

Appraising the Performance of Construction Projects during Implementation in Kenya, 1963-2018: A Literature Review Perspective

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ABSTRACT

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Poor project performance has been noted as the bane in the construction industry globally. This paper sought to investigate, by way of literature, the performance patterns of construction projects in Kenya since independence (1963-2018). This was informed by reports of undesirable project performance in the industry. This descriptive study used available studies previously done in this subject area. In sum, literature is replete with evidence on a myriad of challenges facing the execution of projects. The study established that generally, the project performance is poor and has assumed a chronic trajectory spanning over five decades. On average, the findings reveal that 35-60% of projects initiated in Kenya face cost overruns while time overrun is most severe with 35-73% projects overrunning their schedule. In addition, the findings problematize the issue of plurality of performance measurement regimes in the construction industry. Here, it was observed that no singular construct exists to objectively measure the various facets that constitute the 'health' of a project. This paper has contributed to the body of knowledge by examining the performance patterns in Kenya for over fifty years while at the same time identifying the bottlenecks inherent in projects execution. Importantly, the conceptual performance efficiency framework derived in the current study presents a paradigm shift in the monitoring and evaluation of projects. To this end, an in-depth analysis is recommended on the interaction of efficiency enablers in the buildup of performance efficiency index (PEI). Similarly, a further inquiry is recommended on the integration and impact of the proposed framework in the management of projects.

Keywords: Project Performance, Efficiency, Implementation, construction industry, Kenya

INTRODUCTION

Generally, the Construction Industry has been growing at steady pace globally. Turner and Townsend (2018) postulate that the global construction industry grows at a rate of USD 0.3 trillion annually. Therefore, the growth is projected at USD 10.3 trillion in 2020 compared to USD 7.4 Trillion in 2010. Relatedly, according to Global Construction perspectives and Oxford Economics (2013) the GDP growth in the global construction industry was forecasted to grow by 3.5-4.0% annually. It's therefore clear from the foregoing, that the current state of the construction industry looks bright but the performance is not optimum.



In Kenya, evidence suggests that the construction industry is growing and is a crucial sector for the growth of the economy. For example, according to the reports of Kenya National Bureau of statistics (KNBS, 2018) and the Kenya Economic Outlook (2018) the construction sector grew by 8.6% in 2017. In the same period, the Gross Fixed Capital Formation increased by 15.9% for dwellings and 13.6% for other buildings other than dwellings respectively compared to 2016. The robust growth in the sector is attributed to *inter alia* the improved infrastructural networks which seek to enhance connectivity and mobility in the Country. Among the notable developments thus far include; the completion of the Single-track Standard Gauge Railway (SGR) from Mombasa to Nairobi, the on-going second Phase of SGR running 120 kilometers from Nairobi to Naivasha, expansion and modernization of Outer Ring Road, Expansion of Ngong Road, Construction of Kenya Western Bypass, Dongo Kundu bypass and Nuno-Modogashe Road (KRB, 2018). Additionally, The Big Four Agenda-that defines the Government's priorities and development path for the 2018-2022 planning cycle -provides impetus for increased construction activities for the next five years. This paper posits that for Kenya to realize the vision in its development blue-print, the construction industry must operate at optimal performance through enhanced efficiency in the management of construction projects than it's presently done.

Globally, the challenges facing the construction industry are similar and congruent. However, there is consensus on literature that the challenges are severe proportionately in developing countries and more evident during projects implementation. Asiedu (2009) proffers that improvement of construction projects performance remains a key component and livewire in the overall improvement of the construction industry globally and should therefore be given due attention. This has arisen given the unparalleled criticism bedeviling the industry due to poor performance and little confidence from industry clients. Ofori (2000) believes a fully developed construction industry is one that not only promotes increased value for money for industry clients as well as environmental responsibility in the delivery process. But also increases the viability and competitiveness of domestic construction enterprises. Simply put, the construction industry development is a deliberate process to improve the capacity and effectiveness of the construction industry in order to meet the demand for building and civil engineering products, and to support sustained national economic and social development objectives.

QUEST FOR CONSTRUCTION INDUSTRY PERFORMANCE IMPROVEMENT, 1940-2018

The construction industry globally has a history of client dissatisfaction. In response, several countries at various levels of socio-economic development have recognized the need and importance of taking measures to improve the performance of their construction industry. A review of various government backed reports underscore the need for construction industry development. A summary of these reports has been discussed in sections below.

Global Perspective

Table I presents a summary of the global measures undertaken in an effort to improve the performance of the

TABLE I. SUMMARY GLOBAL REPORTS ON THE QUEST FOR CONSTRUCTION INDUSTRY DEVELOPMENT AND IMPROVEMENT (1944-2018)

No.	Name of report	Country	Objective	Emphasis
1	Placing of Public Contracts (1944)	UK	Standardization of public sector contract management	Less onerous tendering processes and emphasis on lowest price
2	Working Party Report (1950)	UK	Standardization and efficiency of the industry from a supply perspective	Higher performance from contractors and labor productivity
3	Problems before the Construction Industries (1962)	UK	Closer links between designers and constructors	Higher standards of design information, even supply of workload, less emphasis on lowest price
4	Placing and managing of contracts (1964)	UK	Improvement of the design and management of construction projects	Standardization of management processes
5	Public Client and Construction Industries (1975)	UK	Aggregation of projects to provide regular work load	Continuous work load and less competitive tendering
6	Faster building (1983)	UK	Increase in productivity for large warehouses and industrial projects	Use of 'off site' manufacturing techniques, construction management and elemental package processes
7	Faster building (1988)	UK	Increase in productivity for offices and commercial projects	Similar emphasis from the 1983 report
8	Constructing the Team (1994)	UK	Looks at relationships between parties to a construction contract	Recognizes a larger role for Clients and the importance of financial liquidity
9	National Construction Goals (1994)	USA	Setting National Construction agenda	Setting National Construction agenda
10	Efficiency Scrutiny (1995)	UK	Improving communication, training and a single contact for disputes	Recognizes government as a change catalyst to create the improvements required
11	Creating an enabling environment for reconstruction, growth and development in the construction industry (1997)	SOUTH AFRICA	Creating an enabling environment for reconstruction, growth and development in the construction industry	Creating an enabling environment for reconstruction, growth and development in the construction industry
12	Building our future together: strategic review of the construction industry (1997)	IRELAND	strategic review of the construction industry	Strategies for the construction industry
13	Re-engineering the construction process using Information Technology (1997)	FINLAND	Integration of Information Technology in Construction process	Use of IT in construction
14	Future directions of the construction industry coping with structural changes of the market (1998)	JAPAN	Coping with the structural changes of the market	Coping with the structural changes of the market
15	Construction 21: Re-inventing construction (1999)	SINGAPORE	Re-inventing construction	Maximizing value in construction
16	Building for growth, building and construction industries action agenda (1999)	AUSTRALIA	Setting agenda for the construction industry	Recognizes the need action points for the industry

