multidisciplinary team. Additionally, Liu, Bligh and Chakrabarti (2003)²⁴ indicate that a whole-building design demands an integrated approach if it is to be done well, as every aspect of a building affects and is affected by other aspects. According to Kang (2007)²⁵, successful integrated design depends on two key factors: thinking outside the box and working as a team from the beginning.

Effective Collaborative Process: Kang points out that creating an effective collaborative process requires clear intention and skill, especially for large, complicated projects with numerous consultants and participating stakeholders. Every participant must be open-minded about potential design solutions and willing to take some risks (Kang, 2007)²⁶.

²³ Reed, P. (2000) *Graphic thinking for architects and designers* (3rd ed.). New York: Van Nostrand Reinhold.

²⁴ Towards an ideal approach for concept generation. *Design Studies* 24 (4), 341-355.

²⁵ Kang, M. (2007). *A Computer Database of Design Methodological .Tool Patterns for Interior Designers*. Department of Design, Housing, and Merchandising, HES.

²⁶ See Kang, 2007.

Therefore, the need to identify and devise relevant educational curriculum for AED as early as possible is critical.

Project Management: The construction process involves conceptualizing, designing, managing, organizing and coordinating project requirements including time, money resources, technology and methods; these must be integrated in the most efficient manner possible to complete construction projects on schedule, within the budget, and according to the standards of quality and performance specified by the project owner or designer. This demand from collaboration among the multidisciplinary teams besides knowledge of business procedures, economics, and human behavior is realistic (Cywinski, 2001)²⁷.

2.5 The Concept of Collaboration in Project Development

Teamwork requires organization, strategies and coordination. According to Schng and Lin (1997)²⁸, the design of a project system should support multidisciplinary conceptual properties for constructing effective teams. Schng and Lin further point out that the advantages of teamwork approach is the reduction in complexity of the task through distribution of responsibilities, resulting in better utilization of resources, robust behaviors, and a greater variety of behaviors against competitors. A number of factors affecting effective coordination have been identified, including human, environment and work context factors. Human factors can in turn be classified into social factors which

²⁷ Cywinski, J. B, (2001). *Intelligent Workplace*; Carnegie Mellon University, Pittsburgh, Pennsylvania. American Institute of Architects.

²⁸ Schng , C. S. & Lin P. (1997). From Roles to Teamwork: a framework and architecture. *Applied Artificial Intelligence Journal*.

include workers will often to make decisions that affect the group advantageously as a whole, rather than making decisions, which benefits them the most in the short term. Cultural-modern workforces are often multi-national and multi-cultural. Personal factors may include personal likes and dislikes, for example, can be quite important for workforce motivation (Rosenberg, 2010)²⁹.

As the design and construction of successful buildings becomes increasingly complex, designers and experts from many disciplines must be brought together to share their expertise and collaborate on the design of the key building features. Typically, not all of the disciplines and expertise required can be found in a single design firm. Rather, a project design team typically involves designers and experts from a number of different firms that all specialize in their own aspect of the project design. According to Rosenberg (2010), a typical project team may bring together architects, civil engineers, structural engineers, mechanical engineers, planners, surveyors, and a host of technical specialists; each with their own perspectives and goals on what features will create the best design. Contractors and fabricators who will build the project, as well as the facilities personnel who will eventually operate the completed building may also join these designers. Coordinating the inputs from all these divergent viewpoints into a collaborative process can be a monumental task.

To achieve their design goals, design teams must produce and manage vast amounts of information about the project; for example, existing and as-built conditions, project goals, design options considered, results of design analyses performed, construction planning

²⁹ Rosenberg, H. (2010). Solving Our Identity Crisis. IDEC, ASID.

and fabrication strategies. A seemingly boundless range of details must be coordinated, reviewed, and agreed upon by the entire team. Each team member must develop the information needed and design the features required for their own portion of the design work, and this information must be shared with other members of the design team who are impacted by and depend upon these design decisions.

2.6 Collaboration and risk management in project development

Another important aspect in collaboration is risk management. Rezakhani (2012)³⁰ asserts that risk management in project development is an important step in project success. It is the process of identifying, classifying, analyzing and assessing of inherent risks in a project. Due to the nature of the construction projects, which consists of many related and none-related operations, many risk factors will contribute in a project. To have an effective risk management plan, at first step the key risk factors that have the most effect on project objectives should be identified and classified. Project risk management is in collaboration with other project elements and an efficient risk management plan considerably increases the chance of gaining project scope (Rezakhani, 2012). Construction delays are a global phenomenon. Factors causing construction delays in construction projects differ from country to country, due to different prevailing conditions.

³⁰ Rezakhani, P. (2012). Classifying key risk factors in construction Projects. Kyungpook National University, Korea.

Olatunji (2010)³¹ points out that the prevailing conditions that could exert an influence on project delivery time are: political, economic, and physical factors as well as level of technological development; management style, and construction techniques. The construction industry is a major player in the economy, generating both employment and wealth. However, many projects experience extensive delays and thereby exceed initial time and cost estimates.

Delay in construction projects is a situation where the project cannot be completed under the planned time. It is a common issue faced in the construction industry all over the world especially in developing countries. There are a number of factors of delay categorized in broad categories, namely contractor-related factors, consultant-related factors, client-related factors and external factors. Thornton (2007)³², in his survey, found that slow collection, low profit margins and insufficient capital or excessive debt are the 3 major causes of financial difficulties among contractors. Slow collections topped the list in the years 2007 and 2005, in which the contractor received late payment from the client. This is supported by Arshi and Sameh (2005)³³, Assaf and Al-Hejji (2006)³⁴, who found that delay in payment from the client would eventually cause financial difficulties

³¹ Olatunji, A. A. (2010). Influences on Construction Project Delivery Time. Faculty of engineering, the Built Environment and Information Technology. The Nelson Mandela Metropolitan University.South Africa.

³² Thornton, G. (2007). Surety Credit Survey for Construction Contractors: The Bond Producer's Perspective. Kansa City.

³³ Arshi, S.F. and Sameh, M.E. (2006). Significant factors causing delay in UAE construction industry. *Construction Management and Economics* 24: pp. 1167-1176.

³⁴ Assaf S.A. and Al-Hejji S. (2006). Causes of delay in large building construction projects. *International Journal of Project Management* 24(4):pp. 349-357.

to the contractor. Thus, most of the construction works cannot be carried out due to these financial difficulties.

Effective and efficient site management by contractors is very important to ensure projects are completed on time. Poor coordination contributes to delay from estimated completion time. Poor site management may occur when contractors do not have enough experience and suffer from a lack of knowledge in managing the project team (Kadir et al., 2005)³⁵. A project manager is the leader in a construction project in the sense that he is required to manage all the works on site from monitoring progress of construction works to managing all the administrative work in the project. It is of utmost importance for the project manager to manage the work and project teams effectively. Hence, poor site management from the project manager will affect the whole team and also the progress of works, resulting in the eventual outcome of project delay . This view is supported by studies conducted by Arshi and Sameh (2006)³⁶, Faridi and El- Sayegh (2006)³⁷, Toor and Ogunlana (2008)³⁸, who concluded that poor site management, is one of the factors that contribute to delay in construction projects.

In a construction project, there are many parties involved such as contractor, consultant, sub-contractor and client. Often, it may be difficult for these various separate parties to coordinate well in order to complete the project. In one study conducted by Assaf *et al.* (1995) it was found that difficulty in coordination between the parties is one of the

³⁵ 2005). Factor affecting construction labour productivity for Malaysian residential projects. *Structural Survey*, Vol. 23 No. 1, 2005,42-54.

³⁶ See 33

³⁷

³⁸ See Toor and Ogunlana (2008).

factors that contribute to delay. In addition, Majid and McCaffer (1998)³⁹ also agreed that coordination problems will contribute to delay. Ali *et al.* (2008) stated that lack of coordination between contractors and subcontractors will lead to delay, for example in the situation that newly revised construction drawings of a project may be issued later by the contractors to the subcontractors. This leads to construction mistakes and the work requiring to be redone. Reconstruction work takes additional time, therefore impacting upon the completion time of the project.

2.7 A Model of Multidisciplinary Teamwork Plan in Project development

Different multidisciplinary coordination models have been developed to promote teamwork in project development. This study adopted an Integrated Project Delivery Guide (IPDG-2007) developed to guide Architecture, Engineering, and Construction Management. Before members of the design team dive into creating models for their individual pieces of the project, it is essential that key members of the team meet to create standards and document the procedures that will be used to share models. This step is often formalized in a Model Coordination Plan (MCP). The MCP is a document that specifies the overall strategy for dividing the design work into packages that will be completed by different members of the multidisciplinary design team (IPDG-2007).

Step I: A common first step in the project design process is for the lead architect to generate a preliminary design in response to the owner's requirements and other design objectives and constraints. Once a preliminary design has been created, the MCP model can be shared with other members of a multidisciplinary design team to be used as a

³⁹ Majid and McCaffer(1998).Factors of Non-Excusable Delays That Influence Contractors Perception. *Journal of Management in Engineering*, 14(3):pp. 42-48.

starting point for their design tasks. The MCP model of the preliminary design encodes the design intent of the architect and enables other team members to participate and collaborate much earlier. Each discipline can link the architect's preliminary design model into their own model (which acts as a host for the linked model) and use the linked model as the basis for their own design work.

Step II: Having created linked models, each member of the design team can then complete their individual design tasks in parallel, confident that their design work will remain coordinated with the work of other members of the team:

- Structural engineers can design and model the structural members and framework required to support the proposed design and recommend changes that will improve the structural performance. The results of their analysis and design can be linked and incorporated into the overall project model to ensure coordination with other members of the design team.
- Electrical and lighting engineers can design and model the power, lighting, and switching systems needed to support the requirements of the proposed design. They can use their electrical models to perform detailed analysis, design of the buildings electrical systems, and recommend changes that would improve the building performance.
- Interior designers can design and model the interior features needed to support the proposed design. Using the space layouts, fixtures specified, and wet walls initially proposed by the architect, they can design the components of the interior

components and systems in detail. When their proposed design is linked into the overall model, their work will be coordinated with the work of others.

- Mechanical and engineers can also use the linked preliminary design to understand the building's cooling and heating zones as well as the spaces available for mechanical equipment. This collaboration will help them position their components in the context of the architectural, structural, interior design and other building elements that may create interferences, thus maintaining the integrity of the integrated project design (IPDG-2007).
- **Step III: Reviewing and Coordinating the Designs:** As each discipline completes an iteration of their design work, their models can be linked to an integrated project model that incorporates the models produced by all disciplines. This essential step facilitates review, coordination, and interference checking between all of the design work that has been carried on in parallel. Every discipline's individual design decisions can have impacts on many other disciplines, especially where elements from many disciplines must be coordinated to share small spaces for example, in a ceiling space where structural elements, mechanical ductwork, and piping systems all compete for limited space. This is where design review and coordination among all participating disciplines becomes vital.
- **Step IV:** Steps 2 and 3 should be completed often and repeated regularly as part of an iterative design process. As a design matures and continues to adapt and respond to the requirements and opportunities realized by all the project

disciplines, the entire project team can be updated with the latest version of the integrated project model (IPDG-2007).

Below are images of the LEED Platinum award winning office for The Energy Foundation in San Francisco, which was based on collaboration of multidisciplinary teams from different companies.



a



b



c



d

Plate 2.0: a, b, c, d

Project development by multidisciplinary teams in San Francisco (USA)

Source: Tannerhecht Architects and San Francisco Gail -Gordon (2011)

Based on the Plate 2.0 on the previous page, it clearly demonstrates the study's objective on how to promote multidisciplinary teamwork in project development in Kenya. Plate 2.0 (a) shows different disciplines of architects, engineers, interior designers, quantity surveyors and clients embracing information sharing before the project commences. Plate 2.0 (b) shows all the teams on the site. Each experts from different disciplines is brought together to share their expertise and collaborate on the design of the key building features. Plate 2.0 (c) illustrates the project being developed in progress. The final project (See Plate 2.0 (d), is a complete project building based on collaborative design process. To meet the challenges of today is increasingly complex and demanding project requirements, this kind of methodology in project development is necessary in the Kenyan context, which can ensure multidisciplinary teams deliver projects on time, at a higher quality, and with greater efficiency.

2.8 Empirical studies

A number of studies have been carried out to determine the role of teamwork in project success. Nevertheless, literature in this field is from the developed economies such as United States of America, Singapore, Malaysia and United Arab Emirates.

Ali and Smith (2008) studied the contractors' perception of factors contributing to project delay of commercial projects in Malaysia. The study observed that the Malaysian construction industry faces up to 17.3% experience more than 3 months delay and some of them are abandoned. The study focused on identifying factors that contribute to delay in construction projects; to analyzing and rank the causes of delay rated by contractors; and studying the effects of delay in construction projects. One hundred questionnaires

were distributed during data collection stage and only 36 responses received. The respondents consisted of contractors and sub-contractors and data collected was analyzed using SPSS software.

Deriving from the study by Ali and Smith (2008), seven factors that contribute to delay were identified through literature review, namely contractors financial difficulties, construction mistakes and defective work, labour shortage, coordination problems, shortage of tools and equipment, material shortage and poor site management. Of those factors, the three most important factors were found to be labour shortage, contractor's financial difficulties and construction mistakes and defective works. Besides project delay, the research showed that cost overrun and extension of time (EOT) are the most common effects of delay in construction projects.

Another good example of early multidisciplinary team in project development work was identified at Iowa State University in the United States. The institution has a primary goal to prepare students for life after college. The architectural and design classes are developed to emulate real world practice, where students are exposed to the trials and tribulations of communication, negotiation, and the total design process. The strategy employs assigning group projects so individuals learn about group dynamics and negotiation; exposing students to problems that reflect real life situations so students can learn from past mistakes and become confident to tackle future problems. This early team formation helps students understand how to work regionally, and ultimately globally with other teams and further develop a range of skills (Dong & Leslie, 2007).

