CONTRACTORS' CAPACITY EVALUATION IN TENDER AWARD, PROCESS MONITORING AND PERFORMANCE OF ROAD CONSTRUCTION INFRASTRUCTURAL PROJECTS IN NAIROBI COUNTY, KENYA

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ABSTRACT

Kenya has elaborate procedures for vetting contractors even though there is still questionable performance of most of road projects as seen in the cost overruns, delays in completion and compromised quality. In this regard, the selection of the right contractor for road construction infrastructural project is deemed a remedy for poor road infrastructure project performance. The purposeof the study was toestablish how contractors' capacityevaluation in tender award, and process monitoring influences performance of road construction infrastructural projects in Nairobi County, Kenya. The first objective was to establishthe influence offinancial ability of contractorson performance of road construction infrastructural projects in Nairobi County, Kenya. The second objectivewas to establishthe influence of technical ability of contractors on performance of road construction infrastructural projects in Nairobi County, Kenya. Ththird objective wasto establish the influenceof management ability ofcontractors on performance ofroad construction infrastructural projects in Nairobi, Kenya. The fourthobjective was to determinethe influence of contractors'safety record on performance of road construction infrastructural projects inNairobi, Kenya. Thefifth objective was to establish the influence of combined contractors' capacity evaluation in tender award onperformance of roadconstruction infrastructural projects inNairobi, Kenya. Th sixth objectivewas to establish themoderating influence ofprocess monitoring on the relationshipbetween contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in NairobiKenya. Thetudy used descriptivesurvey research design and co rrelational research design, and a ta rget popul ation of 460 comprising all publicservice vehicle (matatu) driversplying eastern bypass, and outer-ringroads in Nairobi, as well asthe engineers from theconstruction firms in NairobiCounty. A sample of 210 was drawn from both categories of respondents, from whom 153 respondents successfullyparticipated in the studyrepresenting 72.8%uestionnaire return. Stratified sampling wasused to divide respondentsinto homogeneous groups. Als, propoiionate sampling and simple random techniques were employed. Pilot study wasconducted to improve on the validity andreliability of thestruments wherebya pre-testwas done and a Cronbalch'sAlpha coeffiecient was applied which was found to be above 0.7. Questionnaires and interview schedules were adminstered to contractors and drivers respectively to collect data. Quantitative data was presented using means and standard deviations. Simple, multiple, and hierarchical regression models were used to test null hypotheses at a significance level of 0.05, and the results for the six hypotheses indicated that apart from second and third hypotheses, the rest were all rejected. Results were: t he first hypothesis, showed$R= 0.669$, $R^2= 0.447$, $\beta =0.373$, $t =11.056$, $F (1,151)=122.235$, $p= 0.000<0.05$; second hypothesis, $R=0.157$, $R^2=0.025$, $\beta=0.124$, $t=1.956$, $F(1,151)=3.827$, $p=0.052>0.05$; third hypothesis, $R^2=0.003$, $\beta=0.049$, $t=0.701$, $F(1,151)=0.491$, $p= 0.485> 0.05$; fourthhypothesis, $R=0.657$, $R^2=0.431$, $\beta=0.359$, $t=10.703$, $F (1,151)=114.558$, $p=0.000< 0.05$, fifth hypothesis, in overall $R=0.826$, adjusted $R^2=0.673$, $F(4,148)=79.226$, $p=0.000,0.05$; and finally, thesixth hypothesis results presented showed that in step 1: $R=0.826$, adjusted $R^2=0.673$, $F(4,148)=79.226$, $p=0.000<0.05$ henceF-value statisti cally significant and in step 2: $R=0.837$,adjusted $R^2=0.690$, $F(5,147)=68.520$, $p=0.000<0.05$ hence F-valuestatistically significant. It can therefore be concluded that process monitoring significantly moderates the relationship between combined factors of contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in Nairobi County, Kenya. The study, however, recommends that further research should be done on building construction projects since that was not within the scope of the current study. It also recommends that further studies should focus on rural contexts since the current focus was on Nairobi County,