TABLE I. SUMMARY GLOBAL REPORTS ON THE QUEST FOR CONSTRUCTION INDUSTRY DEVELOPMENT AND IMPROVEMENT (1944-2018) (CONTINUED)

No.	Name of report	Country	Objective	Emphasis
17	Rethinking Construction (1998)	UK	Improvement in performance and productivity of construction	Compares construction with manufacturing, identified five drivers for change
18	Compares construction with manufacturing, identified five drivers for change (1999)	UK	Awarding contracts by the use of value for money rather than lowest price bid	Recognizes of the weaknesses of the government procurement rules
19	Modernizing Construction (2001)	UK	Strong partnering approach to projects, long term relationships	Selection of parties by best value rather than lowest price, less adversarial approach
20	Improving Public Services (2005)	UK	Places construction as a key driver for delivery of public services	Looks toward creation of long term relationships for improvements in performance
21	Construction Matters (2008)	UK	Requests demonstration of the construction industry's strengths and areas for need for improvement	Outlined the need for government leadership at strategic and operational levels
22	Government Construction Strategy (2011)	UK	Deliver a competitive industry for the future, cost savings through efficient procurement	Cost benchmarking, standardization and justification of value for money

Source: Author's literature compilation (2018)

construction industry. Three themes can be discerned from these reports. Firstly, low pricing and its impact in the performance of projects. The Simon Report in 1944 recognized problems with accepting the lowest price due to the potential for suppliers to 'under-bid' and then either cut corners in terms of specification, or try and maximize income by claiming additional monies. This specific concern was highlighted exactly fifty years later by Latham (1994) who submitted that many clients still do not understand that fiercely competitive tenders and accepting the lowest bid do not provide value for money in construction. Lowest priced tenders may well contain no margin of profit for the contractor, whose commercial response is then to try to claw back the margins through variations, claims. This position holds true in the current construction set-up and contributes significantly to poor cost performance in projects.

Secondly, the use of different controls and information during the construction phase of a project to better performance is amplified. It is acknowledged that projects, by their nature, are unique in terms of location, design, form and function. Although variables will always exist to an extent, the reports recognized that inefficiencies were introduced through the management process. This second theme proposed that standardization of components, management controls and engagement of suppliers and sub-contractors using standard forms of contract will drive out wastage and uncertainty. The proposal of standardization would apply to all elements of a project and to all parties - clients, suppliers and designers. In the Simon Report (1944) it was specifically recognized that it has become impossible for any single Architect or Builder to have specialist knowledge and experience to deal effectively with all the new processes. As a result, specialist firms are operating on a substantial scale engaged

under differing terms and conditions and to differing standards. Hence, this embraced specialization in the delivery of successful projects.

A third area of commonality and potential efficiency contained in the reports recognized benefits accrued from a reliable and stable continuous workload. A cycle of ‘boom and bust’ does not encourage efficient and effective long term planning of resources. Training programs, procurement systems and standard legal documentation require introduction and development over long time scales. Fluctuating economic conditions make continuous long-term investment in training and development extremely difficult for suppliers and clients alike. In sum, a common theme throughout the reports focused on strategic efficiencies – enacted through engagement with information technology and standardization. Secondary themes relate to the growth prospects offered by the construction sector in order to energize a national economy. Suggestions on how to achieve such objectives vary between the reports and are subject to debate, but ultimately, evidence suggests that the quest for construction industry development is still a live subject to this day.

Kenyan Construction Sector Improvements 1963-2018

Kenya has engaged in deliberate efforts to improve the construction sector since attaining her independence in 1963. Firstly, in 1967, through an Act of Parliament, the Kenyan government set up a National Construction Corporation (NCC) to train African contractors in construction business management. The main function of NCC was to “promote, assist, and develop the construction industry” (Republic of Kenya, NCC Act 1972). It also operated as an architectural and engineering firm and it can own and manage either a management institute or a technical college, operate manufacturing business and own construction equipment for commercial use. Furthermore, the NCC Act permitted the corporation to have a say in the design of the syllabi at institutions that train personnel for the construction industry. However, this corporation lasted for only 25 years as it was disbanded in 1992 mainly for having failed to indigenize the construction industry.

Secondly, Public sector construction projects in Kenya, prior to 2003 were identified, planned and implemented by the government line ministries or their implementing agencies in state corporations. In most cases these projects were influenced by partisan politics thus falling short of expectations. It is due to this that the government thought of decentralizing public sector construction projects in an effort to realize equitable development in all regions. Among the decentralization programs formulated were: District Development Grant Program (1966), the Special Rural Development Program (1969/1970), District Development Planning (1971), the District Focus for Rural Development (1983-1984) and the Rural Trade and Production Centre (1988-1989). Though the aim of these programmes was to attain development in all parts of the country, they failed due to the problem of funding. It is against this background, that in 2003, the Constituency Development Fund (CDF) was created through an act of parliament with the aim of ensuring balanced regional development by providing funds to parliamentary jurisdictions (constituencies) to fight poverty.

The Constituency Development Fund (CDF) was established through an act of parliament-CDF Act (2003)- for

the purpose of devolving national resources to achieve rapid socio-economic development at constituency level through financing of locally prioritized projects and enhanced community participation (Mapesa & Kibua, 2006). The scope of CDF then was limited to some construction works including, those that are Educational in nature, address health needs of the community, provide a market for agricultural produce, ensure adequate provision of water, provision of employment through industrialization and also those projects that build roads and bridges, improvement of existing roads and construction of culverts and minor bridges. After the 2007 Amendments, the Constituency Development Fund Committee (CDFC) was empowered to acquire land and buildings, although all assets remain the property of the CDF Board. Indeed, the success story of CDF has reverberated in the construction industry as well as fostering the economic growth. Even so, a myriad of challenges facing the industry still persist.

Thirdly, the National Construction Authority (NCA) as a regulatory body in Kenya is one of the most progressive developments in the construction industry of Kenya. It was occasioned as a result of challenges the industry was facing particularly after the collapse of the National Construction Corporation NCC in 1988. During that time, the issues the industry was facing had only gotten bigger and more dynamic with changing times. Intense lobbying on the part of the stakeholders in the industry finally led to the enactment of the National Construction Authority Act in 2011. The Act was assented to on 2nd December, 2011 and operationalized on 8th June, 2012 with the regulations which operationalizes the Act being passed on 6th June, 2014. Indeed, Talukhaba (1999) being influenced by experience and best practices in construction industries elsewhere such as UK, Malaysia, Singapore and South Africa had made suggestions for the establishment of a regulatory body. In his recommendations, condensed into a "Construction Industry Reform Model" had *inter alia*, a lengthy proposal for total reform and revolution of the Kenyan construction industry. Despite the progress made thus far, there is still a lot to be done.