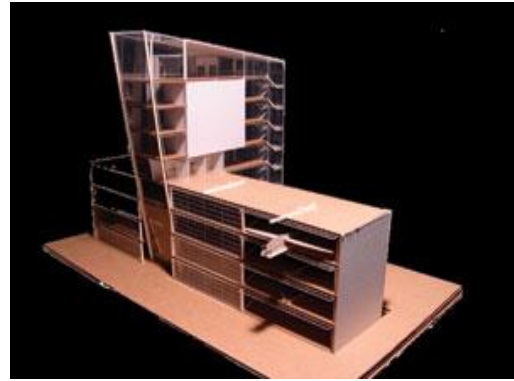
Architecture, Engineering and Interior Design students are exposed to projects that are not merely a box, but with elegant building solutions that promote structural diversity,

address site as well as internal programming issues, and expose students to the total design process. This way, the project becomes a vehicle to promote additional critical working skills across the different teams. Such contests have been instrumental in promoting interaction between designers, architects and engineers. Following the initial meetings, students progress to work on their designs, communicating on a daily basis to ensure that the architectural work is informed by the structural and environmental needs. Students learn the value of face-to-face negotiations and communication, the value of relationships in the working world, and acquired a deeper appreciation for each other's work and discipline (Dong & Leslie, 2007).

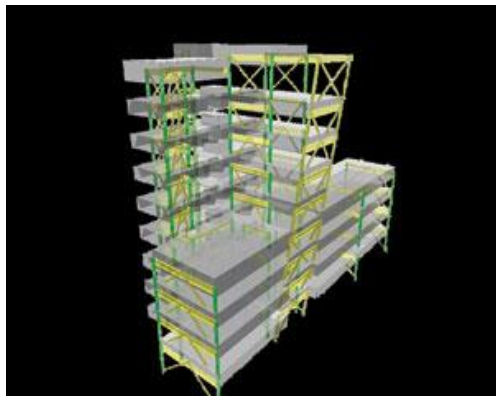
In one case of a project, a student assessment responses indicated that the most valuable time spent on the project was during the collaborative design meetings. Students felt they better understood the design concepts implemented on the project and had a clearer vision on how to proceed with the project. The meetings also enabled students to bond as a team, understand the priorities of each other's design, and generally understand the give and take necessary to complete a project successfully.



a



b



c



d

Plate 2.1: a, b, c, d

Iowa State University Architectural, Engineering and Interior Design students working on a common project in the United States

Source: Dong & Leslie (2007)

From Plate 2.1 (a) above, students embrace a supported progressive move by promoting more collaborative or integrated approaches on projects. Plate 2.1 (b) shows the final product based on teamwork from different disciplines in the design profession. Plate 2.1 (c) illustrates a model of design structure developed by a collaborative team of designers and architects (Plate 2.1, d.). The illustration above shows that when the entire team can

coordinate their work and share design inputs, they can easily assess the impacts of design alternatives and perfect in on the best options earlier, and in parallel. This collaborative approach enables each team to respect the requirements of the other disciplines, and ultimately avoid costly and time-consuming conflicts.

While an on-going challenge is to develop group exercises that encourage collaboration between architects, engineers and interior designers in project development, the case of Iowa State University provides a good example of the need to promote multidisciplinary teamwork in project development. Once those friendships are formed, it's much easier for these professionals to work as a team after college. It is therefore necessary to allow future courses to be more representative of real world experiences.

2.9 Conceptual Framework

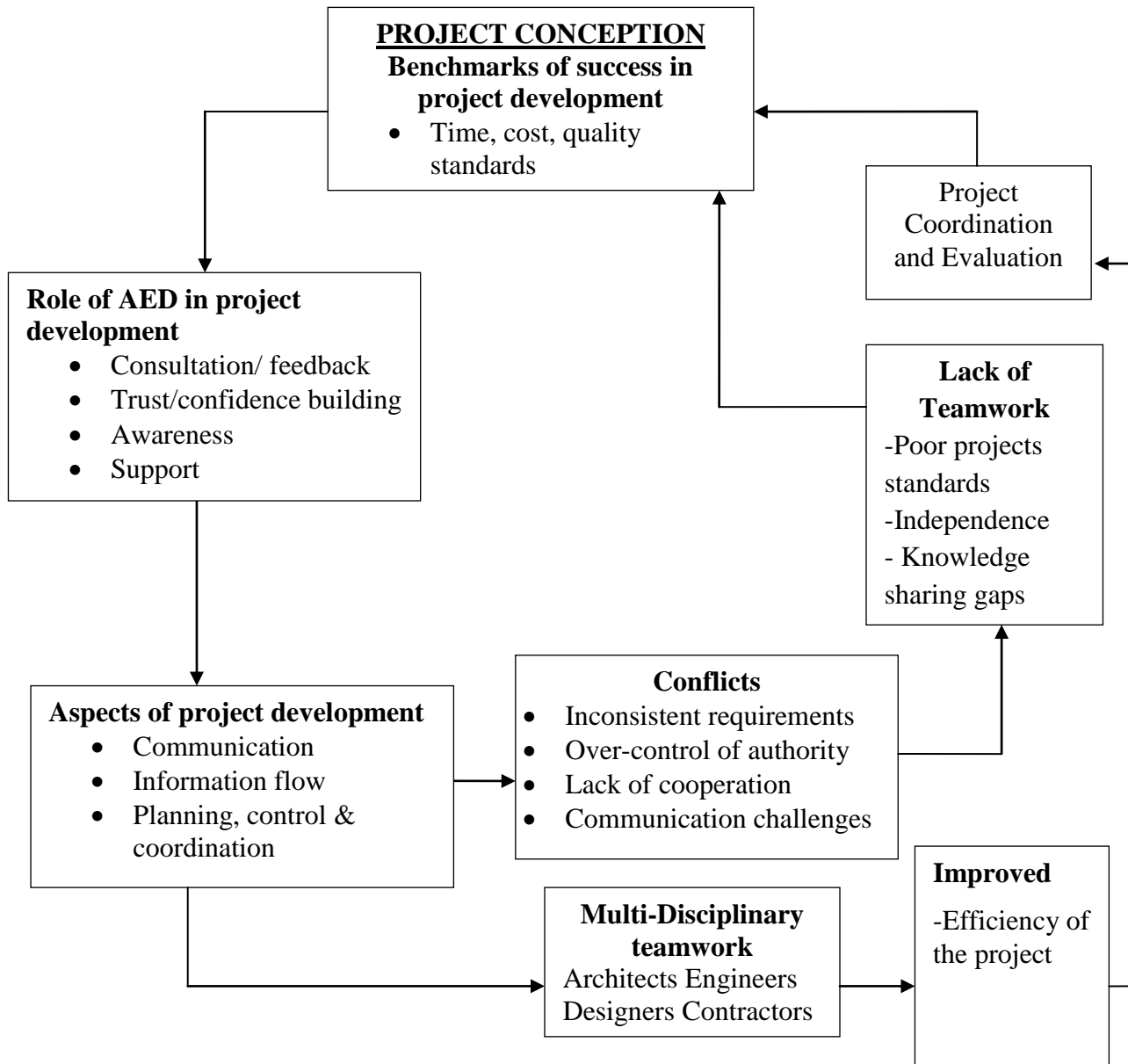


Figure 2.1: Framework on promoting multidisciplinary teamwork

Source: Author

Based on the conceptual framework (see figure 2.1), promoting multidisciplinary teamwork in project development has many benefits. First, recognizing clear benchmarks in project development is critical. Factors such as time, cost, quality standards environmental factors should be considered. Secondly, conflicts may exist among these

teams. However, these professionals, despite their varying disciplines, can share the challenges and work as a team relating to inconsistent requirements; over-control of authority; lack of cooperation and communication challenges that may hinder information flow. Thirdly, the role of each discipline in project development is critical. Architects, Engineers, Designers and contractors all play a critical role in the construction sector. For instance, interior designers can provide information, consultation and feedback and thus build trust and confidence while working with architects, engineers and other professionals and the client at the initial stages in building. Moreover, these professionals are not exempt from the common ethical behaviours such as obligations, duties and responsibilities that are binding on ordinary people.

Since the construction process involves conceptualizing, designing, managing, organizing and coordinating project requirements including time, money resources, technology and methods; these must be integrated in the most efficient manner possible to complete construction projects on schedule, within the budget, and according to the standards of quality and performance specified by the project owner or designer. Therefore, it is important to establish the aspects that could promote multidisciplinary teamwork to ensure these professionals have a platform to fully exploit their potential. In this case, the results would be high projects and improved efficiency in building structures if multidisciplinary teamwork is enhanced. However, lack of multidisciplinary teamwork would result independence, lack of proper information and ultimately may lead to low/poor projects quality.

2.10 Summary of Reviewed Literature

In today's design practice, the rapid growth of information and telecommunication technologies, in combination with increasing specialization of design knowledge, results in a growing need for interdisciplinary collaboration. Designers from different disciplines have to cope with working together with other teams in order to succeed in solving the design problems at hand (Rummel et al., 2005). The current literature has highlighted the growing demand for good ethical practice and professional behavior in construction industry. The literature review has discussed the critical role of Architects, Engineers and Interior designers. It is clear that AED have so many tasks to share for the project to be a successful. Moreover, in order for these professionals to function properly, there must be respect from each other. On the benchmarks of successful projects, the review reveals that considerations need to be put in place since they have an adverse impact on project success in terms of time, cost, quality and safety.

The literature shows that conflicts exist among AED disciplines. Certain aspects can be employed for promoting multidisciplinary teamwork in the construction projects. With the complexity of modern buildings and the tremendous breadth of knowledge needed to design and build them, project development among AED is critical for research. The literature review indicates that improvement of project development through collaboration may not only aid the construction industry, but also be the engine for the national and world economy. The next chapter presents the research methodology that was employed in undertaking the study. This study employed a descriptive survey design to collect data.

CHAPTER 3: METHODOLOGY

3.0 Introduction

This chapter outlines the research methodology that was used in the study. It describes the research design, population, sample, sampling techniques, instruments, data analysis and data presentation.

3.1 Research Design

This study employed a descriptive survey design to collect data. According to Ngau and Kumssa (2004), descriptive surveys are useful in describing the characteristics of a large population. Moreover, very large samples are feasible, making the results statistically significant even when analyzing multiple variables. Since the study focused on Nairobi County, high reliability was easy to obtain. The survey design was adopted because it is an efficient method of collecting original data from a wide range of respondents and provides an opportunity for the researcher to collect systematic information about the aspects that lead to promoting multidisciplinary teamwork in project development in Kenya.

3.2 Population

Kothari (2004) defines a population as the total number of respondents in the total environment of interest to the researcher. The study population was estimated at 850 professionals including Architects, Engineers, Designers, AED lecturers and Contractors within Nairobi County. A total of 250 interior design firms and 286 engineering firms were drawn from the Build design magazine (2011) and the Kenya Directory. On the

to give the number of observations used for calculating estimates of the study population. The researcher selected 10% of the population from each category based on Kothari's recommendation for a larger population. The sample size comprised 10 AED professionals from each category (Architects, Engineers, Designers, Quantity Surveyors, Town Planners, contractors and 15 clients. This gave a total sample size of 95 respondents. Table 3.1 illustrates a summary of the study sample.

Table 3.1: Summary of Sample

Population Cluster	Groups	Population	Sample groups	Total Sample Size
Lecturers	A	18	4	15
	E	24	6	
	D	8	5	
Professionals	Architects	250	25	60
	Engineers	250	25	
	Designers	100	10	
	Contractors	200	20	20
TOTAL		850		95

3.4 Sampling Techniques

The study employed sampling techniques to draw conclusions about the entire population. The sampling techniques were selected to make sure the sample represents the characteristics of the population it purports to as supported by Kothari (2004). Stratified sampling was used to classify the respondents who were clustered according to occupation (lecturer, professional and Contractors) basis so as to give equal inclusion in the study. Purposive sampling was then be used to gather information particularly from

AED professionals, an area familiar to the researcher. Purposive sampling focused on “information-rich cases” to enable the researcher learn a great deal about issues of central importance to the research as advised by Patton (2001). In addition, simple random sampling was used to select the actual number of respondents (lecturers and professionals and contractors).

3.5 Instruments

According to Maina (2012), a research instrument is a testing device for measuring a given phenomenon. The study employed three tools namely: questionnaires, interview schedules and focus group discussions. A detailed questionnaire was developed and used to get input from professionals (AED). Questionnaires were self-administered and were used to provide a wide range of response. The questionnaire had both open-ended and closed ended questions.

Interview schedules were prepared and administered to the AED lecturers. Structured interviews were administered to lecturers from University of Nairobi AED department. The researcher employed personal interviews due to their flexible nature. They allowed collection of large amounts of information, explore issues and probe as the situation requires as supported by Maina (2012). Focus group discussions were administered to a group of contractors and clients with on-going projects. The instruments were self-administered and comprised four sections based on the research objectives.

3.5.1 Testing of Research Instruments

The researcher used piloting to check the reliability and validity of the research instruments and the effectiveness of the research design. A small scale replica was used as a rehearsal of the main study as advised by Sarantakos (1996). The piloting sample was not part of the study's sample. The purpose is: to check, the clarity of the question item, instruments and layouts; gain feedback on the validity of the question items, operation of the constructs and the purposes of the research; to gain feedback on response categories for closed questions and for the appropriateness of specific questions and to check time taken to complete questions (among others).

Validity of the instruments was carried out to ensure that the quality of a data-gathering instrument or procedure measure what it is supposed to measure as supported by Best and Kahn (2001). In addition, the reliability test was conducted to ensure that the study variables accurately and consistently measure and obtain the same results under the same conditions.

In this study, pilot testing was done to discover possible weaknesses, inadequacies, ambiguities among others. The pilot study was conducted within the Nairobi Central Business District. It targeted 12 respondents including 10 AED professionals and 2 contractors. Clarity of the items in the instruments was assessed based on how the respondents had answered all items consistently. However, the findings helped to improve the final instruments. The researcher improved layout, numbering and itemization of the questions. Some redundant questions were removed after rephrasing the questions. The results of the pilot study were not considered in the actual study.