which is an urban setting. The study further suggests that the influence of other moderating variable such as construction firm characteristics should also be examined by other researchers. The study is significant since it adds value to knowledge exposition in respect to project management especially during evalution process for selecting effective contractors intended to contribute to per formance o f road construc tion infrastruc tural project s. Hence, special attention should be paid to contractors' safety record to assess their ability to deliver roads that will not jeopardize the performance of the roads once they have been handed over for public use. Similarly, the Dominotheory of accidents causation should now be incorporated in measuring performance in the post delivery stage and not only for utilization at the construction or project implementation stage. Further, the study is significant in that process monitoring as a moderating variable has been used here for the first time to show the strength and relationshion between the contractors' capacity evaluation and performance of road construction infrastructural projects. It is evident that process monitoring is still weak within construction industry but its full institutionalizing can leadto an increase in performa nce ofroad s. Lastly, The study has laid sufficient ground to avoid blaming the technical and management abilities of contractors and strongly adduced performance of roads in terms of contractors' financial and safety record abilities. There istherefore need to improve on these two crucial aspects to so lve perfor mance issues on ourroads.

CHAPT ER O NE

INTROD UCTION

1.1 Background of t he Study

Thegiant global economies have excelled through infrastructure. Many countries in African continent have realized this importance and hence huge budgetary allocation to infrastructural projects. According to Wasike (2001), physical infrastructure development as well as maintenance are fundamental to the rapid growth of economic development as well as the reduction of poverty. Therefore, costs of production, creation of employment, investment and market access are dependent upon infrastructure quality, and more so transport. Chan, Scott and Chan (2004) explain that included within infrastructure are the requisite capital for the economic services' production from utilities, including telecommunication, water, as well as electricity. Another key element of infrastructure is transport entailing seaports, airports, bridges, and roads; all of which are central to the promotion of activities of economic nature. Islam (2006) however posits that the construction tale, somehow, finds its origins from thefoundations of humanity; with infrastructural development including sanitation, power supply, water supply and roads often considered critical drivers of quality of life.

The least and middle level developing countries, just like the developed counterparts, are doing their best to ensure they reach superior degree in terms of economic and infrastructural advancement. Some growth has been reported in these countries. As Rhodes (2015) notes, UK's construction industry in the year two thousand and four, had economic output contribution worth one hundred and three billion Sterling Pounds, six point five percent of the aggregate two point one million jobs. In addition, in the year two thousand and fifteen, six point two percent of the aggregate population of the UK was actively in the construction industry. According to statistics released by Deloitte East Africa entitled "Africa Construction Trends 2015", Kenya still maintains the leading according to the scale of construction projects in East African region, with Ethiopia following closely (Mwiti, 2016).

These statistics indicate that twenty percent of all construction projects in Africa are from the East African region, corresponding to fifteen percent in dollar value at 57 billion US dollars in the year two thousand and fifteen; which represents marginal reduction from the sixty point seven billion US dollars in the previous year (Mwiti, 2016).

The Standard Gauge Railway (SGR) project by Kenya has been ranked the fourth most expensive project in the region; consuming up to three point eight billion US dollars. Tanzania's Bagamoyo port tops the rank at a cost of eleven billion US dollars (Mwiti, 2016). Atieno and Muturi (2016) argue that inappropriate infrastructure emergedunder the Econo micRecovery Strateg y (ERS) fo rWealth an d Emp loyment Creation of the period 2003-07; it was identified as a key limit to the ease of doing business. Moreover, Kenyan Vision 2030 acknowledges infrastructure as significant beacon for sustainable development as enshrined in the economic pillar. Zenabu and Getachew (2015) assert that the various stakeholders often consider construction project completion within budget as a major criterion for project success.

Rapid economic development coupled with an upsurge in the degree of motorization has lately shaped the dynamics of urban transport system in Kenya. An appraisal report by African Development Fund (2013) stated that the stock of transport infrastructure in Nairobi is lagging the prevailing demand as demonstrated by the 2006-2025Ma ster Plan f orUrba nTransp ortin then airo biMetrop olitanArea. It was noted byOnyango, Bwisaan d Orwa (2017)that inorde r to release economic ospe rity and well beingin a deve loping countrylike Ken ya, it isparamount that t he focus should be on inf rastructurepro ,jects. According to the Kenyan Vision 2030, among the significant determinants of sustainable economic advancement is the infrastructure sector. It further articulates that this is particularly the case for six major sectors of the economy, namely: business process outsourcing, tourism, financial services, manufacturing, agriculture and livestock, as well as the wholesale and retail businesses (Republic of Kenya, 2010).