The National Construction Authority is mandated to regulate, streamline and build capacity in the construction industry of Kenya. In an effort to address itself to challenges facing the industry, the body offers contractors registration, projects registration, contractor and Artisans training as well as promote industry research through its Annual Construction Research Conferences and Exhibitions. Although the full impact of the body on the overall performance of the industry is still a matter of debate given the short time they have been in operation, this research sees cardinal opportunity gaps that are yet to be fully exploited. Firstly, the promotion of the construction industry research agenda should be enhanced. Ideally, the body should endeavor to establish strong linkages with academic institutions to spearhead the research agenda than it's presently done. Most importantly, the body should sanction a national construction industry debate culminating into Construction Industry Research Priority List as a blue-print in as far as industry research is concerned. Secondly, the body should, in line with its mandate of building capacity in the industry, advocate for the review of the construction-related legislation governing practice of practitioners, for example Cap 525 should be reviewed and expanded to include other emerging disciplines in the construction industry such as: Construction Project Managers, Landscape Architects, and Interior designers and facilities managers. To this end, the study echoes that the National Construction Authority should embrace benchmarking of best practices to help foster industry growth.

REVIEW OF PERFORMANCE CHALLENGES DURING PROJECTS IMPLEMENTATION

Despite the Construction industry being considered as a locomotive of physical developments which bring substantial and significant impacts to the country's economy. It always faces chronic performance problems such as time overrun, cost overrun, waste generation (Memon et al., 2012), poor safety, poor quality, excessive resource consumption and threat to environment. A detailed account of some critical challenges facing the industry and in particular projects is elaborated in the subsequent sub-sections below;

Cost Performance Challenges

Cost is one of the major considerations throughout the lifecycle of a project. Unfortunately, most of the projects fail to achieve project completion with the estimated cost. This is a major challenge both in developed and developing countries. The trend is more severe in developing countries where these overruns sometimes exceed 100% of the anticipated cost of the project (Azhar et al., 2008). The challenge is becoming more critical as revealed in World Bank (2005) report. The report pointed out that 63% of the 1778 financed construction projects faced poor performance with overruns in budget at an average of 40%. Contributing to this discussion, Flyvbjerg et al. (2003) had studied 258 projects in 20 nations with combined value of approximately USD90 billion. They found that cost escalation happened in almost 9 out of 10 projects with an average of 28% higher than forecasted costs. The study concluded that cost performance has not improved over the time and its magnitude has not changed for the past 70 years. Another study conducted by Olawale (2012) shows that average cost overrun was rather small with approximately 7.9% of project cost.

Construction Time Performance Challenges

Achieving completion of construction projects on time is a basic requirement. However, rarely are projects completed on time. This has become a worldwide problem. For example, a study showed that the Vietnamese government has acknowledged this issue as a serious concern, especially with government-related funded projects (Le-Hoai, Lee, & Lee, 2008). In Nigeria, out of 3,407 projects only 24 projects were completed on time, while 1517 were delayed and 1812 were abandoned (Amu & Adesanya, 2011). Omoregie & Radford (2006) reported that the minimum average percentage escalation period of projects in Nigeria was found to be 188%. A similar research was conducted in Bosnia and Herzegovina on 177 projects and found that the contracted date was not met in 51.40 % of the projects (Zujo, Car-Pusic, & Brkan-Vejzovic, 2010). Al Momani (2000) conducted a survey on 130 public projects in Jordan and found that delays occurred in 106 (82%) of the projects. Frimpong, Oluwoye, & Crawford (2003) found that 33 (70%) out of 47 projects in Ghana were delayed. Whilst, in Saudi Arabia 70% of the projects faced time delay with average time delay of 10% to 30% of the original duration of the project (Assaf & Al-Hejji, 2006).

According to Memon (2013), Malaysian construction industry is facing the same critical problem of time

overrun. Abdullah (2010) reported that more than 90% of large MARA construction projects experienced delay since 1984. Endut et al. (2009) studied on time performance of 359 projects (301 new constructions while 58 refurbishment projects) in Malaysia. Of these 301 were public projects and 51 private projects. The study found that only 18.2% of the public sector projects and 29.45% of private sector projects had 0% time deviation (no delays) while the average percentage of time overrun for other projects was 49.71%. Time Delay can be due to one or more reasons including problems of financing and payment for completed works. As an example, Yogeswaran, Kumaraswamy, & Miller (1998) scrutinized 67 civil engineering projects in Hong Kong and found at least 15 – 20% of time overrun was due to inclement weather. From the upshot, delivering projects on time still remains a big challenge for both developed and developing economies.

Poor Safety

The construction industry is notoriously known for its poor safety record as compared with other industries. According to Muiruri and Mulinge (2014), health and safety measures in the construction industry are wanting. Similar findings were established by Gwaya (2015). Poor safety results to accidents and fatalities which have a significantly effect on the efficiency and cost of the project. Accident data prepared by the Occupational Safety and Health Branch of the Labor Department, Hong Kong as summarized by (Rachel, 2006) shows that accident rates in the construction industry are much worse than all other industries for many years: for 1000 workers, the accident rates are on an average 3 times more than the other industries. Bureau of Labor Statistics USA (Nahmens & Ikuma, 2009) reported that in USA total injury and illness incidence rates are 9.5 to 14.3 per 100 workers in prefabricated wood manufacturing while in the residential construction, incidence rate is approximately 5 per 100 workers.

Koskela (1992) mentioned that the cost incurred as a result of poor safety practices in the construction industry is approximately 6% of the total project cost. In a research, Everett and Frank (1996) found that the total costs of construction accidents accounted for 7.9% to 15% of the total costs of projects. UK Health and Safety Executive reported that the total losses due to accidents in the UK were equal to about 8.5% of the tender price (Rawlinson, 2003). These accidents may be caused by different factors thereby opening viable areas of research. However, Kartam (1997) believes accidents are directly attributed to unsafe designs and site practices while Baxendale & Jones (2000) stated that most of the accidents are caused by poor management and control.