3.6 Data Analysis

Data were analyzed through quantitative and qualitative techniques. The use of these quantitative methods enabled the researcher to draw meaningful results from a large body of qualitative data, and helped provide the means to separate out the large number of confounding factors that often obscure the main qualitative findings as purported by Maina (2012). Quantitative analysis involved the use of numeric measures to evaluate the variables based on the study objectives. Descriptive statistics were used. Under descriptive statistics, the frequency and percentages were employed to describe the data sets. Numerical values to questionnaire responses were entered in computer and SPSS computer program used. As for the results of interviews and focused group discussions, qualitative techniques were used to present the findings. This involved a critical assessment of each response and examining it using thematic interpretation in accordance with the main objectives of the study, which were then presented in narrative excerpts within the report. The data gathered in this study were summarized so as to establish the fundamental results.

3.7 Data Presentation

The results generated from the survey (questionnaires, interviews and focus group discussions) were presented in tables and charts based on the research objectives. The results indicate the percentage of the actual respondents to a particular question rather than the percentage of the total sample. With respect to the descriptive results, the results from the questionnaire were reported first followed by those from the interview and focus group discussions. In a few cases the results from the interview and focus group discussions were combined for convenience of their presentation.

Construction has succeeded in its endeavors through a collaborative approach to business. Plate 4.0 (a) indicates a project development of a real estate. Through collaborative relationships with clients, designers and subcontractors, the team established an unconventional approach in building construction. Project success factors would also involve technological input (Plate 4.0.b). Indeed, this high degree of collaboration is only possible in an atmosphere of mutual trust and respect. By embracing a collaborative environment with our project teams, different professionals were allowed to monitor and evaluate the progress of the project (Plate 4.0, c). in the end, the company was able to deliver some very complex projects on time, under budget and with happy clients (see Plate 4.0, d).

Interview response from the field included the following;

Mr. Malaki: Having all of the design team at the table at the beginning of a project ensures that; the client's wants, needs, and vision can be met; that each discipline can offer valuable information focused on design, constructability, and budget. It is also important because ideas build upon one another can greatly help in creating a well-integrated project that exceeds a client's expectations; and sometimes even exceeding the design team's vision-[Mr. Malaki-Interior Designer] (Plate 4.1, a).

Mr. John: As an engineer, I would like to say Working as a team to complete a shared vision has many benefits, and especially to the interior designer because they are normally left out at the start. By creating a team, all players are on equal footing from the beginning, and this allows all of them to start the project with a shared program of the

client's goals. Synergy can be created to expand the design ideas, and then help refine them (Plate 4.1, b).

Mrs Fiona: I have found that when we work as a team from the start of a project, there is more creative energy and greater development of ideas and better clarification of each individual role.

Mr. Johnston: Often interior designers come into the project after the project has been started. This requires designers to get up to speed before we can begin our programming and design concept. We often run into challenges based on decisions that were made before we designers were engaged. Not being present or a part of this process can leave up open to misdirection by missing key client concerns. I believe what we need in Kenya is a framework that supports teamwork because a well-functioning team can prevent these problems (Plate 4.1, c).

3.8 Summary of Research Methodology

This study employed a descriptive survey design to collect data. The study population was estimated at 850 and a total sample size of 95 respondents. The sampling techniques used were stratified and purposive sampling. Questionnaires, interview schedules and focus group discussions were developed to collect data. Data were analyzed through quantitative and qualitative techniques. Chapter four gives an analysis of the study results; field observations, evidences of field interviews and findings.

CHAPTER 4: DATA ANALYSIS, RESULTS AND FINDINGS

4.0 Introduction

In this section, the results obtained from participants (i.e. Architects, Engineers, Interior Designers, Lecturers and clients (end users) are presented. The findings are presented in four sections that summarize the research questions on: benchmarks of a successful teamwork, conflicts if any, role of AED and aspects that can promote multidisciplinary teamwork in project development.

4.1 Field Observations



a

a



b



c



d

Plate 4.0: a, b, c, d

Ongoing project development in Kilimani-Nairobi-Kenya: (Source: Author)



a



b



c



d

Plate 4.1: a, b, c, d

Field interview sessions in Westlands-Nairobi (Source: Author)

Several groups generally make up a construction team, such as the architect and engineering team, the owners and investors, and the contractors. All team members share the common goal of wanting to complete the project, but they may also have conflicting priorities. However, early team formation before the onset of a project (as seen in Plate 4.1, d), may help achieve quality work, and at the same time giving project owners the value for money, while the architect and engineers are concerned with aesthetics and

safety. Aligning these interests and completing a project on time and on budget require teamwork from all participants.



a



b



c



d

Plate 4.2: a, b, c, d
Field observation sessions-Parklands- Nairobi
Source: Author

One of the field observations done by the researcher as illustrated in Plate 4.2 shows a project in progress. One of the first steps in building an effective team is to define the goals of the project. In construction, this can involve a preconstruction meeting or a kick-off meeting. Everyone should agree on the objectives, such as emphasizing safety and staying within the budget (Plate 4.2, a). Moreover, when working as a team, each member has different duties and responsibilities. To function effectively, team members must understand these, as well as the duties and responsibilities of the other team members (see Plate 4.2, b). At the beginning of the project, each team member should set out what he is responsible for. This will prevent overlap of duties that can cost money and cause confusion. For instance, design engineers need to make field visits to confirm that the engineering specifications they are liable for are being met.

One key to working effectively as a team is for team members to respect and trust each other. In construction, people from different professions, such as contracting and architecture, must cooperate closely and it may be difficult for these people to understand each others' approaches to a problem (plate 4.2, c). Members of the construction team should spend time getting to know each other, teaching a bit about the work they each do. This can help team members trust that the other people on the team know their jobs well and can accomplish what they set out to do. This way, the team is able to deliver quality work within budget and set time schedule (Plate 4.2, d).



a

b

Exterior view of the current official residence of Deputy President in Karen



c



d

A well-designed project development in Embakasi:
Nairobi

A collapsed building in

Plate 4.3: a, b, c, d
Field observation sessions
Source: Author

In project development, design teams must produce and manage vast amounts of information about the project for example, existing and as-built conditions, project goals, design options considered, results of design analyses performed, construction planning and fabrication strategies. The illustration (plate 4.3, a & b), the VP's residence project was delayed due to contactors' challenges. Nevertheless, the project shows that a seemingly boundless range of details were coordinated, reviewed, and agreed upon by the entire team. As observed in (Plate 4.3, c), each team member must develop the information needed and design the features required for their own portion of the design work, and this information must be shared with other members of the design team who are impacted by and depend upon these design decisions. Lack of such coordination in project development in Kenya may be the reason for collapsing buildings (see Plate 4.3, d). The significance of this illustrations points to the extent to which effective teamwork management of professional firms has been employed in the building construction industry in Kenya. At the end of it all, high quality work is produced through combined effort.

Lack of multidisciplinary teams + lack of collaboration/coordination + miscommunication/ conflicts =poor project development = building collapse.

4.1 Benchmarks of a Successful Teamwork in Project Development

The study was interested in establishing benchmarks of a successful teamwork in project development. A three-point likert-scale was used to rate the respondents' views on the same. Data were collected, analyzed and results reported as shown in Table 4.1.

[A-agree; N-Neutral; D-Disagree]

Table 4.1 Benchmarks of successful teamwork in project development (N=58)

	A	N	D	(%)
The project development framework provides opportunity for AED to work together	32	16	52	
We have set programs in our firm that allow for teamwork	50	5	45	
There are clear benchmarks for successful project development	35	15	50	
The policy on project development industry is effective and inclusive	22	10	68	
Market demands guide the extent to which teamwork is formed	72	18	10	

From Table 4.1, majority (52%) disagreed to the statement that the current framework provides an opportunity for AED to work together, as compared to a minority (32%) who agreed to this fact. Only 16% remained neutral. The majority (52%) who disagreed may be due to the fact that the developing countries have not steered a clear framework that promotes multidisciplinary teamwork. Literature review established that the developed economies such as United States of America (USA) have well integrated teams that collaborate in project development and hence achieve the most effective outcomes. The results reveal that the framework for providing an opportunity for AED to work together is still a work in progress.

On whether respondents had set programs in their firms that allow for teamwork in project development, majority (50%) agreed while 45% disagreed. Those who were

neutral were 5%. Although results indicate firms have set programs that guide teamwork in project development, a significant number (45%) disagreed.

Concerning benchmarks for successful project development, a majority (50%) disagreed having clear benchmarks for successful project development, 15% remained neutral whereas 35% agreed having clear benchmarks that ensure successful project development. The gaps existing on the extent to collaboration may hinder the actors working together throughout the project and hence poor risk management.

On whether policy is both inclusive and effective, a majority (68%) disagreed that policy on project development industry is effective and inclusive as compared to 22% who agreed. Only 10% were neutral.

On the other hand, 72% agreed that market demands guide the extent to which teamwork is formed. However, 18% remained neutral while 10% disagreed.

4.1.1 Project Success Factors Enhancing Teamwork

The emergence of project success factors and success criteria as a prerequisite to the study of project success is agreed upon across literature world (Ika, 2009). The measurement of project success in project development has traditionally been grounded in the industry-accepted classic objective success metrics: cost, schedule, performance, and safety.

The study sought to establish the project success factors that can enhance teamwork in project development. Collected data on the same were analyzed and presented in Figure 4.1.

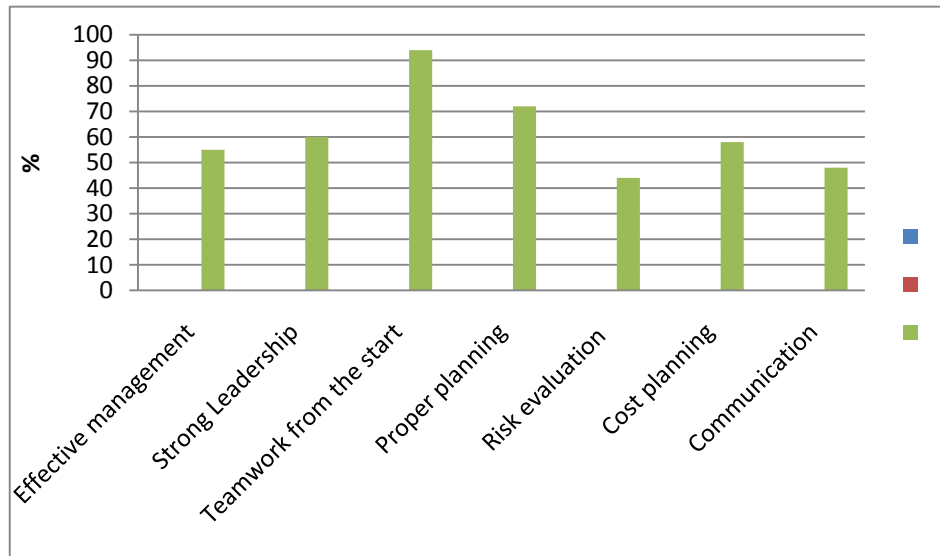


Figure 4.1: Project success factors

From Figure 4.1, project success factors established were involving of all teams from onset of project (92%), proper planning (72%), strong leadership (60%), effective management (55%), cost planning (58%), communication (48%) and risk evaluation (44%). Initial research has indicated that there are more subjective considerations that, while being difficult to quantify, can have an important impact on perceptions of project success.

4.1.2 Critical Issues in Project Development in Kenya

The study sought to establish critical issues in project development in Kenya, based on a success/ delays witnessed in key government projects such as the Prime Minister’s Office, the Vice Presidents’ Official Residence and the Milimani Law Courts. The research study sought to establish frequency AED involvement with each other during project development. Data were analyzed and presented in Figure 4.2.

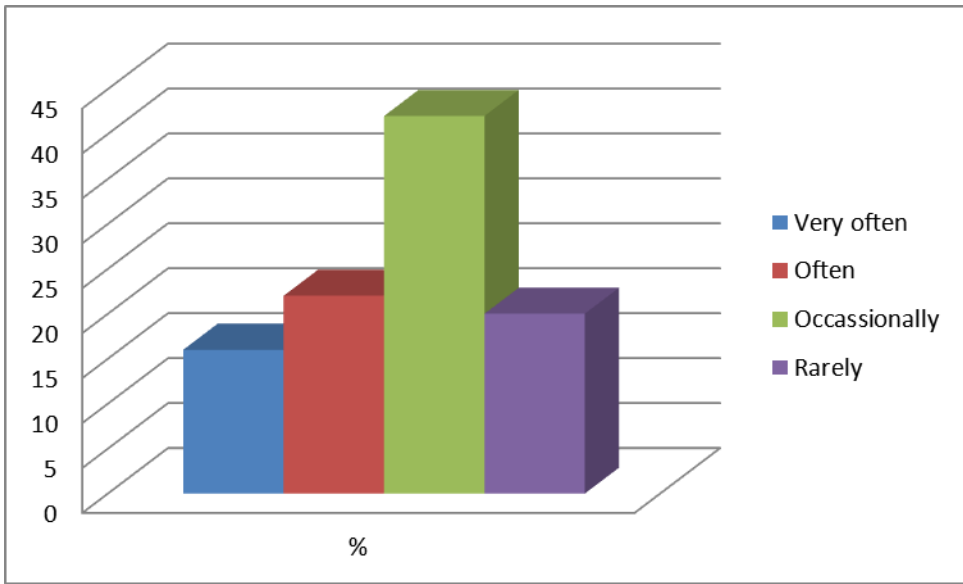


Figure 4.2: AED Engagement

From Figure 4.2, a majority (42%) said they occasionally engage other disciplines in project development, 20% indicated they rarely engage other team members of different discipline (AED), 22% said often while 16% said very often.

4.1.3 Role of Multidisciplinary Teamwork Project Management

The study sought to establish whether involving different professionals in project development has helped eliminate conflicts in project management and development. Collected data on the same were analyzed and presented in Table 4.2 on the next page.