The said blue print acknowledges the vitality of infrastructural development to the social as well as economic transformation. Accordingly, the sector is a major inspiration to the country with international standard modern metropolitan cities, municipalities and towns. Contextually, the current study focuses on the Eastern Bypass and the Outer-Ring roads. Started in January 2011 and completed in May 2012, the Eastern Bypass project in Nairobi joins Mombasa road at the Cabanas interchange. It runs through Pipeline as well as Utawala Estates via Kangundo Road. It then proceeds to the Thika Super Highway which is equally recent. This part of the road is 39km in length, made of Asphalt Concrete pavement and classified B class type of road (Kimani, 2015). The bypass has two lanes, it is a two-way single carriageway, each 9 m wide, with an open channel earth surface drain on either side. Its main objective was to assist ease the traffic congestion along Mombasa Road, via Uhuru Highway and into Waiyaki Way.

Approximately 13Km in length with a 2-lane carriageway, the Outer–Ring road is important for the urban transport system in Nairobi. The extent of service was originally low with average journey speed of between 12 and 15kmph. Majority of the port of Mombasa bound freight traffic from Thika Road as well as the Public Service Vehi cles (PSVs) use thisroad fromthe ind ustrial se t-up s in t hearea. TheGo vernment of Kenya, thr ough KU RA, improvedthe road to facilitate easy traffic flow as well as make traffic moveme ntonflations wi th keycorridors such asNairobi – the Eastern Bypass, Thika Highway, and Nairobi – Mombasa Highway better. The Outer-Ring road links Mombasa Road (A109) and Thika Roadd (A2) trunk roads (African Development Fund, 2013). It comm. encesat the jun ctionoff GSUalong Thi k road andtermina tesat the Eas tern by pass road. Ittraverses the industrial set-ups from GSU to Mathare River Crossing, at Jogoo Road and Out ering J unc tion up to Ngong River and after Ta ssiaEstate. Commer cialbanks, fu el stations,retailsoutlets, residential estates aswellas mar ket centersare the majorstablishments along this road, witht he highestdensity exper ienced atDon holm, Umoja, Kariobangi, Huruma, and Dandora estates.

These mega public sector construction (PSC) projects require competent contractors for effective and efficient performance. The ability to select the appropriate contractor is pivotal to the sector and can heal the problem of compromised project performance

such as delayed completion, poor quality and cost overruns. Among the many causes of economic stagnation and bottlenecks to achievement of the aspirations of Vision 2030 are the cost overruns (Nyandika & Ngugi, 2014). Others such as Rahman, Memon and Karim (2013) posit that in Malaysia, three most significant impactful contributors to cost overrun or material cost fluctuations are challenges regarding cash flow management, contractors' financial difficulties, as well as inappropriate supervision and site management. Performance of construction projects is faced with multiple inconsistencies, and that the causes of mediocre performance are yet to be overtly ascertained (Obare, Kyalo, Mulwa & Mbugua, 2017).

Lack of professionalism, inexperienced personnel, corruption, and poor skill-sets are the major problems identified by Zuofa and Ochieng (2017) as determinants of project failures in the context of Nigeria. Others such as Seboru, Mulwa, Kyalo & Rambo (2016) argue that concerns dealing in road construction ought to have suitable policies in regard to the requisite material quantity determination in a bid to foster superior road construction project performance. Therefore, contractors' capacity evaluation in tender award plays a major and a significant role in construction industry. According to Rao, Kumar and Kumar (2016) assert that the construction industry has been ineffective in delivering outcomes such as cost as well as time overruns, substandard quality andpro ductivity, andsub sequent customerdissa tisfaction. Acco rdingto Ma rti andO'Brien (2005) qu alitycontract awa rdinghould be observed in the sense that the contract award mechanism need to focus on and accounts for quality and ability, not just "least cost." However, Rao, Kumar and Kumar (2016) stillinsist that to adjust success chances in construction projects, choosing a suitable contractor is among the major assessments to be taken by the clients.