Poor Quality

Another problem facing the construction industry is poor quality standards. It is very common and serious problem as the expected quality is not complied with in the construction projects (Kometa & Olomolaiye, 1997). Failure in achieving the required quality also has significant impact on project cost. Koskela (1992) stated that quality cost (non-conformance) in the construction industry of USA contributed to 12% of total project cost. Burati, Farrington, & Ledbetter (1992); Ledbetter (1994) and Love (2002) studying quality performance of construction projects through case studies as summarized in Marosszeky, Thomas, Karim, Davis, & McGeorge (2002) showed

that quality failures had resulted in rework which incurred extra cost approximately 2% to 12% of project cost while Marosszeky et al. (2002) stated that quality rectification problems contributed to approximately 3.4% to 6.2% of project cost.

Construction Waste Generation

Waste is another serious problem in construction projects. Waste has a direct impact on the productivity, material loss and completion time of project resulting in loss of a significant amount of revenue. Forsberg & Saukkoriipi (2007) stated that the amount of waste generated is around 30-35% of a project's production cost. In addition, the amount of construction materials wasted on the site is relatively high and equals 9% by weight of the purchased materials. They investigated material waste generated in a Dutch construction project and found that the average waste per house was 6,860 kg which consisted of 4,480 kg of construction debris and 2,380 kg of other types of solid waste. This state of affairs is replicated in other parts of the world and is the basis behind the advocacy for proper waste management practices in the construction industry.

Excessive Resource Consumption

Built environment has significant impact on resources where it accounts for one-sixth of the world's freshwater withdrawals, one-quarter of its wood harvest and two-fifths of its material and energy flows. The structures also have an impact on areas beyond their immediate location, affecting the watersheds, air quality, and transportation patterns of communities (Rodman & Lenssen, 1994). Buildings built without due consideration to energy, environmental impact and natural resources conservation will result in detrimental wastage affecting our ecological integrity (Sheen & Tam, 2002)

Excessive resource and energy use and a growing demand for raw materials are largely responsible for the depletion of natural resources worldwide as well as the acceleration of global warming. About 40% of the world's resource and energy used is linked to the construction and maintenance of buildings. This contributes to one-tenth of the global economy (Rodman & Lenssen, 1994). Other studies indicate that more than half of all resources consumed globally are used in construction, and 45 per cent of energy generated across the world is used to heat, light and ventilate our buildings, with a further 5 per cent arising from constructing those (Edwards, 2001). As an example, in the European Union, buildings are responsible for more than 40% of the total energy consumption and the construction sector is estimated to generate approximately 40% of all man-made wastes. In addition, the construction sector is the Union's largest industrial sector, contributing approximately 11% to the GNP and having more than 25 million people directly and indirectly engaged (CIB, 1999).

Threat to Environment

Built environment is considered the most environmental unfriendly human activity because it consumes large amounts of natural resources and produces a huge amount of pollutants. The environmental impact of the

construction industry is extensive and readily identifiable (Rodman & Lenssen, 1994). Most people are not serious about environmental protection in construction sites. They assume that a construction site is only a temporary setup lasting for two to three years. In fact, the industry is a major source of urban air pollutants (Chan, 2000). The emission of CO₂ by buildings contributed to global warming and extreme weather change all over the world. The harvest of timber leads to the loss of natural forests. Other impacts of constructing a new building include: quarrying to provide aggregates, production of cement, and the wasteful use of water and the widespread use of toxic chemicals in materials (Kin-sun, 2004). In sum, these challenges are an impediment to full development of the construction industry in any economy. Thereby making any attempt to address it, a worthy course.

RESEARCH METHODS

The current study was descriptive in nature with a historical bias. Authors of research methods (Saunders 2016, Creswell 2014, Bryman 2012, and Walliman 2011) believe the time dimension in a research is important. Here, they argue, that the time dimension in research refers to the period over which research is conducted. Research can be done over a long time, repeating the research again after a certain period. Cross-sectional study is carried out only once (Cooper & Schindler, cited in Schoonraad, 2003). This study was across-sectional study, since the research was completed within a certain period – between June to December 2018. It's important to note also that in the literature section, secondary data was obtained from books, internet websites, and articles among others.

Data mining was employed as the overarching approach to analyze the data sets spanning five decades. In addition, multiple data collection methods were used comprising of: documents search, online digital repository reviews as well as interviews with subject matter experts in the academia and the industry. Creswell (2014) supports the use of multiple data collection method in a study as this enhances data triangulation and reliability.

Table II shows the sample size used in the current study. 63 No documents were collected with a theme on the performance of construction projects, 30 No documents were used as sample size from which data was collected hence representing a sample size of 47.6%. The documents were clustered into a 20-year period for easy trend analysis. The documents were picked through simple stratified random sampling technique.

TABLE II. DOCUMENTS SAMPLING FRAME

Documents reviewed	20- Year research Period			Total
	1963-1983	1984-2003	2004-2018	
Total documents	10	25	28	63
Sample Picked for analysis	5	12	13	30
% Sample size	50%	48%	46.4%	47.61%

Source: Author's findings, 2018

RESULTS AND DISCUSSION

Research Patterns and Profile

As shown in Table II and Table III, a total of 63No documents were found in literature with a theme 'Performance of construction Projects in Kenya'. The primary sources being: the online digital repository channels for universities and government departments. The primary sources were corroborated with additional sources such as documents search via the goggle search engines well as interviews with subject matter experts in the academia and the industry. The materials collected were further scrutinized for relevance and a total of 30No documents were used for analysis. In addition, and in order to establish performance patterns, the research period was clustered into three parts of 20 years each. A detailed account of the findings and the author's insights are discussed in the subsequent sub-chapters.

Projects Performance 1963-1983

From independence, the study findings captured in Table III, reveal that the performance of building projects during implementation were wanting. For example, the years 1967 to 1970 show a very poor performance in terms of contract sum overrun. Mbatha (1983) calculated the percentage of the contract sum overrun to the original contract sum. The contract sum overrun reached its peak in 1970 at 61.24% after increasing rapidly from -4.6% in 1967. The reason given for poor cost performance from 1967 to 1970 could be due to the economic and political growth of the country. This was the time after independence, the construction industry lagged behind due to the side effects of independence. The report by World Bank (1979) expounded on the causes of delay and cost overrun in government projects among them: inefficient technical/ economic appraisal, poor estimates by clients, lack of contract strategy, badly written conditions of contract, poor assessment and allocation of risks, inadequate tender evaluation, and lack of competency from the contractors and poor inter-ministerial communication and rigorous government procedures. The report recommended inter alia, a total reform on the implementation of construction projects.