Table 4.2: Multidisciplinary team formation eliminates conflicts

Method	N=58) %
Yes	72
No	28

Results in Table 4.2 reveal that a majority (72%) agreed to the fact that involving different teams in project development can eliminate conflicts while a minority (28%) declined. It is true that project development draws on many skills, and thus promoting multidisciplinary teamwork is important because it allows various teams to meet at the earliest possible opportunity and that clear communications channels are established with one person from each team nominated as the primary contact.

4.1.4 Adoption of new teamwork strategies

The study further sought to establish from respondents whether their firms had created any new strategies to steer collaboration among AED in their projects. Results are given in Figure 4.3.

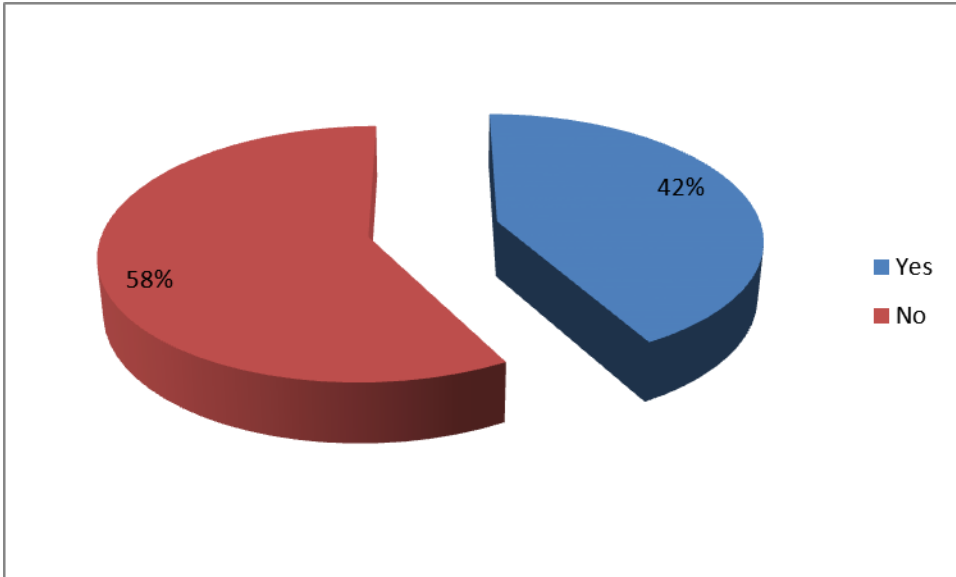


Figure 4.3 Adoption of new teamwork strategies

From figure 4.3, majority (58%) indicated that their firm had no new teamwork strategies. Only 42% said their firms had created new strategies to enhance teamwork. Given the ever-increasing projects. The findings disagree with a study by Stone (2010) indicating that there is a growing recognition by governments and business community of the value that AED add to the economy new strategies and opportunities on the horizon. An interview with one of the respondents revealed that strategies for teamwork are usually undertaken with respect to client (owner) for whom the design project is undertaken while in the field.

4.2 Conflicts among AED in project development

The researcher in this research question sought information on conflicts among AED in project development. Data were collected and analyzed on the same and the results are displayed in Table 4.3.

Table 4.3 Conflicts existing among AED in project development

Method	N=12)			(%)
	A	N	D	
We work with other professionals towards a common interest	60	22	18	
We hold forums with other teams regarding project development.	36	8	56	
Architects do not seem to recognize the field of interior design.	62	8	30	
Collaboration among AED in project development in the field has so far improved.	45	5	55	

From table 4.3, results reveal a majority (60%) of respondents noted that they work with other teams for a common interest, 18% disagreed while 22% remained neutral. The success of multidisciplinary teamwork partially depends upon no single team member feeling substantially inferior to any of the others. In my experience, working towards a common interest is critical. Nevertheless, bringing together people from different environments with diverse goals requires planned facilitation to enable proper teamwork, so that the team can work to produce excellent results under the right working conditions.

On forums, a majority (56%) disagreed holding forums on project development with other teams. Only 36% agreed holding forums while 8% were neutral.

It is worth noting that 62% agreed to the notion that architects do not seem to understand the interior design field as compared to a minority of (30%) who disagreed. However, a

(8%) remained neutral. Given the different aptitudes and role among AED, It is not surprising that successful collaboration is a challenge.

Furthermore, a majority (55%) disagreed that collaboration among AED had so far improved, (45%) agreed, while 5% were neutral. The 55% majority indicating collaboration has not improves so far could be attributed to the different roles of each team. Nevertheless, a significant number (45%) indicated collaboration had improved. This could be attributed to the fact that contemporary architectural practice incorporates ever more technically complex engineering solutions in the pursuit of scale, form and sustainability. 4.2.1 Challenges facing AED Professionals in Project development

The study further sought to establish the challenges facing AED in Project development.

Data were analyzed and presented in Figure 4.4.

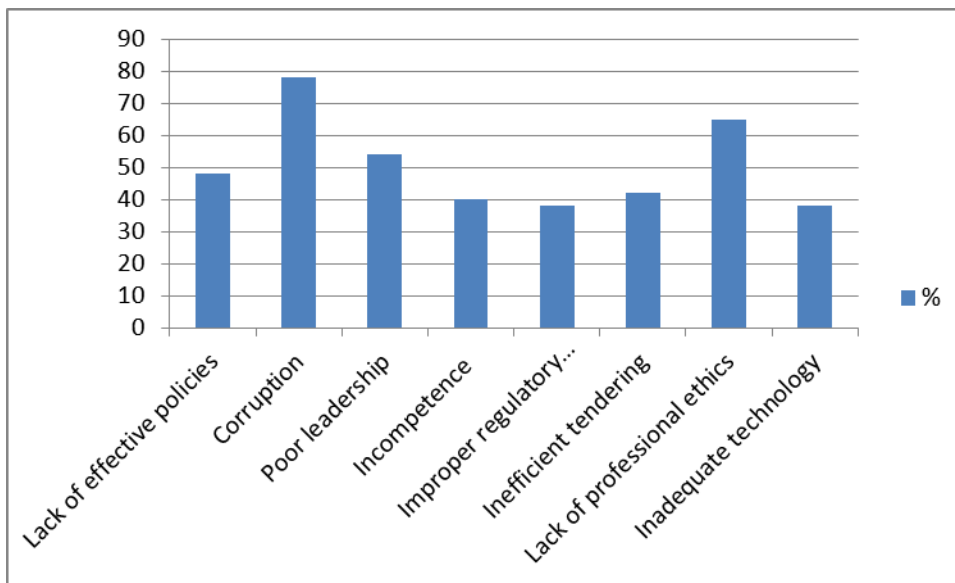


Figure 4.4: Challenges facing AED in Project development

From figure 4.4, challenges facing AED in project development include corruption (78%), lack of professional ethics (65%), poor leadership (54%), lack of effective

policies (48%), inefficient tendering procedures (42%), incompetence and ignorance (40%), inadequate technology (38%) and inefficient regulatory framework (38%).

4.3 Role of AED Professionals in project development

The researcher was also interested in establishing the role of AED in project development sought. Data were analyzed and presented in Table 4.4 on the next page.

Table 4.4 Role of AED in project development

Method	N=12)			(%)
	A	N	D	
Interior designers play a big role in project development.	85	10	5	
Interior designers are neglected in most cases at the onset of most projects.	75	10	15	
We always seek AED input in all projects right from the start to completion.	45	20	35	
Clients' preference creates the gap on the role of interior designers and other disciplines.	68	22	10	

From Table 4.4, results indicate that a majority of (85%) agreed that interior design play a critical role in project development. Those who were neutral were 10% while 5% disagreed.

On whether respondent sought input of other right from initial project stage to completion, 45% agreed, 35% disagreed while 20% were neutral. Although the results appear to indicate some kind of engagement to seek input, it could be argued that the nature of this engagement vary depending on the client preference and specific profession in question. An integrated team approach is critical in pulling off a successful project right from the onset (Guzman, 2010).

The researcher also sought to find out whether client's preference influence teamwork and create gaps on involving interior designers and other teams. Results indicate majority (68%) who agreed, 22% remained neutral while 10% disagreed. The findings indicate that clients play a critical role in project development, and can influence the extent of teamwork formation. The responsibilities of engineers and architects often overlap. Both professions are integral to the design and construction of structures, such as buildings and bridges.

4.4 Aspects that can Promote Multidisciplinary Teamwork

The researcher sought to find out measures that can be undertaken to ensure successful project development in Kenya. Data regarding the same were collected, analyzed and results reported as shown in Figure 4.5.

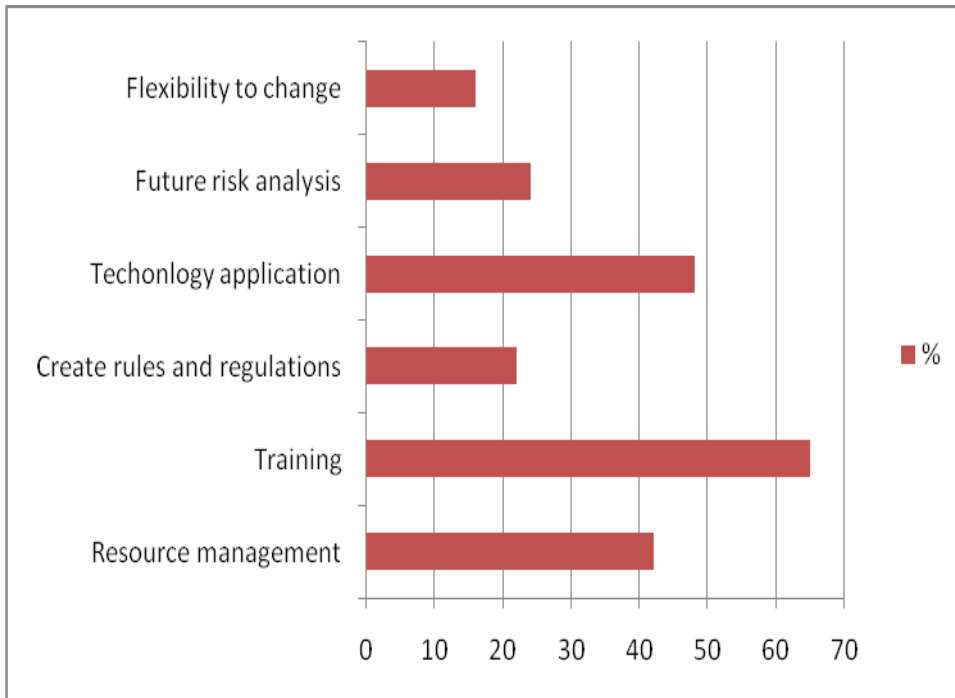


Figure 4.5 Measures for successful project development

From the results in Figure 4.5, a number of measures that can be undertaken to ensure successful project development in Kenya include training (65%), technological application strategies (48%), resource management (42%), risk analysis (24%), implementation of sound rules and regulations (22) and flexibility to change (16%). The construction industry is no doubt a very competitive and risky industry, and the engagement of infrastructural projects are highly capital intensive. The progress of these infrastructural construction projects can thus be enhanced by these factors.

4.4.1 Factors considered essential in project development

The researcher sought to establish factors thought to be essential in project development. Data regarding the same were collected, analyzed and results reported as shown in Figure 4.6.

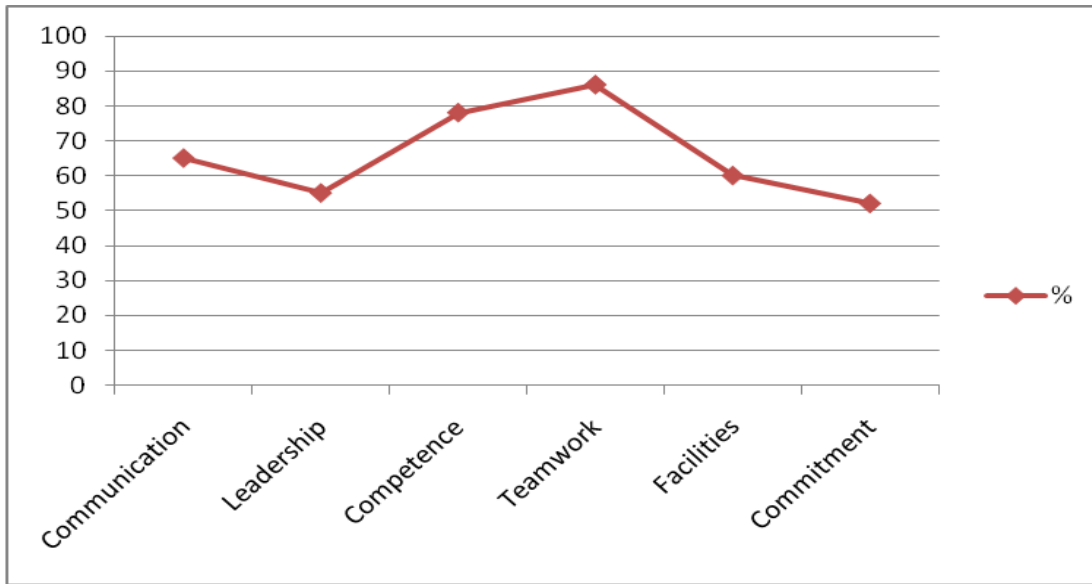


Figure 4.6 Factors that can promote successful project development

From Figure 4.6, teamwork (86%) scored the highest as one most critical factor in promoting successful project development. Other factors considered were competence (78%), communication (65%), facilities (60%), leadership (55%) and commitment (52%). Results indicate that teamwork is the most critical factor considered essential in project development. Effective communication and competence were also given a very high rating by all categories.

4.4.2 Strategies adopted in project development

The study further sought to establish strategies adopted in project development by firms for promoting multidisciplinary teamwork Results obtained are presented in Table 4.5 on the next page.

Table 4.5: Critical success strategies adopted in project development

	AED	%
Meeting project schedule		62
Within budget		76
Safety		68
Standards		55
Client needs		80
Rewards		42

From Table 4.8 it can be seen that the majority 80% indicated client needs was most critical, (76%) indicated working within budget, 68% considered safety, 70% standards and regulations while 62% meeting project schedules. However, 42% indicated rewards.