Further, Rao, Kumar and Kumar (2016) posit that a careful contractor selection considering set criteria such as experiences, attitudes and competences can lower cost as well as time overruns, simultaneously improving the work quality and as well as environment. According to these authors, contractor selection, normally done through tendering in construction industry, consumes longer time and there are a few standard procedures to be followed (Rao, Kumar & Kumar, 2016). In view of Palaneeswaran and Kumaraswamy (2001) the tendering process, which begins with prequalifying

contractors, is vital in identifying qualified contractors based on a client's predetermined risk and failure minimization criteria as well as to boost selected contractors' levels of performance**.** In this regard, Ologunagba and Akinmusire (2016) conducted a study on the prequalification criteria for contractors to the project performance of civil engineering projects, with respect to time dimension. The study determined that contractors' prequalification criterion had no adequate capacity to yield anticipated outcome. This might mean that there is need to combine several criteria to reach a decision on who qualifies for the road construction works.

1.1.1 Per formance of RoadConstruction Infrastru ctural Projects

Inpracti ce the word "performance "is multidimensional. Therefore, it entails key performance indicators (KPIs), whose origins are traceable to Australia, and which implies the specified road network contracts' performance; measures of performance, which are its conceptualization according to the Transport Association of Canada's (TAC) survey of Canadian Road Networks; performance indicators as theyare us edin theEuro peanHarmoni zationon Perf ormance In dicators (Haas, Felio, Lounis & Falls, 2009). Theterminologies: perf ormance indi cators; keyperformance indicators; and performance measures have fondly as well as interchangeably been u sedin th e r oad constru ctionsector.

The re iswide lite rature onto whatconstit uteproject suc ess. Some claim that the success of construction project is determined by time-performance, budget-performance, and quality standard-performance (Omran, Abdalrahman, & Pakir, 2012). There have been substantive arguments on performance measurement as noted by Neely (1999) who describes the research into performance measurement as a revolution, he notes that 3,615 article have been published and a new book on the subject was published in 1996. Scholars such as Bassioni, Price and Hassan (2004) assert that construction companies have so far implemented some performance measurement frameworks, such as EFQM excellence model, KPI, and the Balanced Scorecard. Each of these frameworks evaluates performance measurement from different perspective that either complement each other or even overlap with each other. These frameworks point out significant variables to consider in measurement of project performance. Theproj ectperform anceof roadworks can be measured on time

lyc ompl etionof theroad wit hinthe sco pe,cost, andat the appropriatelevel of perf ormance, asdet ermined by theconsumer, end- userconsu mmationwith the pro jectand the pro jec utility (Ogweno, Muturi & Rambo, 2016).

This is in tandem with the assertions by Shen har (1997) thatprojectsuc cesscan be sepa rated intofour ele ments:customerimpact, projectefficie ncy, bus iness accomplishment andpreparation forfu ture, ho wever, Sa deh, Dvir and Shenhar (2000) who outline five dimensions: user-advantage, developing firm benefits, meetingthe desi gngoals, bene fit to thenational infra structureand de fense. Obare et.al (2016) focused their study on the project control framework, diversity of the projectte amt rain ing and the ruralroads' constru ctionpro jectper formance inKe nya: the specificdimensions in this regard included timely, budgetary and quality completion of projects. Other dimensions under focus in this regard were customer, and project team satisfaction. The fundamental criteria forperformance ofconstr uction projectsa cco rding to Thomas, Palaneeswarm and Kumaraswamy (2002) are: work progress; qua litystandards; he althand safet y; fis cal stability; asset utilization; as well as the quality of relationship with consultants, clients, and subcontractors. Other criteria according to the framework are claim and contractual disputes, as well as reputation and subcontracting levels.

The terminology "performance" is often used in economics, engineering, and other disciplines. However, it has both general and specific dimensions. From the latter perspective, and more so in the road construction context, the concept ought to be measurable. This is because it is very necessary for the assessment of prevailing and expected road infrastructure outlook, in addition to the institutional service efficiency as well as provision of safety to the ultimate users. It is also critical for cost-effectiveness, productivity, environmental conservation, investment preservation and related functions (Haas et al., 2009). Rao, Kumar and Kumar (2016), on the other hand, summarized fifteen performance assessment conditions that covered contracting company attributes; potential and past performances, experience record, fiscal stability as well as project-specific criteria, contractor evaluation considerations.