Relatedly, Mbugua (1979) established that the problem of poor project implementation had manifested itself strongly in the construction industry. The paper gave insights into the solutions to address the epidemic. They included: staff incentives, co-ordination of ministries, and decentralization of government machinery to the districts to serve among other purposes the reduction of project delays. It is the viewpoint of the current study, and this paper, that the challenges during 1963-1983 appear exogenous of the construction industry. This was largely as a result of changing government policies which were not matched with corresponding changes in contract procedures because the government was settling operation-wise. Most importantly, the bureaucracy in the government offices has a share in the poor performance of construction projects.

TABLE III. STUDY FINDINGS ON CONSTRUCTION PROJECTS PERFORMANCE, 1963-2018:

Period	Author	Method used	Emphasis of Study/Key finding
1963-1983	Mbugua (1979)	Performance Review	The study established that the problem of poor project implementation has manifested itself strongly in the construction industry. The paper gave the insights into the solutions to address the epidemic; they include; staff incentives, co-ordination of ministries, decentralization of government machinery to the districts was meant to serve among other purposes the reduction of project delays.
	World Bank (1979)	Performance Review	The report by world bank (1979) expounded on the causes of delay and cost overrun in government projects among them; inefficient technical/ economic appraisal, poor estimates by clients, lack of contract strategy, badly written conditions of contract, poor assessment and allocation of risks, inadequate tender evaluation, lack of competency from the contractors and poor inter-ministerial communication and rigorous government procedures. The report recommended inter alia, a total reform on the implementation of construction projects.
	Harris (1976)	Comparative study	The study compared two tendering procedure namely competitive tendering and package dealing, in the comparison, time element of each procedure was analyzed and it was concluded that package dealer designed projects were more reliable. It was not possible to evaluate contract performance in the ministry of works since the procedures were predominantly open tendering. The study thus advocated for a review of the tendering procedures and approaches for faster delivery of building projects.
	Mbatha (1983)	Case Studies	The study calculated the percentage of the contract sum overrun to the original contract sum. The contract sum overrun reached its peak in 1970 at 61.24% after increasing rapidly from -4.6% in 1967. The years 1967 to 1970 show a very poor performance in terms of contract sum overrun. The reason given for poor cost performance from 1967 to 1970 could be due to the economic and political growth of the country. This was the time after independence as the locomotive of the economy, the construction industry lagged behind the industry suffered the side effects of independence.
	Mbatha (1986)	Case Study	A study done in Kenya for public building projects established that out of one hundred (100) projects, seventy three (73) experienced time overruns compared to thirty eight (38) out of one hundred (100), which suffered cost overruns.
	Kithinji (1988)	Questionnaire Survey	Established using the systems approach that the organization structure within which building projects are managed is not suitable for the tasks involved. The inappropriateness is largely as the result of lack of channels for speedy communication
	Nyaga (1989)	Questionnaire Survey	Variations in labor productivity on construction projects are a big concern in the performance of construction projects. The study established that human factors were more important determinants of labor productivity than technical factors. Generally, to improve the projects performance, emphasis should be given to management of labor productivity.
1984-2003	Talukhaba (1999)	Questionnaire Survey	Construction project delay is a widespread phenomenon in Kenya. Payments and architect's instructions accounted for 70.6% of variations in percentage of delay (Time Overruns). The study findings pointed to the problem areas in project implementation process hence need for structured project management for construction projects
	Gichunge (2000)	Questionnaire Survey	73.50 % of construction projects face challenges of variations hence a serious source of cost and time risks in building projects during the construction period. Poor quality workmanship was another performance challenge largely brought about by the use of defective materials and this occurs in 38.20% of projects. To address cost risks, time risks, cost overruns and time overruns the study recommended the revision of conditions of contract and refinement of prediction models for better management of projects.
	Kivaa (2000)	Questionnaire Survey	The study faulted the time estimation methods used. The estimation Methodologies in the construction industry are associated with several draw backs and therefore experience several problems. The Bar Chart and Critical Path model (CPM) assume a static project environment and therefore the time estimate derived is deterministic. The contingency time added to cater for uncertainty is based on subjective judgment. PERT on the other hand attempts to account for the effect of uncertainty by basing the activity time on three estimates using the probability theory

TABLE III. STUDY FINDINGS ON CONSTRUCTION PROJECTS PERFORMANCE, 1963-2018: (CONTINUED)

Period	Author	Method used	Emphasis of Study/Key finding
2004-2018	Kimani (2004)	Questionnaire Survey	The study investigated and established that cost and time overruns can be minimized by; design plans that minimize design changes during construction stage and ensuring adequate finance planning that limits the delay caused by lack of finance
	Abwunza (2006)	Questionnaire Survey	The study investigated and established that building cost performance is influenced by the quantity surveyors' perception of the risk importance of cost factors that include: extra work, design and specification changes coupled with extended or reduced contract period and delays in preparing detailed drawings. Delayed payments, late instructions, financial failure of contracting and defective materials were other risk factors identified. The study recommended the project team to place greater emphasis on all the 20 important risk factors identified in mitigating potential cost overruns in building contracts
	Seboru (2006)	Case Study	Established that road construction delays were rampant and are majorly caused by exogenous and endogenous factors these include; political interference, inflation, interest rates, design changes, inadequate planning and scheduling. The study recommended formation of an independent body of professionals to oversee road construction in Kenya.
	Mureithi (2006)	Questionnaire Survey	The study investigated and established that projects carried out using the traditional procurement methods performed worse in terms of adherence to programs having higher percentage time overrun of 56%. This is compared to projects that were carried out using the non-traditional procurement methods with a lower time overrun of 20%. On the other hand, adherence to budget plans, the cost overrun using the traditional procurement method was high (36%) compared to (20%) for contemporary procurement methods
	Masu (2006)	Questionnaire Survey	Resource-mix practices used by construction firms, accounted for 81.46% of the variances in construction projects performance. Finance resource and machine time combination accounted for 86.5% of the causes of poor performance in projects. Overall, inappropriate matching of construction resources contributed significantly to poor performance of construction projects.
	Waihenya (2011)	Questionnaire Survey	Cost overruns in construction projects continue frustrating the process of development in Kenya. The study established the causes of cost overruns in non-traditional building contracts. The causes include among others; cost of building materials, design changes, changes in finishes, hiring of extra tools during construction not anticipated. The adoption of non-traditional contracts was advocated in the study.
	Muchungu (2012)	Questionnaire Survey	The study established that despite high quality of training of consultants in the built industry in Kenya, construction projects do not meet their performance goals as would be expected. It emerged there is a strong correlation between human, social and motivational factors with project performance. Appreciation of employees is recommended, Ideal levels of reward and remuneration commensurate to effort of the employees should be set in an effort to foster performance.
	Munano (2012)	Questionnaire Survey	Construction Projects completion rate for public sector are too low and worrying. It was established that project completion rates for the government of Kenya for 4 years up to 2010/2011 financial years were 37.97%, 47.53%, 33.14% and 21.88% respectively hence an average completion rate of 35.60%. The study recommended special emphasis to preconstruction planning in an effort to improve the performance of construction projects
	Malala and Ndolo (2014)	Questionnaire Survey	88% of CDF Projects in Kikuyu Constituency were delayed as at 2014. A partly 12% were on schedule while no project (0%) was ahead of schedule. Overall, all CDF construction projects in this constituency were rated unsatisfactorily hence their performance wanting.
	Mbawi and Muchelule (2015)	Case Study	More than 50% of projects initiated by universities in Kenya are unsuccessfully implemented. The study sought to investigate the factors influencing the performance among Kenyan universities in Kisumu county. It was revealed that planning, management support, human capital, communication and monitoring & evaluation have a significant positive impact on construction project performance