4.4.3 Collaboration and project development

The researcher further sought suggestions from respondents on ways to promote collaboration among multidisciplinary teams to ensure successful project development.

Results obtained are presented in Figure 4.7 on the next page.

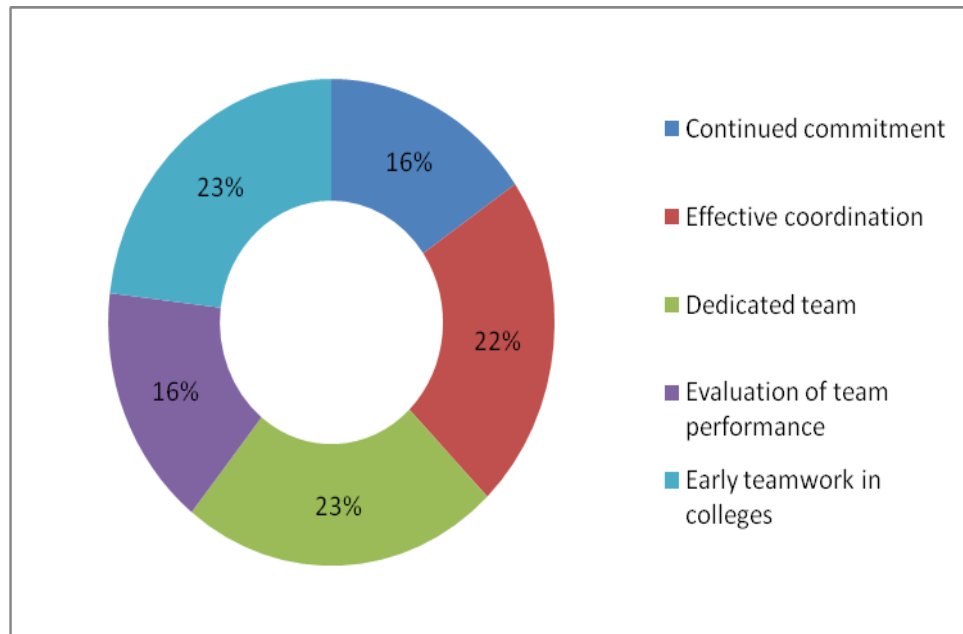


Figure 4.7 Suggestions on promoting collaboration among AED teams

The results in Figure 4.7 show that early teamwork in college (23%) and dedicated teams (23%) are key issues to be considered based on respondents' suggestions. In addition, effective coordination (22%), evaluating team performance (16%) and continued commitment (16%) are critical. The results disagree with a study by Andersen and Money (2006) indicating that a high degree of trust shared by project participants, timely and valuable decision from top management, availability of resources as planned throughout the project, top management's support, and regular monitoring and feedback by top management, are of generic nature and would be required to be present to ensure success in project development.

4.5 Summary of Findings

From the foregoing, this chapter laid out the data resultant from the field work of the study. Among the issues the research delved into and whose data is laid in this chapter were:

- Benchmarks of a successful teamwork
- Success factors
- Critical issues in project development
- Multidisciplinary teamwork
- Conflicts among the multidisciplinary teams
- Challenges facing architects, engineers and interior designers
- Aspects that can promote multidisciplinary teamwork among others

The results are presented in form of bar charts, pie charts and the likert scale. The analysis results and meanings of the data are reported in chapter five.

CHAPTER 5: ANALYSIS AND SYNTHESIS OF RESULTS

5.0 Introduction

This chapter presents data interpretation, analysis and synthesis of results obtained from the previous chapter. The analysis is discussed based on the research questions.

5.1 Benchmarks of Successful Teamwork in Project Development

The study was interested in establishing benchmarks of a successful teamwork in project development. This was the first objective of the study. A three-point likert-scale was used to rate the respondents' views on the same. Data were collected, analyzed and results reported as shown in Table 4.1 in the previous chapter.

From Table 4.1, majority (52%) disagreed to the statement that the current framework provides an opportunity for AED to work together, as compared to a minority (32%) who agreed to this fact. Only 16% remained neutral. The majority (52%) who disagreed may be due to the fact that the developing countries have not steered a clear framework that promotes multidisciplinary teamwork. Literature review established that the developed economies such as United States of America (USA) have well integrated teams that collaborate in project development and hence achieve the most effective outcomes. The results reveal that the framework for providing an opportunity for AED to work together is still a work in progress.

On whether respondents had set programs in their firms that allow for teamwork in project development, majority (50%) agreed while 45% disagreed. Those who were neutral were 5% as shown in Table 4.1. Although results indicate firms have set programs that guide teamwork in project development, a significant number (45%) disagreed.

Concerning benchmarks for successful project development, results in Table 4.1 show a majority (50%) disagreed having clear benchmarks for successful project development, 15% remained neutral whereas 35% agreed having clear benchmarks that ensure successful project development. The gaps existing on the extent to collaboration may hinder the actors working together throughout the project and hence poor risk management.

On whether policy is both inclusive and effective, a majority (68%) disagreed that policy on project development industry is effective and inclusive as compared to 22% who agreed. Only 10% were neutral as presented in Table 4.1.

Literature review established that the developed economies such as United States of America (USA) have well integrated teams that collaborate in project development and hence achieve the most effective outcomes. The results reveal that the framework for providing an opportunity for AED to work together is still a work in progress.

On the other hand, risks have a significant impact on a construction project's performance in terms of cost, time and quality (Osipove, 2012). As the size and complexity of the projects have increased, an ability to manage risks throughout the construction process has become a central element preventing unwanted consequences, and this explains the reason for a continued effort to set programs that promote multidisciplinary teamwork.

The gaps existing on the extent to collaboration may hinder the actors working together throughout the project and hence poor risk management. In Kenya, we have witnessed a surging number of collapsing houses for instance Sunbeam building in Nairobi and

another building at Nyamakima in 2006 which claimed innocent lives. Similarly, there have been cases of poorly and substandard constructed roads in most parts of the country, a clear indicator that policy on project development is still a work in progress. These cases raise issues regarding professionalism and ethics in the construction industry. For instance, despite there being an Engineering code of conduct which comes from the Engineering Bill (2011) and highly respected Engineers' Registration Board (ERB), Kenyans continue to experience unethical conduct caused by their engineers and contractors. According to Bowen et al (2007), ethical codes of conduct, corruption and bribery, favoritism, unfair conduct, strict rules and overriding of the audit process have a negative implication on project development processes in any organization and profession and could thus result into decreased performance and service delivery. Although it appears there is an effort to establish an inclusive policy on AED, the results point to the need for more effective policies to promote multidisciplinary teamwork in project development.

From results in Table 4.1, 72% agreed that market demands guide the extent to which teamwork is formed. However, 18% remained neutral while 10% disagreed. The results hold true owing to the fact that project development in the construction industry is essentially client-led and is characterized by a large number of suppliers such as construction firms, competing for a small number of comparatively high-value orders. In general, the results agree with a study by Han (2012) indicating that construction projects are naturally complex due to its wide divergence of project sites, high pressure on market and client demand.

5.1.1 Project Success Factors Enhancing Teamwork

The emergence of project success factors and success criteria as a prerequisite to the study of project success is agreed upon across literature world (Ika, 2009). The study sought to establish the project success factors that can enhance teamwork in project development. Collected data on the same were analyzed and presented in Figure 4.1.

From Figure 4.1, project success factors established were involving of all teams from onset of project (92%), proper planning (72%), strong leadership (60%), effective management (55%), cost planning (58%), communication (48%) and risk evaluation (44%). Initial research has indicated that there are more subjective considerations that, while being difficult to quantify, can have an important impact on perceptions of project success.

The measurement of project success in project development has traditionally been grounded in the industry-accepted classic objective success metrics: cost, schedule, performance, and safety. Initial research has indicated that there are more subjective considerations that, while being difficult to quantify, can have an important impact on perceptions of project success. The literature on the success factors for public construction project reveals that very few studies have been taken up and that too they are not focused on individual performance criterion. For example, Jacobson and Choi (2008) identified success factors for overall performance such as: specific plan or vision, open communication and trust, political support, expert advice and review, high degree of commitment, clear role and responsibility, willingness to compromise and collaborate, respect, risk awareness and community outreach.

Similarly, Toor and Ogunlana (2009) observed other factors in their study such as a shared vision between the client, architect and contractor, project planning and control, project personnel and involvement of client. Nevertheless, more awareness of success factors of public projects with specific reference to different performance criteria needs to be created among the multidisciplinary professionals in the Kenyan context. In addition the objective of project development is to ensure the success of the project, and this involves not only managing the schedule, cost, and quality, but also satisfying a number of criteria for performance measurement, such as no-disputes and complying with safety norms. From the results in Figure 4.1, teamwork from the start, proper planning, strong leadership, and cost-planning scored high.

In project development, Toor and Ogunlana (2009) point out that a comprehensive site investigation helps in sound planning which in-turn helps in clarifying the scope and developing a thorough understanding. In addition, effective management is critical along with leadership skill that can enhance trust among the different teams (AED). Clarity also limits the social and political interference. Hence all these success factors are important for cost compliance. Valuable timely decision by top management and availability of resources can help in taking timely measures to avoid dispute. If any conflict during construction is not resolved and timely decisions are not given, dispute becomes complicated and difficult to resolve. AED, contractors and clients must have thorough understanding of these factors to assure quality standards in any given project.

An interview results revealed that effective communication and good administration lead to successful projects. As one respondent was quoted saying:

“Right from conception stage, effective management of all information required should be the overriding success factor.”

It is observed that most important success factors for quality compliance are: owners need thoroughly understood and defined, regular quality control and quality assurance activities, regular monitoring and feedback by top management, top management’s support, and availability of resources as planned throughout the project. Quality improves under watching eyes. This could be top management or quality control people and their regular monitoring and support. Availability of resources and clear scope are linked to the quality work on site (Chua et al., 1999). Hence all the mentioned success factors are important for quality compliance in project development. It is clear from the above statement that developing a fully-fledged information system to encompass all teams is critical. At the same time, additional functionality is needed to enable the teams makes use of the environment as supported by Stouffs (2000).

5.1.2 Project Development in Kenya

The study sought to establish critical issues in project development in Kenya, based on a success/ delays witnessed in key government projects such as the Prime Minister’s Office, the Vice Presidents’ Official Residence and the Milimani Law Courts. From the questionnaire, the researcher sought to establish the frequency of AED involvement with each other during project development. Data were analyzed and presented in Figure 4.2 in the previous chapter. Figure 4.2 shows a majority (42%) said they occasionally engage other disciplines in project development, 20% indicated they rarely engage other team members of different discipline (AED), 22% said often while 16% said very often.

Conventional literature suggests that architectural, engineering and interior design professionals seldom have a chance to collaborate with each other. Project development requires early team formation that enhances multidisciplinary teamwork. The findings show that AED collaboration is still a work in progress. According to Charleson and Pirie (2009), the biggest challenge in collaboration among engineers and architects (interior designers not mentioned here), lies in the different modes of thought that these professionals possess. Members of each team tend to have different perceptions of the same reality and this may be the reason for the rare engagement during project development. Conventional literature suggests that architects want the freedom to explore designs and involve the engineer when they have already settled on the design, and the differing timings significantly influence the extent to which they engage each other.

One interviewee noted that:

We may engage others but in most cases, the architect or engineer is a private and independent firm that accomplishes its project under contract with the owner.

The interview results also established that many public agencies and large corporate owners maintain their own in-house design teams. In such instances, the architect or engineer is just an arm of the project and hence engagement is rare. It was evident that the guidelines provided on how to work effectively as a team varied from firm to firm. Moreover, teamwork can only be productive if the team members appreciate the goals and strive towards reaching them. So it is important that they actually represent the different aspects of the problem or solution space and are aware of their own role in the team, which may influence the nature of engagement.

5.1.3 Multidisciplinary Teamwork Project Management

The study sought to establish whether involving different professionals in project development has helped eliminate conflicts in project management and development. Collected data on the same were analyzed and presented in Table 4.2. Results in Table 4.2 reveal that a majority (72%) agreed to the fact that involving different teams in project development can eliminate conflicts while a minority (28%) declined. It is true that project development draws on many skills, and thus promoting multidisciplinary teamwork is important because it allows various teams to meet at the earliest possible opportunity and that clear communications channels are established with one person from each team nominated as the primary contact

According to Lawson (2003), the architects, engineers and designers have the lead role and what is expected from each party and its limits major conflicts during the project development cycle. On the other hand, if the interior design group has architects within the team, it makes sense for one practice to handle both architecture and design. If on the other hand an independent architect is retained, their brief must recognize the involvement of interior designers. The earlier that involvement is initiated the better: early discussions on the functions and feel of a building's interior will help the architect and facilitate a good working relationship and thus manage any conflicts that may emerge (Lawson, 2003). The results in Table 4.2 also indicate a minority (28%) who said 'No' noting that teamwork does not eliminate conflicts. This may be attributed to the fact that though AED may work together on a particular project, there would almost certainly be the lead consultant and hence other teams may not be given the scope to maximize their

opportunities presented during project development. Indeed, responsibilities across these disciplines may conflict with each other, creating a battle for professional duties.

An interview result revealed that having the different teams involved eases any tensions as commented by one respondent:

“Once responsibilities have been allocated and agreed, the project plan can be drawn up and developed in a stress-free environment.”

Overall, the results indicate the critical role and need to promote multidisciplinary teamwork. Liu, Bligh and Chakrabarti (2003) indicate that a whole-building design demands an integrated approach that incorporates all the teams to ensure quality projects.

5.1.4 Teamwork Strategies

The study further sought to establish from respondents whether their firms had created any new strategies to steer collaboration among AED in their projects. From figure 4.3 presented in the previous chapter, majority (58%) indicated that their firm had no new teamwork strategies. Only 42% said their firms had created new strategies to enhance teamwork. Given the ever-increasing projects, collaboration between multidisciplinary teams is becoming a standard practice. The findings disagree with a study by Stone (2010) indicating that there is a growing recognition by governments and business community of the value that AED add to the economy new strategies and opportunities on the horizon.