These main contractor selection or evaluation criteria are further broken down to sub-criteria as follows (Rao, Kumar & Kumar, 2016): firstly, the attributes of the contracting concern include age (imputing "experience") and contractor's firm registration. Others are experience, implying past record of undertaking projects of similar type and size; and contractor's past performance would be explanatory of the workqu alityin pre viouslycomp letedpro jects, time-perfor mance (adherence toche dule in prev iouswork). The other factors include any case of blacklisting in prior projects, as well as the quality of service within the defect-liability window period, as well as contractor' fiscal capacity assesses the contractor based on prevailing commitments as well as turnover; moreover, the contractor's potential performance which seeks to assess him/her based on the requisite asset availability, and existing workload.

1.1.2 Contractors' Capacity Evaluation in Tender Award

Contractors' capacity evaluation in tender award for this study is limited to the prequalification and bidding processes. Rashvand, Majid, Baniahmadia and Ghavamirad (2015) point out that the choice of an appropriate service provider for a construction project is among the fundamental decisions confronting a client for the project development. This assertion is in tandem with Chiang, Yu and Luarn, (2016) who claim that project owners should select contractors with capability to meet quality expectations, cost, and time. Dwarika and Tiwari (2014) on the other hand observe that many countries currently use bid assessment and contractor pre-qualification techniques, and this whole process entails the development and broad assessment of requisite as well as suitable decision criteria to adjudge the overall contractors' suitability.

This selection of a contractor is most relevant since, service providers might fail to fulfil contractual obligations; thus, pre-qualification of contractors is an important stage especially at the beginning of a project. The selection of construction contractor in general contains two stages namely prequalification and bid evaluations (Trivedi, Pandey & Bhadoria, 2011). Bid evaluation as well as contractor pre-qualification decisions consist of the analysis of three main elements: (1) contractors' overall information (2) prequalification yardstick, and (3) bid evaluation benchmark (Hatush

& Skitmore, 1997). Pre-qualification is a procedure to examine and gauge the competency and skills of contractors to successfully complete a project if it is given to them. During the pre-qualification stage, service providers are invited to apply for a project, and they are normally evaluated based on a pre-determined criterion that is utilized to short-list them.

Conversely, during the bid evaluation stage, the contractors who are shortlisted during the pre-qualification stage are, once again, invited for further scrutiny. The capacity of each applicant was compared with the predefined sets of minimum values. Researchers in earlier studies have shed more light on this process (Zedan & Skitmore, 1994; Russell & Skibniewski, 1988). Pre-qualification avails to a client, a list of contractors who are regularly invited to tender. This approach is the most popular among nations, and it is from the said list that variaus criterion types are used to assess the aggregate contractor suitability (Hatush & Skitmore, 1997).

According toHatush andSk itmore (1997), the proce durefor the evaluation of tender bid submissions by prequalified contractors is called bid evaluation. Herbsman and Ellis (1992), for instance, suggested amulti parametersystem for the evaluation of bids. Accordingto this framework, bothprimary and auxiliary criteria ought to be considered in the process, the primary factors are the bid quantity; execution time; as well as the quality of prior work. Over and above the foregoing basic parameters, secondary factors too ought to be considered.

1.1.2.1 Financial Ability of Contractors

Large-scale constructionis likelytobe affectedby finances and hence poor performance. Berman and Bianchi (2005) found that banks could facilitate the acquisition of other loans because of contractor’s quality image and good reputation in the financial markets. Awards of major construction contracts in developing countries are skewed in favor of foreign counterparts against local contractors since the foreign firms are considered more technically and managerially advanced and well-organized in funds mobilization including competence.

In comparison with this, local contractors have over the years had challenges related to inadequate working capital, mediocre project performance in light of adhering to the deadlines for completion, substandard quality of work as well as management of capital which has in many cases caused bankruptcy and even mid-term project abandonment. In other words, majority of local contractors usually do not complete construction contracts within initial contract sums and hardly within scheduled completion times. Ogbebor (2002) and Akintude (2003) in their studies in the Nigerian construction industry confirmed that indigenous construction companies have challenges of under-capitalization. Similarly, Asinza, Kanda, Muchelule and Mbithi (2016) wrote that inadequate funds have a relationship with other factors such as machinery, labour and material acquisition. Inadequate funds hinder the contractor from employing skilled labour and acquire materials of the right quality and quantity. Moreover, if funds are unavailable, contractors might not procure good quality machinery.