TABLE III. STUDY FINDINGS ON CONSTRUCTION PROJECTS PERFORMANCE, 1963-2018: (CONTINUED)

Period	Author	Method used	Emphasis of Study/Key finding
	Gwaya (2015)	Questionnaire Survey	Ineffective monitoring and evaluation of construction projects is rampant, frequent delays, cost overruns, deficient quality and Inadequate safety are still prevalent in the construction process and execution of projects in Kenya. The study advocated for modeling of project management evaluation as an antidote to the challenges facing construction process and execution of projects in Kenya.
	Ong'ondo (2015)	Questionnaire Survey	Despite the wide uses of project control techniques in projects implementation, many projects were found failing. The study explored on the factors for effective project control process culminating into the development of Project Control Management (PCM) framework for construction projects in Kenya
	Atieno (2016)	Questionnaire Survey	Evaluated the factors affecting performance of road construction projects in arid and semi-arid areas in Kenya. It was established that 82.7% of variance in performance of road projects can be explained by contractor's competency, construction parities financial management, Construction Resources and conflicts. Study recommended thorough scrutiny of contractor's competency before project award, expedition of interim payment certificates as well as conducting peace initiatives
	Aduma and Kimutai (2018)	Questionnaire Survey	The study established that the risk management practices, legal risk management, construction risk and contract risk management were found to have inverse relationship with the construction project performance while design risk management had a positive one. The study called for a thorough design process, legal approvals and policy requirements adherence and proper planning to ensure all resources are available to foster efficiency in the performance of construction projects.

Projects Performance 1984- 2003

It emerged from the study findings that the period 1984-2003 recorded a high number of activities in the construction industry albeit with deplorable performance during execution. For example, a study done for public building projects established that out of one hundred (100) of the projects, seventy three (73) experienced time overruns compared to thirty eight (38) out of one hundred (100), which suffered cost overruns (Mbatha, 1986). Another study undertaken for both public and private building projects returned a similar finding (Talukhaba, 1988). The overall implication is that national resources are significantly wasted. According to (Gichunge, 2000) the most serious source of cost and time risks in building projects during the construction period is 'extra work' (technically termed as variations), which normally occurs in 73.50% of the building projects in the population whereas defective materials accounted for 38.20% for observed unacceptable quality work cases. There is evidence that construction projects performance in Kenya is inadequate. Time and Cost performance of projects in Kenya are poor to the extent that, over 70% of the projects initiated are likely to escalate in time with a magnitude of over 50%. Musa, 1999; Talukhaba, 1999; Karimi, 1998; Mwandali, 1996; Wachira, 1996; Mbatha, 1993; Gitagi, 1992; Magare, 1987; Talukhaba, 1988; Kithinji 1988; Bakuli, 1986; Mbaya, 1984;).

According to Talukhaba (1999), one of the contributing factors to poor construction project performance was the inadequacy in the standard form of contracts that were in use during this period. For example, the standard form of contract in use was first drafted in 1970 with the first revision coming through in 1991. The revision, however, did not take into account the changes occurring in the construction industry since 1970s. The revision only managed to

rationalize inefficiency in the construction process and transferred more risks inherent in construction to the disadvantaged parties, that is, the client and the contractor. Despite the universal need to recognize and involve project managers in the implementation of projects, the revision failed to put this fact into consideration. There is widespread inefficiency in the Kenyan construction industry Mbaya (1984), Mbatha (1986), Kithinji (1988), Khangati (1986), Mbeche and Mwandali (1996). In addition, the authors established that time and cost performance of construction projects in Kenya are poor to an extent that over 70% of projects initiated in Kenya are likely to escalate in time with a magnitude of over 50%. Similarly, over 50% of projects are likely to escalate in cost with a magnitude of over 20%.

During this period notable key projects that performed poorly include; The National Social Security (NSSF) Complex cost KSH 2.5B compared to the estimated cost of Ksh 600m, it took five years to complete as opposed to the original estimate of two years. The migori District Headquarters with the original contract sum of KSH 518m ended up costing KSH 1.5B. The seemingly poor performance in projects was a national concern, the Kanyakine hospital had been abandoned for five years (The daily Nation, April 26, 1992). Nyaga (1989) considered variations in labor productivity on construction projects as a big concern in the performance of construction projects. Consequently, he established that human factors were more important determinants of labor productivity than technical factors. Hence, to improve the projects performance, emphasis should be given to management of labor productivity. On the other hand, Kivaa (2000) believed, poor time performance in projects is attributed to faulty time estimation methods used. The study argued that the estimation Methodologies in the construction industry are associated with several draw backs and therefore experience several problems. Firstly, the Bar Chart and Critical Path model (CPM) assume a static project environment and therefore the time estimate derived is deterministic. Secondly, the contingency time added to cater for uncertainty is based on subjective judgment hence not scientific. PERT on the other hand attempts to account for the effect of uncertainty by basing the activity time on three estimates using the probability theory. All in all, and despite the scramble for solution, there is consensus among scholars that the performance of projects at implementation during this period was unsatisfactory.

Projects Performance, 2004- 2018

The advent of the new millennium came along with many challenges bedeviling the implementation of construction projects. Findings from literature (Table III) are replete with evidence that, although performance was not better the previous decades, it was comparatively the worst from 2004 to 2018. Mureithi (2006) established that projects carried out using the traditional procurement methods performed worse in terms of adherence to programs having higher percentage time overrun of 56%. This is compared to projects that were carried out using the non-traditional procurement methods with a lower time overrun of 20%. On the other hand, adherence to budget plans, the cost overrun using the traditional procurement method was high (36%) compared to (20%) for contemporary procurement methods. In addition, Masu (2006) established that resource mix practices used by construction firms, accounted for 81.46% of the variances in construction projects performance. Finance resource

and machine time combination accounted for 86.5% of the causes of poor performance in projects. Overall, inappropriate matching of construction resources contributed significantly to poor performance of construction projects. The latter recommended that efforts should be directed to the training of the key participants in construction resource management. Work studies on construction resources, application of resource optimization techniques, Just-in-time philosophy and project information management strategies should be embraced.