An interview with one of the respondents revealed that “strategies for teamwork are usually undertaken with respect to client (owner) for whom the design project is undertaken while in the field.” The results indicate a wake-up call for firms to enhance

consultation with multidisciplinary teams that includes contractors, engineers, landscape architects, environmental graphic designers, artists, sustainability consultants, and other specialists, as a strategy in promoting teamwork in project development.

With such a team, we can produce alternative conceptual approaches to the client's needs, and graphics to visualize the discussion. Such suggestions are meant to stimulate thought, not necessarily to describe the final outcome, but all the more allowing full involvement of team members which is critical, as individual insights can prevent costly changes down the road. Therefore, strategies that focus on continual collaboration between the different teams (AED) are necessary.

5.2 Conflicts Among Architects, Engineers and Designers

The researcher in this question sought information on conflicts among AED in project development. The results were based on objective two of the study which was to investigate the conflicts that may exist among Architects, Designers, Engineers and related disciplines in project development. The results reveal a majority (60%) of respondents noted that they work with other teams for a common interest, 18% disagreed while 22% remained neutral. The success of multidisciplinary teamwork partially depends upon no single team member feeling substantially inferior to any of the others. In my experience, working towards a common interest is critical. Nevertheless, bringing together people from different environments with diverse goals requires planned facilitation to enable proper teamwork, so that the team can work to produce excellent results under the right working conditions.

On forums, Table 4.3 shows a majority (56%) disagreed holding forums on project development with other teams. Only 36% agreed holding forums while 8% were neutral. On the other hand, 62% agreed to the notion that architects do not seem to recognize the interior design field as compared to a minority of (30%) who disagreed. However, a significant number (8%) remained neutral. Given the different aptitudes and role among AED, It is not surprising that successful collaboration is a challenge. Furthermore, a majority (55%) disagreed that collaboration among AED had so far improved, although a significant number (45%) agreed. Only 5% were neutral. The 55% majority who indicated collaboration had not improved so far could be attributed to the different roles of each team. Nevertheless, a significant number (45%) (see Table 4.3) indicated collaboration had improved. This could be attributed to the fact that contemporary architectural practice incorporates ever more technically complex engineering solutions in the pursuit of scale, form and sustainability.

The success of multidisciplinary teamwork partially depends upon no single team member feeling substantially inferior to any of the others. In my experience, working towards a common interest is critical. Nevertheless, bringing together people from different environments with diverse goals requires planned facilitation to enable proper teamwork, so that the team can work to produce excellent results under the right working conditions.

The results could be attributed to different roles in the disciplines of architecture and engineering and interior design, particularly in terms of their accepted methodologies for research and practice, which still remain unclear. Each discipline tends to operate as if their methods and customs were universally applicable. Each has the tendency to speak

primarily to those who share their native language and core beliefs, and each believes that its cultural outlook is superior. According to Nguyen (2004), this lack of cross-border respect and comprehension presents an obvious obstacle to true collaboration. Having forums and facilitated workshops as an arena to bring together different disciplines is of particular importance in getting a team of people with different skills, experience and aspirations to work together. It is possible to instill a common purpose in the team by keeping all activities related to exploration, creativity and decision making in such forums as a way of promoting multidisciplinary teamwork in project development.

It is worth noting that majority (62%) (see Table 4.3), agreed to the notion that architects do not seem to understand the interior design field. Given the different aptitudes and role among AED, it is not surprising that successful collaboration is a challenge. Tensions between the professions, according to Charleson, and Pirie (2010), take root in early education life. Stanfield (2003) argues that the idea of first year engineering students must be able to record structures by sketching and drawing has yielded such miscomprehensions as ‘sketching for architects.’ It appears that architects want the freedom to explore their designs and involve the engineer and the designer when they have settled on a design. Conversely, the engineers want to be involved before major architectural decisions that might irreparably affect structural options and lead to inferior option in terms of cost and quality. Results disagree with a study by Nguyen (2004) indicating that conflicts among AED are mainly caused by the unique internal features and different boundary conditions of every construction project.

On whether collaboration among AED had so far improved, The 55% majority (Table 4.3) indicating collaboration has not improved so far could be attributed to the different

roles of each team. The results agree with a study by Rahim (2009) indicating that although architects and structural engineers collaborate closely in the professional world, in many curricula, students from the disciplines rarely mingle. This has partly been due to the fact that there are vastly different pedagogical approaches to teaching architecture and engineering: architectural educators value and promote creativity by assigning open-ended problems with numerous solutions, whereas structural engineering students, who must grapple with much more extensive technical knowledge, are rarely asked to push the limits of their discipline.

Nevertheless, a significant number (45%) (see Table 4.3) indicated collaboration had improved. This could be attributed to the fact that contemporary architectural practice incorporates ever more technically complex engineering solutions in the pursuit of scale, form and sustainability. As a result, architects are continually pushing the limits of construction through the use of advanced digital design techniques, thereby increasing the dependence on their structural engineering and interior design collaborators in order to realize their designs (Olse & Namara, 2010).

Conflict factors can be divided into three major groups; communication; organization conflicts and personal variable (Robbins, 1983). According to Wilkinson (2000), among various issues concerning work conflicts among AED working together on building projects, whether huge and small, often arise from misinterpretations of terminologies used to communicate among these groups; both in verbal and in drawings. Moreover, inattentiveness leads to misunderstanding. If one is forced to listen to an unfamiliar language for a while, as ambiguity accumulates, one tends to lose attention in such cases,

the speaker in his effort to put the message across, need to put in more effort to establish a common ground of understanding, which involves assisting the other to overcome such a barrier. Lack of supplying a detailed clarification of what work exactly needs to be done may cause conflicts. For instance, an architect is required to state clearly while the engineer and or interior designer should confirm. Yet, in reality, each side often work on a hectic schedule and hardly have enough time to go over small to medium modifications (Stitt, 1994). Moreover, organizational conflicts involve factors such as missing of integrator, lack of good planning and the overlapping responsibilities.

Based on the conflicts among architects, engineers and interior designers in project development, the study revealed the need to identify and address the root causes of conflicts. This highlights the fundamental connection between collaboration and respect for each professional discipline. The underlying conditions that create conflicts during project development can be eliminated through knowledge sharing by all these professionals. The study established that consultation is indeed recognized as key in project development, although not fully utilized in most projects. Lack of good planning can also be attributed to the existing conflicts.

As the project gets complicated, they require experts in various fields to get involved (Gray, 2001). To avoid chaotic consequences, good planning is a requisite. Good planning in this case would call for sensible work sequence, clear areas of responsibility on all positions with distinct definitions on chain of command, lines of duty, priority, and finite timelines and so on. Failure to practice good planning usually results a domino effect on team members both vertically and horizontally. Trouble starts when the engineer views an architecturally designed item as an excessive and unnecessary, while

the architect insists that the motif remains consistent for the entire building in with the project theme (Schlaich, 1991). Architects often complain that engineers care less about what the space looks like. According to Parganos (2001), this gap still exists because of miscommunications in the early stages of the project.

From the interview results, one of the respondents was quoted saying:

“The focus of the problem is the authority between architect and engineer definitely. Contractors get frustrated and blamed when problems occur, yet in some cases it is the decision from engineer that counts.”

The statement above underscores the need come up with ways that may promote multidisciplinary teamwork in project development, and thus concurs with objective four of the study. Indeed, the response above also highlights the need in both architecture and interior design to realize that their roles, methodologies, and service expectations are continually evolving within a shifting social, economic, and political culture.

According to Kerzner (1984), project development requires knowledge of modern management as well as an understanding of the design and construction process. Construction projects have a specific set of objectives and constraints such as a required time frame for completion. Specifically, project management and development in construction encompasses a set of objectives which may be accomplished by implementing a series of operations subject to resource constraints.

“We meet people from different firms, their views vary. Even when the teamwork exists, communication still breaks down at a personal level, and may give misleading information.”

“You can imagine an architect or client making a change to designs and fails to effectively communicate these changes to the contractor and sub-contractors in time for them to be implemented. Its chaos!”

The statements above clearly reveal that conflicts that exist and the need to address such scenarios during project development. There are inconsistent between requirements of professional services and requirement of contract among client and contractor. Moreover, the interview results revealed gaps relating to the control of authority. Poor communication was also highlighted as a major challenge in project development:

There are potential conflicts between the stated objectives with regard to scope, cost, time and quality. Some of these conflicts emerge from; lack of specification of project objectives and plans including delineation of scope, budgeting, scheduling, setting performance requirements, and selecting project participants.; poor maximization of efficient resource utilization through procurement of labor, materials and equipment according to the prescribed schedule and plan; lack of proper coordination and control of planning, design, estimating, contracting and construction in the entire process; and ineffective communications and mechanisms for resolving conflicts among the various participants. These conflicts should be resolved at the onset of a project by making the necessary tradeoffs or creating new alternatives by promoting multidisciplinary teamwork.

5.2.1 Challenges facing AED Professionals in Project development

The study further sought to establish the challenges facing AED in Project development. Data were analyzed and presented in Figure 4.3 in the previous chapter. From Figure 4.4, challenges facing AED in project development include corruption (78%), lack of professional ethics (65%), poor leadership (54%), lack of effective policies (48%), inefficient tendering procedures (42%), incompetence and ignorance (40%), inadequate

technology (38%) and inefficient regulatory framework (38%). From the results, it is evident that corruption is a big challenge, and results agree with a recent report that established corruption and incompetence in many public projects in Kenya: the results agree with a recent study by Mathenge (2012) indicating that political systems play a critical role in fueling bribery and corruption, and many projects have failed to achieve the designed course due to bribery, favoritism and political corruption.

The Milimani Law Courts, for instance, just about 10 months after it was commissioned, was seen to pose danger and safety of judicial staff. The project was initially poorly refurbished, and the Chief Justice was quoted saying this was a result of “administrative corruption and incompetence. I want to state that all the professionals involved in this project must take responsibility. Professional bodies must take disciplinary action against its members who have been part of this mess,” “Indeed to refer to this building as ultra-modern is to insult both the English language and the intelligence of Kenyans,” the CJ said adding “It is unbelievable that a building that cost the tax payer over one billion Kenyan shillings after variation from the original cost of six hundred million shillings is in this sorry state of disrepair.” (*The Standard Newspaper, November 29, 2011*).

In addition, the results in Figure 4.4 indicate that government regulations and other bureaucratic controls continue to grow and affect project development in Kenya. Projects also continue to get larger and more technical; requiring more specialized people, high-tech equipment, and better project control systems which is still work in progress. This trend requires that project managers have technical, business, organizational, ethical, and leadership savvy. The American Society of Civil Engineers (ASCE) requires construction engineers to design systems for execution of the construction process (Hinze, 2001). For

example, the design-build process requires a construction professional within the construction organization to monitor and coordinate the construction work (Hinze 2001).

The Kenyan Public domain continues to observe clear cases of collapsing buildings, unfinished and substandard constructed roads, uninspected houses by those trained and entrusted in this noble profession. As a result, lives has been lost and resources gone to waste in a country which has an ambitious vision which aims to make the nation a medium level industrial country by the year 2030. Some may validly argue that these are only isolated cases and the excellent constructions works done within our borders speak volumes. Yet other schools of thought may tell us that we have only the tip of iceberg and the real work is yet to come. The results point to the need for promoting multidisciplinary teamwork in project development to address such fundamental issues.

An interview with one professional revealed that the various contractual arrangements, seen mostly in Nairobi reflect the fundamental differences in the allocation of responsibility to match the characteristics of different projects. This has been a challenge to many as cited by one interviewee:

“The big challenge is that many actors take part, assuming different roles, but contractual arrangements are not being given strategic considerations since collaboration across the teams is very limited.”

The statement disagrees to a lesser extent with conventional literature indicating a more focused collaboration across multidisciplinary teams in project development. From the response above, it appears that the dilemma of modern project development is, in many ways, similar to the confusion between the terms interior design and interior architecture. As such, the fundamental requirement for promoting multidisciplinary teamwork to

facilitate project success should be set, and at the same time sharing and clarifying current issues that impact all design related professions.

In some cases, the owner may decide to cancel the entire project and assume direct control as a result of outside experts working as consultants. The challenge of flexibility and efficiency was cited as a common challenge. According to Stouffs (2002), the apparent dispute in information flow can be resolved through developing a common system allowing each team additional functions and collaboration for better project performance.

The results also pointed to poor leadership as a big challenge. In most cases, the uncertainty in undertaking a construction project comes from many sources and often involves many participants in the project. Since each participant tries to minimize its own risk, the conflicts among various participants can be detrimental to the project. As such, good leadership may moderate such conflicts through proper contractual relations with other teams.

Public safety regulations have similar effects, which have been most noticeable in the energy field involving nuclear power plants and coal mining. The situation has created constantly shifting guidelines for engineers, constructors and owners as projects move through the stages of planning to construction. These moving targets add a significant new dimension of uncertainty which can make it virtually impossible to schedule and complete work at budgeted cost (Othel, 2007).

5.3 Role of AED Professionals in project development

The researcher was also interested in establishing the role of Architects, Engineers and Interior Designers in project development. This was based on objective three of the study which out determine the role of AED in project development. Data were analyzed and presented in Table 4.4. From Table 4.4, results indicate that a majority of (85%) agreed that interior design play a critical role in project development. Those who were neutral were 10% while 5% disagreed. Interior designers love their profession but often struggle with the complexity of running a professional interior design practice, either working for themselves or running a large practice with staff.

Interior design is not just the design of domestic and commercial interiors, there is also a lot of paperwork involved and tried and true professional systems to follow for the business side of the industry. There are also specialist areas that require additional knowledge including hospitality, commercial office design, retail, health care, aged care, industrial and a whole host of other specialist fields. Professional interior design is a complex and law governed industry that has codes and systems that must be adhered to.