1.1.2.2 Technical Ability of Contractors

Delivery of a quality products in construction depends on many factorsa ndone crucial factor thatcontri butesto thatis the technical abilityofthe con tractor. Omran, Abdalrahman and Pakir (2012) argue that project managers obtain diverse knowledge and skill set through experiences throughout their working life. The authors note that lack of knowledge and cognitive skills in many projects established within Nairobi County hinder the decision making and it is of imperative for the project organization as well as management to be properly organized and operated so as to limit the cost estimate risks. Adequate road drainage system should be incorporated in any road construction design to safeguard the road fabrics (Emeasoba & Ogbuefi, 2013).

1.1.2.3 Management Ability of Contractors

Management of construction works requires dedicated managers. Abiodun, Segbenu and Oluseye (2017) pointed out that to bolster the improvement of contractors' performance in light of construction projects, proper planning, suitable leadership as well as communication ought to be upped. Management is highly associated with contractor performance. Aje, Odusami and Ogunsemi (2009) state that management capacity is a primary criterion for assessing contractors at the prequalification as well

as tender assessment stage. Hence, haphazard planning as well as scheduling have a potential for mediocre performance by a contractor. If, for instance, certain design associated issues occur, then fast decision ought to be taken by top management to adjust contractor performance. Also, miscalculated coordination issues leads suboptimal performance of the contractor. Finally, efficient, effective, and economical asset management by a contractor has a potential to impact his performance favorably.

1.1.2.4 Contractors' Safety Record

Safety in construction has been of focus so much during implementation stage ignoring the outcome in the post-delivery stage. According to Australian Transport Safety Bureau (ATSB) safety report, integrating systems for safety into the ordinary commercial operations has no indications of the ability for accident alleviation and risk management (Australian Government, 2012). The International Finance Corporation (IFC, 2017) notes that the contractors should be asked to provide details including past Environmental, Health and Safety (EHS) performance; status of Environmental and So cialManagement System (ESMS); number and qualifications of Environmental, Social, Health and Safety (ESHS) personnel; and last but not least is the occupational safety and health procedures and controls.

Documentation quantity ndlevel of informationand detail thatar erequest edto contractors shall be commensurateto the scope ofwork an dother specificfeatures that theco ntractoris being pre qualifiedaga inst. This is deemed important not only to ensure safety standards are adhered to during construction phase but also to contribute to future safety expected during operational phase. In most cases, safety is normally not keenly implemented. For example, Diugwu, Baba and Egila (2012) revealed that like in several developing economies, Nigerian statutory provisions, with capacity to ensure the assumption and operationalization of systems for safety and health management by concerns, appears to be deficient. This phenomenon leads to inadequate attentiveness to critical safety and health matters among construction workers in Nigeria. In addition, concerns appear incapable or unwilling to offer sufficient attentiveness to safety and health management. As a result, the sum total of safety and health standards, operational capacity and corporate reputation of the construction industry in Nigeria have been affected.

The continuous evaluation of project execution in regard to thedesign sche dules, andth e utilizationof infrastruc ture, inputs, aswell as servi ces by the bene ficiaries ofproject, is called “project monitoring”. For example, Ogendi, Odero, Mitullah and Khayesi (2013) concluded that pedestrian safety ought to be of central attention in any road safety effort in Nairobi City County. Accordingly, planners of urban road safety should embrace prevailing cost-effective responses to assure the pedestrian safety, including area-wide calming of traffic to control the motor vehicle speeds 30 km/h, provision of pedestrian sidewalks, residential area traffic calming, as well as the strict operationalization of traffic rules.

Additionally, Greenfield and Morgan (2014) posited thatbe foreeng aginga contractor in cons tructionwork, the contractma nagerwould ne ed to be satisfied, bothabo utthe compet enceof the contractor to carryout thework safely, and their owncompetence - that is, knowledge andexperience - to reach a soundjudgement about the competence of a contractor. Arrangements willneed to be put inlace with a maincontractor for the assessment andmanagement ofany sub-contractors andthe princi plesset out in this gui dance maybe used. Austraulian Safety Transport Bureau therefore points out that having a safety management systems in place may produce the follwoing (Australian Government, 2012): incidents and accidents alleviation; reduction in overt and covert costs; recognition of safety need by travelling pedestrian; reduction in insurance premiums; as well as evidence of due diligence in investigations relating to legal or regulatory safety.