Relatedly, Munano (2012), observed that majority of projects undertaken for public sector are not completed on time. For example, project completion rates for the government of Kenya for 4 years up to 2010/2011 financial years were 37.97%, 47.53%, 33.14% and 21.88% respectively. This shows an average completion rate of 35.6%. Mbawi & Muchelule (2015), revealed the performance of projects implemented by public universities suffer cost challenges with over 50% of the initiated projects facing cost overruns. Furthermore, Malala and Ndolo (2014) revealed that 88% of CDF Projects in Kikuyu Constituency were delayed as at 2014. A partly 12% were on schedule while no project (0%) was ahead of schedule. Overall, all CDF construction projects in this constituency were rated unsatisfactorily hence rendering their performance wanting. This situation is repeated in many parts of the country. Elsewhere, Gwaya (2015) argues that time, quality and cost issues are still major problems in the construction industry and that addressing them requires a holistic approach via construction project management modeling.

Atieno (2016) evaluated the factors affecting performance of road construction projects in arid and semi-arid areas in Kenya. It was established that 82.7% of variance in performance of road projects was explained by contractor's competency, construction parities financial management, Construction Resources and conflicts. Aduma and Kimutai (2018) have established that the risk management practices, legal risk management, construction risk and contract risk management were found to have inverse relationship with the construction project performance while design risk management had a positive one. The study called for *inter alia*, a thorough design process, legal approvals and policy requirements adherence and proper planning to ensure all resources are available to foster efficiency in the performance of construction projects. Generally, despite the much research by various scholars, the performance challenges continue unabated.

Comparison of the Study Findings with Similar Studies

The findings from the current study when compared to similar studies in other countries epitomize similar challenges albeit with varying proportions. In Kenya, the findings in Table III reveal that 35-60% of projects initiated face cost overruns. In developed economies, cases of cost overrun in projects are not an exception. For example, in the United Kingdom, Olawale & Sun (2010) conducting a survey on cost overrun problems in construction projects stated that 41% of respondents experienced overrun on just less than 10% of their projects while 59% of respondents experience cost overrun on 10% or more of their projects. In Netherlands, Cantrell (2009) Investigating 87 projects (29 road projects, 28 rail projects and 30 fixed link projects) revealed that cost overrun was the common problem at an average of 10.3% of project cost. The study showed that the percentage of cost overrun in road projects was the highest with the rate of 18.5% followed by rail projects with 7.6% and finally fixed

link project with 4.5%. A similar study in Slovenia involving 92 traffic structures, established that that contracted construction price overrun was 51 % (Zujo et al., 2010).

In the developing countries, the current study findings show a similar trend. In Pakistan, Azhar et al. (2008) established that cost overrun was a common problem in construction projects. The minimum range of cost overrun experienced was found as near around the 10% of the total cost of the project. In large construction firms these overrun ranged up to about 40% while in medium size firms this percentage increased up to nearly about 60% of the project cost. In Uganda, Northern by-pass project in Kampala was overrun by more than 100% and a study of a total of 30 projects showed that 53% of the projects had cost overruns (Apolot et al., 2011).

Time overrun is severe in the construction industry of Kenya compared to developed and other developing countries. Findings in Table III established that on average 35-73% projects overrun their schedule. In other words, there is a high likelihood of time overrun in a project compared to cost overrun in Kenya. In Nigeria, out of 3,407 projects surveyed by Amu and Adesanya (2011) only 24 projects were completed on time, while 1517 were delayed and 1812 were abandoned. According to Memon (2013), Malaysian construction industry faces a chronic crisis of time overrun. A total of 359 projects studied, (301 new constructions while 58 refurbishment projects) The study found that only 18.2% of the public sector projects and 29.45% of private sector projects had 0% time deviation (no delays) while the average percentage of time overrun for other projects was 49.71%.

From the upshot, construction projects in Kenya generally perform poorly when compared to projects in the developed countries. In addition, the performance is similar comparatively to most of the developing countries, this confirms the earlier literature findings that performance is poorer in developing countries.

Implications of the Study Findings: Towards Efficiency Management Framework for Construction Projects in Kenya:

From the findings of this study, two cardinal issues of concern can be discerned for the construction industry of Kenya. Firstly, despite the wide research on the whole aspect of construction projects performance, the performance in Kenya is still poor spanning over five decades. Secondly, the findings problematize the issue of plurality of performance measurement regimes in the construction industry. Here, the study observed that no single construct exists to objectively measure the various facets of the 'health' of a project. The study posits that the two issues are intertwined and addressing them requires a paradigm shift.

A number of researchers have advocated for a wider focus of construction project performance. Some researchers (Billy et al., 2006; Zuo, 2011) have argued that it is important to incorporate safety aspects of the project in performance evaluation because the construction industry is the most unsafe industry due to its high rate of fatalities. According to PMBOK 5th edition (2013) and Construction Extension to PMBOK 3rd edition (2007), knowledge areas needed to successfully manage a project are well delineated. This implies that the success of a project goes beyond the Iron Triangle criterion commonly used. In addressing this issue, Khosravi & Afshari, (2011), formulated a success measurement model for construction projects in Singapore. The aim was to develop a

success measurement model for construction projects to fulfill two main objectives; firstly, to provide a project success index for finished projects in order to compare them with each other and secondly to establish a benchmark for future improvements in the success of construction projects execution. The model's output is a project success index which is calculated based on five project success criteria. According to them, the project success index will be calculated by using the following equation (Eq. (1)):

$$PSI = 0.209PTP + 0.233PCP + 0.199PQP + 0.173PHP + 0.186PCP \quad \text{Eq. (1)}$$

Where: PSI: Project Success Index; PTP: Project time performance; PCP: Project cost performance PQP: Project quality performance, PHP Project Health and Safety Performance and PCP is Project Clients' Performance. All five success criteria should be measured based on an approach applied by each project-based organizations. Contributing to this model, Gwaya (2015) propounds an argument that the Clients' contribution to the performance of construction projects can be set at 18% while the rest of the team members contribute to 82%. This therefore implies success of a project in this framework is a measure of the shared perspective among the project participants hence working together harmoniously without conflict will foster the success of the project.