On whether respondent sought input of other right from initial project stage to completion, 45% agreed, 35% disagreed while 20% were neutral as shown in Table 4.4. Although the results appear to indicate some kind of engagement to seek input, it could be argued that the nature of this engagement vary depending on the client preference and specific profession in question. An integrated team approach is critical in pulling off a successful project right from the onset (Guzman, 2010).

The researcher also sought to find out whether client's preference influence teamwork and create gaps on involving interior designers and other teams. Results in Table 4.4

indicate majority (68%) who agreed, 22% remained neutral while 10% disagreed (see Table 4.4). The findings indicate that clients play a critical role in project development, and can influence the extent of teamwork formation.

The researcher was also interested in establishing the role of AED in project development sought. Although an architect's professional services are required to perform the specifics for the client involving structure, electrical, plumbing, and mechanical engineering in a given project, Crawford and Bryce (2003) emphasize that the interior designer is contracted at the beginning of the project or in the pre- design phase to collaborate ideas of design with the architect and client in an integrative team fashion.

He or she now adds value to the client's real estate as well as to their organization under design/study. Specification approval and material purchase justifications for the interiors portions can also be conducted and are followed up with site inspections of the project to ensure that the design specifications and building codes are within conformance to their design. According to Pulver (2010), interior design itself is not a luxury ticket item, but actually a profession of skill sets that can improve the status of a commercial building type while being flexible to changes in the economy, technology, demographics, and overall business goals within a given organization; not to mention contribute to saving the client time and money.

On the participation of interior designers, results agree with a study by Pile (2003) who noted that interior design projects involve a number of steps in a logical order and the practice of design as a formal process which has been weakened because teamwork and the role of an interior designer is not usually emphasized. From the interview results, one respondent noted that:

“Interior designers are usually brought in as sub-contractors when all major decisions have already been made by the major professionals.”

The statement is evidence to show that interior designers are neglected especially at the onset of projects, and are perceived to be minor as compared to architects and engineers professionally. Yet, it is the interior designer who makes sure the quality, function and style of the project meet client expectations. Pile (2003) adds that the designer is the most important member of your team, bringing in all the necessary people to get the job done. All communication is channeled through the designer to the workmen. From cabinetmakers and electricians, to drapery installers and faux finishers, the interior designer has a wealth of quality craftsmen to draw from to accomplish the job and is there to protect your interest.

The contribution of an interior designer in project development is significant. The study found out that although firms tend to have laid down policies that facilitate collaboration, the process to foster positive practices that recognize interior designers as key actors in project development is still a work in progress. It could be that there is a lack of a clear and well-communicated performance management system with clear parameters against which team formation and collaboration that ensures participation of all teams is measured. There were gaps in the extent of engagement among architects, engineers and designers, although there was a clear recognition that each discipline need to become more active in promoting multidisciplinary teamwork.

On whether respondent sought input of other right from initial project stage to completion, majority agreed. Although the results appear to indicate some kind of

engagement to seek input, it could be argued that the nature of this engagement vary depending on the client preference and specific profession in question. An integrated team approach is critical in pulling off a successful project right from the onset (Guzman, 2010).

The researcher also sought to find out whether client's preference influence teamwork and create gaps on involving interior designers and other teams. The findings (see Table 4.4) indicate that clients play a critical role in project development, and can influence the extent of teamwork formation.

The responsibilities of AED often overlap. Both professions are integral to the design and construction of structures, such as buildings and bridges. Architects design the space to meet client needs, as well as the aesthetic appearance of the inside and exterior of the building. Engineers' main responsibility is to ensure the design is safe and meets all appropriate building codes. Engineers concern themselves with making buildings safe and functional by selecting structural materials, determining the structural members of the design, and specify the electrical, heating, ventilation, air conditioning and plumbing systems. One way that engineers and architects communicate their ideas to each another is through blueprints, or technical drawings.

Duties and responsibilities are plentiful within a commercial building type for an interior design project manager. Again the ultimate goals of interior design are to ensure the health, safety, and welfare of all of those who will or may occupy the space, so the services offered all revolve around the mission of the interior design practice itself. Such services or responsibilities and duties include defining the scope of work desired by the client (planning and design), working through programming (workflow, strategic plan,

schedule, budget), schematic services (dialogue of design solutions including drawings, material samples, budgets, and product mockups), design development (finalizing drawings and specifications of architectural plans), construction documents (interface with other trade professionals and consultants), and construction administration (ensuring as-built or as-recorded design and specifications are documented, punch lists are completed and final authorization of payments are administered (Grube, 2010).

5.4 Promoting Multidisciplinary Teamwork

The researcher sought to find out measures that can be undertaken to ensure successful project development in Kenya. Data regarding the same were collected, analyzed and results reported as shown in Figure 4.5. The results in Figure 4.5 indicate a number of measures that can be undertaken to ensure successful project development in Kenya include training (65%), technological application strategies (48%), resource management (42%), risk analysis (24%), implementation of sound rules and regulations (22) and flexibility to change (16%). The construction industry is no doubt a very competitive and risky industry, and the engagement of infrastructural projects are highly capital intensive. The progress of these infrastructural construction projects can thus be enhanced by these factors.

The researcher sought to find out measures that can be undertaken to ensure successful project development in Kenya. The construction industry is no doubt a very competitive and risky industry, and the engagement of infrastructural projects are highly capital intensive. The progress of these infrastructural construction projects can thus be enhanced by these factors. From the results, it was revealed that essential benefits that have the

highest mean values are training and technology. This therefore indicated that contractors and clients believe that as a result of proper training, there will be an efficient establishment of good relationship among the multidisciplinary teams during project development. In the case of resource management, there is need to look at the availability of resources, support from top Management, financial security, equal empowerment, and total cost perspective as supported by Brensen and Marshall, 2000).

5.4.1 Essential Factors in Project Development

The researcher sought to establish factors thought to be essential in project development. Respondents were given six factors to rate by numbering which factors they thought were most critical to the least critical. Data regarding the same were collected, analyzed and results reported as shown in Figure 4.6. From the results displayed in Figure 4.5, teamwork (86%) scored the highest as one most critical factor in promoting successful project development. Other factors considered were competence (78%), communication (65%), facilities (60%), leadership (55%) and commitment (52%). Results indicate that teamwork is the most critical factor considered essential in project development. Effective communication and competence were also given a very high rating by all categories.

Results indicate that teamwork is the most critical factor considered essential in project development. Effective communication and competence were also given a very high rating by all categories.

From the interview results, responses one contractor revealed various key factors cited for successful projects, as one respondent was quoted:

Currently, we have large and complex projects to manage and therefore you need to consider, first, early planning and good leadership. Even with all these, you must ensure good management and first- line supervision as you emphasize on a positive client relationship and involvement.

Although owners and contractors may have different perceptions on project management for construction, they have a common interest in creating an environment leading to successful projects in which performance quality, completion time and final costs are within prescribed limits and tolerances. It is interesting therefore to note the opinions of some leading contractors who were interviewed.

The responses of some interviewed revealed that they did not always understand the concerns of the project owners although they generally agreed with some of the key factors for successful and unsuccessful projects cited. The significant findings of the interviews clearly demonstrate that owners may have the same perception of their own role, but they differ significantly in assuming that role in practice. There is a trend toward breaking a project into several smaller projects as the projects become larger and more complex. It was also established that most project owners recognize the importance of schedule, but they adopt different requirements in controlling the schedule depending on the specific teams they are engaging at each project phase. From the results of these interviews, it is obvious that owners must be more aware and involved in the project development process in order to generate favorable conditions for successful projects, which in turn influence the extent to which the different teams engage one another.

5.4.2 Strategies Adopted in Project Development

The study further sought to establish strategies adopted in project development by firms for promoting multidisciplinary teamwork. From Table 4.5 it can be seen that the

majority 80% indicated client needs was most critical, (76%) indicated working within budget, 68% considered safety, 70% standards and regulations while 62% meeting project schedules. However, 42% indicated rewards (see Table

The results presented in Table 4.5 in the previous chapter are in agreement with a study by El-Saboni (2011) indicating that the measurement of project success in the construction industry has traditionally been grounded in the industry-accepted classic objective success metrics: cost, schedule, performance, and safety. Therefore, enhancing factors critical to the success of the construction project should encompass the nature and structure of the local industry, type and scale of projects, procurement procedures, local working culture, maturity of the organization involved as well as society norms as supported by Toor and Ogunlana (2006).

The results indicate that meeting project schedule is also a key aspect in project development. In Kenya, for instance, the Vice President's house at Karen was under construction for six years due to a number of setbacks that delayed its completion. In 2006, the construction of the residence began. According to the Ministry of Works, construction work had stalled after the first contractor was found not to be competent enough. The ministry was forced to look for another contractor who fast-tracked the completion of the residence (The Standard Newspaper, February 24, 2012).

Meeting project safety and standards are critical issues in project development. From the interview results obtained, the issue of professional ethics was evident: "regardless of their professional training, meeting ethical standards is important in everything we do." Indeed, Bowel (2007) in his study argued that in building and designing professions, the incalculable value of human life demands nothing less than the highest moral

considerations from those who might risk it otherwise. Since project development has a direct effect on the lives of people, these professionals owe special moral responsibility. However, Fan (2001) argues that professionals in general tend to believe that their obligations to their clients far outweigh their responsibility to others, such as public.

5.4.3 Collaboration and Project Development

The researcher further sought suggestions from respondents on ways to promote collaboration among multidisciplinary teams to ensure successful project development. Results obtained are presented in Figure 4.6 in the previous chapter. The results in Figure 4.6 show that early teamwork in college (23%) and dedicated teams (23%) are key issues to be considered based on respondents' suggestions. In addition, effective coordination (22%), evaluating team performance (16%) and continued commitment (16%) are critical.

The researcher further sought suggestions from respondents on ways to promote collaboration among multidisciplinary teams to ensure successful project development. The results disagree with a study by Andersen and Money (2006) indicating that a high degree of trust shared by project participants, timely and valuable decision from top management, availability of resources as planned throughout the project, top management's support, and regular monitoring and feedback by top management, are of generic nature and would be required to be present to ensure success in project development. Similarly, Jacobson and Choi (2008) point out that thorough understanding of scope on the part of project manager and contractor, comprehensive pretender site investigation, regular monitoring and feedback by owner, no bureaucratic interference, no social and political interference, clearly articulated scope of work, quality

control and quality assurance activities, and adequate communication among all project participants, which are required to be present to ensure success against a certain criterion. It is thus clear that collaboration at early stage in design process can significantly impact the ultimate efficiency of the final project as emphasized White and Thornton (2008).

Early teamwork by the different professions in college level was also a critical issue observed during the interviews.

“Some of these differences emerge from the school environment, and I think if interior designers, architects and engineers start to work together while in college, some of these problems can be avoided.”

The statement above is a clear indication that collaboration among the multidisciplinary teams at college level is still a work in progress. The prevailing challenges seem to affect not only Kenya, but other countries as well.

Another respondent was quoted saying:

“There is need for openness to diverse opinions regarding solutions to a given problem. In addition, a system should be put in place to enhance and allow for conflict resolution”

Another respondent notes:

“Professionalization of the interior design field should be enhanced to allow interior designers to be co-opted in the project at the very beginning rather than as sub-contractors.”

Although architects and structural engineers collaborate closely in the professional world, in the United States, Olsen and Namara (2010) point out those students from the disciplines rarely mingle. This has partly been because there are vastly different pedagogical approaches to teaching architecture and engineering: architectural educators value and promote creativity by assigning open-ended problems with numerous possible

solutions, whereas structural engineering students, who must grapple with much more extensive technical knowledge, are rarely asked to push the limits of their discipline.

As observed earlier, the findings revealed that that interior designers have the ability to contribute positively to the development of projects at all stages,(see Table 4.4); but may need to further investigate ways in which these service offerings can be structured, enhanced, and communicated more effectively to business. According to Lingwood (2010), interior design is not considered essential in project development and business, unless an interior designer has proved their value in other areas such as branding or marketing.

5.5 Summary

Current literature has highlighted the growing demand for collaboration and ethical practice and professional behavior among the multidisciplinary teams (Pulver, 2010). On the existence of benchmarks of a successful teamwork in project development, the study established that firms are currently setting programs that allow for teamwork in project development. Nevertheless, there seems to be no clear-cut benchmarks for successful project development for effective teamwork to be realized. It was established that market demands are the guide principle that impact on the extent of teamwork among architects, engineers and interior designers.

The concept of ‘whole building design’ where interior designers are consulted as part of a wider design team at the planning stage, is an approach that would involve designers in the earliest stage of the project development. Interior designers are “extremely important in the ‘whole building’ design process and should be contracted at the onset of the

project, referred to as the pre-design phase or programming phase, with the other major disciplines, key stakeholders, client, and end-user contacts” (Mazarella, 2010). Although it is not standard industry practice, the results of this study points to the need for appreciation of the need for this type of integrated approach to building design to reach the best possible project outcome.

Concerning project success factors, team involvement at project onset scored the highest, though certain factors such as proper planning, strong leadership, effective management, cost planning, communication and risk evaluation were found critical. Despite the fact that majority of the respondents citing early team formation, the study established that AED occasionally engage other disciplines in project development. In fact, a significant number noted that they rarely engage each other in project development. Conversely, majority agreed to the fact that involving different teams in project development can eliminate conflicts but did not make effort to ensure teamwork is enhanced.

The study also established that not many firms had new teamwork strategies. Only 42% said their firms had created new strategies to enhance teamwork. This may be the reason for such an occasional engagement in teamwork across the disciplines. Although majority of respondents noted that they work with other teams for a common interest, a slight above average declined the fact that they hold forums on project development with other teams. Indeed, such findings explain the reason why architects do not seem to understand the interior design field.

It was also established that collaboration among AED has not improved so far. The study found out a number of challenges, which may be hindering such collaboration; among

them corruption, lack of professional ethics, poor leadership, lack of effective policies, inefficient tendering procedures, incompetence and ignorance, inadequate technology, and inefficient regulatory framework. From the results, it is evident that corruption is a big challenge, and results agree with a recent report that established corruption and incompetence in many public projects in Kenya. The study established measures that can be undertaken to ensure successful project development including training, technological application strategies, resource management, risk analysis and implementation of sound rules and regulations.

The study found out that meeting client needs was the most critical success strategies for many firms; working within budget was second while safety and standards scored third and fourth respectively. Effective coordination, evaluating team performance and continued commitment were among suggestions made to promote multidisciplinary teamwork. From the responses of the sampled focus groups, it was stressed that early team formation starting at college level and recognizing the role of interior designers (who have been neglected for years) was critical. The interdisciplinary design partnerships were crucial to the success of the projects, and as a result, the respondents emphasized greater appreciation of their own skills and respect for other teams as well as the other discipline.

The next chapter highlights the study's conclusion, recommendation and areas for further research based on the results discussed above.

CHAPTER 6: CONCLUSION AND RECOMMENDATION

6.0 Introduction

This chapter presents conclusions, recommendations and suggestions for further research based on the results of the study. The findings were thematically based on the objectives of the study.

The study focused on promoting multidisciplinary teamwork in project development in Kenya. Multidisciplinary teamwork among Architects, Engineers and Interior Designers (AED) is an effective strategy in enhancing quality projects. Literature review informs us that whereas it is an effective strategy in developing countries, it is still in early stages of implementation in the developing countries. The literature review also informs us that creating an effective collaborative process requires clear intention and skill, especially for large, complicated projects with numerous consultants and participating stakeholders. The study conclusion and recommendation are as discussed underneath.

6.1 Summary and Findings

Based on the responses to the questionnaire and interview responses, a set of most significant success factors have been identified for different project performance criteria. Depending on the nature of projects, the performance criteria vary. The study has revealed that some factors such as leadership, communication and coordination are important. There is no doubt that progress with continuously increasing performance, in relation to the built environment as well as elsewhere in society implies the need for an

intensified collaboration of interdisciplinary expert teams, especially give high expectations in an ever-accelerating innovation.

On the other hand, the benefits of using interior design project managers can be essential to the needs of select clients who are pursuing excellence with aesthetics, function, and construction ability of their desired building structure. The knowledge of their services and capabilities is one that should be understood and known to be readily available to all future, current, and past building owners wishing to pursue excellence in their design. These professionals can create a unique space that has the client's expectations and visions put forthright before any imposed ideas or personal taste factors. These are the professionals that can provide superior excellence in interior specialization of one's given interior environment. These are the professionals a building owner should consider first in achievement of their dreams, goals, and functions of their personal building structure's interior and its integrity (Grube, 2010).

Based on the findings of this study, the following conclusions were made:

1. The main conclusion as per the findings of this study was that although clear benchmarks exist that can promote multidisciplinary teamwork in project development, collaboration among AED and other professionals is not effectively considered at the onset of most projects. Although there is an effort in terms of new strategies being employed to promote multidisciplinary teamwork, it appears that the respective teams have no clear guidelines that can facilitate early team formation.

2. The most prevalent cases of conflicts involve issues related to lack of proper communication, poor leadership and lack of professional ethics. The study revealed that working within budget and satisfying client needs are critical issues that may create conflicts. Interview results showed a lack of common ground in promoting multidisciplinary teamwork at college level, which to some extent highlights the differences between the disciplines in the field. Engaging the different teams (AED) at an early stage in class can translate positive abilities to communicate and design in interdisciplinary teams in future.
3. The study further established that interior designers play a key role in project development, but are regarded as the last option, often being engaged at the end of the project.
4. Training, teamwork, competence, commitment, resource management and technological application are major aspects that can promote teamwork among multidisciplinary teams in project development.

6.2 Recommendations

The findings identified gaps in the roles of interior designers and existing conflicts among the various disciplines. It is the finding of this research that the recommended solutions could help promotes multidisciplinary teamwork in project development in Kenya and beyond. Therefore, based on the derived research conclusions, the following recommendations are made:

1. The AED organizational structures and associations should implement clear policies that guide on successful benchmarks in project development. They should also ensure that teamwork in project development is given priority through monitoring and organizing of short time seminars and workshops.
2. There is need for the government to implement a more holistic approach to building awareness and more collaborative initiatives within the AED disciplines to deal with existing and emerging conflicts. Accordingly, there is need for coordination of information at intra and inter-organization or firm level to ensure the success of a project and avoid delays such as the ones witnessed in some government projects like the Vice Presidents official residence in Karen.
3. The entire AED disciplines must be structured, managed, and operated in a manner that supports the efforts and decisions of every professional regardless of their role in project development. Specifically, managers of companies must coordinate activities of their personnel in order to achieve a common goal that interior designers can also be fully involved at the onset of project development. Moreover, there is need to establish common ground amongst the students, while highlighting the differences between the disciplines in an environment of respect and support. This may help create remarkable growth in student abilities to communicate and design in interdisciplinary teams; skills that will prove very useful upon completion of the professional degree.

4. Stakeholders should mobilize all relevant forces to ensure code of ethics are strictly followed, and also foster quality training programs a way of promoting multidisciplinary teamwork in project development alongside training.

6.3 Areas for Further Research

The researcher recommends the following key areas as follow-ups to the current study.

1. A study on the role of organizational policies on teamwork in project development is suggested. This is because the study identified gaps in terms of benchmarks and strategies employed to foster teamwork. Moreover, results from Table 4.1 revealed that the current framework does not fully provide an opportunity for AED to work together. A more expansive and inclusive AED profession that recognizes disciplinary specialty as a complement to core knowledge and teamwork is still a work in progress. Consequently, such a study may encourage professional organizations to take the lead in promoting a more integrated professional track in project development in Kenya.
2. An analysis on interdisciplinary conflicts and resolution as cultural behaviour among architects, engineers and interior designers in project development in Kenya is necessary to ensure project success and avoid the existing and emerging conflicts. This is because there are opposing perspectives on the role of the architects, engineers and interior designers. For instance, architects continue to argue that the design of interior space falls under their jurisdiction. Therefore, the

suggested study may provide a focused approach to resolving existing conflicts and promote teamwork.

3. A study on multidisciplinary profession without multidisciplinary education is required to look at how students can foster early teamwork formation in project development. This is necessary because the results from this study identified the need to identify and devise relevant educational curriculum that allows for early team formation. Although foundational courses at the university are fundamentally the same for the beginning students in architecture, engineering or interior design; knowledge base diverges, and the students usually develop more specialized knowledge, so too do their academic tracks diverge. Therefore, such a study will enable students and lecturers to increasingly rely on each others' expertise and seek collaboration after graduating.
4. A series of in-depth case studies on various public projects should be undertaken in future in other Counties in Kenya as well in order to verify the applicability and reliability of the success factors identified in this study. Such a study will be necessary because in practice, Kenyans have witnessed complex public projects collapse or taking too long before completion. As such, the study may provide team members strategies on how they can contribute specific talents and abilities that relate to the scale at which they work, and also provide an appropriate model on collaborative and integrated way of working during project development.

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Schedule of Activities

ACTIVIT	September – October 2012			November- December 2012			Jan. 2013 May Nov Dec			
	1	2	3	1	2	3	1	2	3	4
Proposal presentation										
Pretesting										
Data Collection										
Data Coding & Editing										
Data Analysis										
Report Writing										
Thesis Presentation										
Graduation										

Budget

ITEM	PRICE PER UNIT	TOTAL COST
Travel expenses		30,000
Stationery		10,000
Typing & photocopying		25,000
Binding Expenses		5000
Air Time		3,000
Miscellaneous		17,000
Total		Ksh 90,500

APPENDICES: RESEARCH INSTRUMENTS

Appendix 1: Questionnaire for Professionals (AED)

My name is George Washington Karani, a student at the University of Nairobi. I am undertaking a study on “promoting multidisciplinary teamwork in Project Development with reference to Nairobi County. The information provided will be used for academic purposes only. Please assist through contribution of information towards this study by answering these questions.

PART I: Benchmarks of a successful teamwork in project development

1. Please indicate your level of agreement with the statements in the table below:

Use:

Strongly agree- SA

Agree- A

Neutral- N

Disagree- D

Strongly disagree- SD

PART I: Benchmarks of a successful teamwork in project development

Statement	1- SA	2- A	3- N	4-D	SD
We have set programs within our companies that allows for consultation with other disciplines.					
There are clear benchmarks for successful project development that are followed by all professionals.					
The policy on building and construction industry is effective and inclusive.					
The job market and client demands guide the extent to which teamwork with other discipline is carried out.					

2. List any project success factors that can enhance teamwork in project development.
3. Critical issues in project development in Kenya -How often do you involve other professionals (AED) in your projects?

Very often [] Often [] occasionally [] rarely []

Give a reason for your answer above

4. In your opinion, do you think involving other professionals in project development has helped eliminate conflicts and substandard building projects in Kenya?

Yes [] No []

Give a reason for your answer above:

5. Has your company/ firm created new strategies to steer collaboration among AED in their projects?

Yes [] No []

If your answer is yes: List some of them:

PART II: Conflicts that may exist among AED and related disciplines in project development

6. Please indicate your level of agreement with the statements: Use

Use:

Strongly agree- SA

Agree- A

Neutral- N

Disagree- D

Strongly disagree- SD

Statement	1- SA	2- A	3- N	4-D	SD
Collaboration					
We work with other professionals (AED) towards a common interest.					
We always make sure we follow professional ethics when dealing with clients on their projects.					
We often have forum to discuss with our colleagues in other disciplines (AED) on issues pertaining our work.					
Architects do not seem to recognize the field of interior design.					
We have well laid down procedures that guide our filed projects right from the start.					
Collaboration among AED in project development in the field has so far improved.					

7. List the challenges you experience in an effort to ensure AED professionals and clients collaborate in t their work?

PART III: Role of Architects, Engineers and Interior Designers (AED) in project development.

8. Please indicate your level of agreement with the statements: Use

Use:

Strongly agree- SA

Agree- A

Neutral- N

Disagree- D

Strongly disagree- SD

Statement	1- SA	2- A	3- N	4-D	SD
Role of AED in project development					
Interior designers play a big role in project development.					
Interior designers are neglected in most cases at the onset of most projects.					
AED teamwork in our projects has improved					
We always seek AED input in all our construction projects right from the start.					
Clients preference creates the gap on the role of AED and other disciplines.					

PART V: Aspects that could promote multidisciplinary teamwork in in project development

9. Indicate measures that can be undertaken to ensure project success (for efficiency and effectiveness)in the construction industry in Kenya.

10. Indicate the most important essential factors that you consider essential in project success.

- i. Communication
- ii. Teamwork
- iii. Leadership
- iv. Facilities
- v. Competence
- vi. Commitment

11. Indicate two critical success factors across various success category listed below that your firm has adopted in project development with clients.

- i. Meeting schedule
- ii. Within budget
- iii. Meeting technical specification & Standards
- iv. Fulfilling customer’s needs

12. Suggest three ways in which teamwork can be developed to foster collaboration between multidisciplinary teams (AED)?

Appendix 2: Interview Schedule for Lecturers

PART I: Benchmarks of successful project development

1. What is your general view concerning project development in Kenya?
2. What are the factors that can enhance team formation towards successful in project development?
3. What are the factors contributing to inefficiency in construction sector related to the different disciplines and professionals involved?
4. Do you think the government has developed clear benchmarks for successful project development that are followed by all professionals? Explain your answer
5. Given the current job market and client demands, what are the key issues that can be developed to guide successful project development?

PART II: Conflicts

1. List the challenges you experience in an effort to ensure AED professionals and clients collaborate in their work?

PART III: Role of AED in project development

1. In your opinion, do you think Interior Designers play a big role in project development?
2. What suggestions could you give to enhance collaboration among AED and other professionals to ensure interior designers are engaged in the entire project development.

PART IV: Aspects that can promote project development

1. What success factors across various success category can be adopted in project development to ensure quality and long-term projects sustainability with clients.
2. Suggest three ways in which teamwork can be developed to foster collaboration between multidisciplinary teams (AED)?

Appendix 3: Focus Group Discussion Schedule for Clients

PART I: Benchmarks of successful project development

1. What is your general view concerning project development in Kenya?
2. What are the factors that can enhance team formation towards successful in project development?
3. What are the factors contributing to inefficiency in construction sector related to the different disciplines and professionals involved?
4. What role can AED play as professionals in project development?
5. What suggestions could you give to enhance collaboration among AED and other professionals to ensure interior designers are engaged in the entire project development.
6. What success factors across various success categories can be adopted in project development to ensure quality and long-term projects sustainability with clients?
7. Suggest three ways in which teamwork can be developed to foster collaboration between multidisciplinary teams (AED)?

Appendix 4: Interview response from the field

Mr. Malaki: Having all of the design team at the table at the beginning of a project ensures that; the client's wants, needs, and vision can be met; that each discipline can offer valuable information focused on design, constructability, and budget. It is also important because ideas build upon one another can greatly help in creating a well-integrated project that exceeds a client's expectations; and sometimes even exceeding the design team's vision-[Mr. Malaki-Interior Designer] (Plate 4.1, a).

Mr. John: As an engineer, I would like to say Working as a team to complete a shared vision has many benefits, and especially to the interior designer because they are normally left out at the start. By creating a team, all players are on equal footing from the beginning, and this allows all of them to start the project with a shared program of the client's goals. Synergy can be created to expand the design ideas, and then help refine them (Plate 4.1, b).

Mrs Fiona: I have found that when we work as a team from the start of a project, there is more creative energy and greater development of ideas and better clarification of each individual role.

Mr. Johnston: Often interior designers come into the project after the project has been started. This requires designers to get up to speed before we can begin our programming and design concept. We often run into challenges based on decisions that were made before we designers were engaged. Not being present or a part of this process can leave up open to misdirection by missing key client concerns. I believe

what we need in Kenya is a framework that supports teamwork because a well-functioning team can prevent these problems (Plate 4.1, c).

Appendix 5: Map of Nairobi County