Gwaya (2015) later conceptualized the relationship of the variables comprising the traditional measures of project cost, project quality and project time, which were observed to account for only 57% of projects' performance. Another set of three variables - human resource management, scope management, and project process performance management - was added, and was observed to account for 42% of the performance of projects. The data analysis and synthesis yielded a project management evaluation model represented in a mathematical equation shown in equation 5.2;

$$Pe = 82\% \text{ PMECs \& Cr} + 18\% \text{ PMECt} + e \quad \text{Eq. (2)}$$

Where:-Pe is the overall project execution efficiency while PMECs & Cr is the consultant and contractor contribution component and PMECt represents the Client's contribution to project performance. An error, e which is a function of the operating environment, political situation and any other external factors that can influence the project was included.

From the foregoing, the models have largely attempted to operationalize the PMBOK (2013) management areas and omitted technical matters which have been observed to have a bearing in the poor performance of projects in the current study. For example, part- findings in Table III aver that causes of poor cost and time performance include design changes, change of ground conditions, materials and technology used (Kimani 2004; Masu 2006). These factors are largely technical in nature as opposed to matters of management function. It's the viewpoint of this study therefore that efficiency in the execution of projects in Kenya should be evaluated on two fronts; the project management efficiency and the technical efficiency. The interaction between the two constructs and their inherent variables should be investigated to yield a single index for purpose performance efficiency monitoring in projects.

A conceptual performance efficiency monitoring framework has been deduced in the current study and is shown in Figure I.

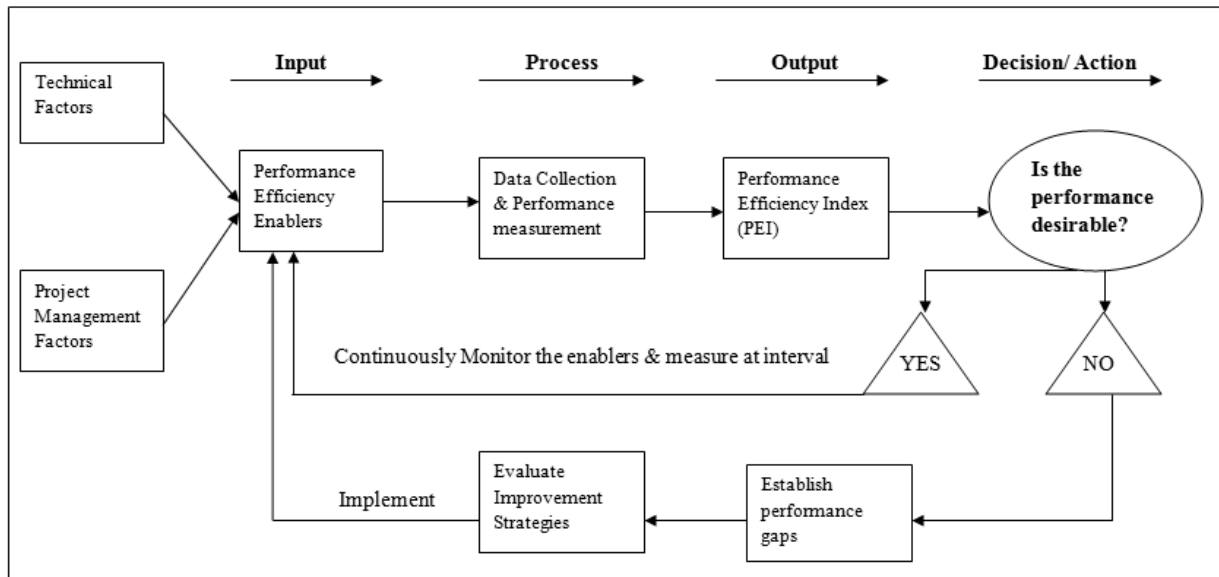


FIGURE I. PERFORMANCE EFFICIENCY MANAGEMENT CONCEPTUAL FRAMEWORK; SOURCE, AUTHOR'S OWN CONSTRUCT, 2018

CONCLUSION AND RECOMMENDATIONS

This study aimed to appraise the performance of construction projects during implementation in Kenya, by way of literature. This was informed by undesirable project performance results being reported in the industry. Poor project performance has been noted as the bane in the Kenyan construction industry. In this regard, the authors explored the historical research information since independence up to date (1963-2018) to: firstly, understand the performance patterns over the years as established by the previous scholars and secondly, identify gaps in the performance management with a view to bridge the gaps on account of insights from the findings. The primary sources being: the online digital repository channels for universities and government departments. The primary sources were corroborated with additional sources such as documents search via the goggle search engines well as interviews with subject matter experts in the academia and the industry. The materials collected were further scrutinized for relevance and a total of 30No documents were used for analysis. In addition, and in order to establish performance patterns, the research period was clustered into three parts of 20 years each. In sum, the study established that literature is replete with evidence on the myriad challenges facing the execution of projects. The overarching theme advanced in the various studies is that the performance of construction projects during implementation is poor and has assumed a chronic trajectory spanning over five decades. On average, the findings reveal that 35-60% of projects initiated in Kenya face cost overruns while time overrun is most severe with 35-73%

projects overrunning their schedule. Simply put, there is a high likelihood of time overruns in a project compared to cost overruns in the construction industry of Kenya. The findings from the current study when compared to similar studies in other countries epitomize similar challenges albeit in varying proportions. In this regards, it was observed that construction projects in Kenya generally perform poorly when compared to projects in developed countries. However, the performance is similar comparatively to most of the developing countries pointing to severe project implementation challenges in developing countries.

Furthermore, the findings problematize the issue of plurality of performance measurement regimes for projects in the construction industry. Here, the study observed that no single construct exists to objectively measure the various facets of the 'health' of a project. The implication of this finding is that the performance measurement as done and presented throughout the literature is not eclectic. Ideally, the performance of a project should be exhaustive on the account of known basis and framework. This was found lacking in the current study. As a panacea, the study reviewed the principles of PMBOK, Iron triangle performance criterion as well as recent models suggested by authors in literature. A synthesis was performed on account of the findings established in the current study. To enhance the performance of projects, the study established that focus should be given to Project management efficiency and technical efficiency during projects implementation than it's presently done. Consequently, a conceptual performance efficiency management framework is deduced for the construction industry of Kenya.

In conclusion, this paper contributes to the body of knowledge by examining the performance patterns in the construction industry of Kenya over fifty years while at the same time identifying the bottlenecks inherent in the execution of projects. Most importantly, the conceptual performance efficiency framework derived in the current study presents a paradigm shift in the monitoring and evaluation of construction projects. The study yields further areas of research in the management of projects. In this regard, the study recommends an in-depth analysis on the interaction of efficiency enablers, computations of the performance efficiency index (PEI) as well as further research on the proposed performance efficiency management framework and its integration in the management of construction projects.

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