1.1.3 Process Monitoring

The urgency of having a monitoring system in place for construction projects especially the road construction infrastructuralproject isto ensure quality interms of performance. Monitoring is also necessary to improve on knowledge transfer and learning for future projects. Onatere, Nwagboso and Georgakis (2014) define monitoring as, “[a] stage [that] entails the data gathering to ascertain progress according to targets. Formal reporting of proof facilitates the matching of expenditure and outputs to measure successful delivery and the meeting of milestones. Quiroz (2005) asserts that a properly maintained paved road ought to stay for a period of 10 to 15 years preceding a resurface, even though inadequate maintenance can lead to deterioration within 5 years.

Quiroz, therefore, proposed five steps to aid in conducting monitoring in quality manner, these include (Quiroz, 2005): self-control framework by the contractor; interval inspections; both formal and informal inspections by supervisors and project managers; as well as the maintenance of a record book to trail the road users' comments or compliments. By so doing, maintenance work quality can be assured. In order to realize the desired outcome of projects, sufficient systems, processes and procedures guided by enabling laws, alongside proper enforcement and monitoring need to be put in place (Quiroz, 2005). Stufflebeam and Shinkfield (2007) and Chikati (2009) affirm that process monitoring should be regularly done through gathering and processing of vital project information to make sense on how the project is being run or implemented. In view of International Federation of Red Cross (IFRC), process monitoring involves tracking activities and it works in tandem with compliance monitoring (IFRC, 2011):

> "Process (activity) monitoringtracks the use of inputs and resources, the progress of activities andthe delivery of outputs. It examines how activities aredelivered – the efficiency in time and resources…. Itis often conducted in conjunctionwith compliance monitoring, [whereby it] ensures compliancewith donor regulations and expected results, grant andcontract requirements, localgovernmental regulations and laws, and ethicalstandards…"IFRC (2011)

Evaluation of a program entails measuring the process, the needs, inputs and outcomes (O'Sullivan, 2004). Program or project process monitoring involves methodical and incessant documentation of key program's or project's aspects. According to Rossi, Lipsey and Freeman (2004), these key aspects assess whether program is performing according to appropriate standards or as intended.

There are indicators to whether a program is performing well or not and this is measured through a methodical and incessant monitoring of certain process' aspects related to a program. This allows for continuous assessment that gives way for frequent feedback on program's performance, which is requisite in facilitating effective management of the program. From management point of view, process monitoring aims to find out how the program is being implemented and also putting in place corrective actions or measures where it is deemed necessary. This is important

at the piloting stage of the program because it offers an opportunity to deal with unexpected problems. This kind of monitoring can also be done in ongoing programs or projects such as road construction projects to get information about its performance, and to determine if the target population benefits from the project or not (Rossi, Lipsey & Freeman, 2004).

Monitoring and Evaluation (M&E) should be considered as a determinant in successful completion of the roads (Hassan, 2013). He goesf urther to state that Monitoring hasa critical role in minimization andprevention of time and cost overruns hence requiredqua lityst andards are attainedduring projectimple mentation.

Kamau and Mohamed (2015) on the other hand point out that M&E present a control action to reduce the variances from the set standards. Project monitoring has been defined as the continuous appraisal of project execution process in accordance to the pre-set schedules, including the application of infrastructure, services, and inputs by beneficiaries of projects. Hence, both contractors and clients view quality as a critical component in construction works. Mwangu and Iravo (2015) determined that project monitoring had a positive correlation to project performance.

These manifestation according to theInternational Federationof Consulting Engineers (FIDIC), include mediocre or non-resilient workmanship, as well as unsafe structures, deferments, cost overruns and construction contract disputes (Ngosong, 2015). Accordingly, Ngosong asserts that the quality and worth of construction are of significant attention to public as well as private sector clientele alike. IFC (2017) suggest that regularmeet ingsare essential to ensurecontractor perfor manceis satisfac toryand that project speci ficationsare being met; moreover, theauthority of monitoringstaff who control contractorpe rformancealso needs to be clarifiedand understoodby contr actors. Generally, the public sector as a responsibility of deliverying almost all public goods and services at all levels. Nsasira, Basheka and Oluka (2013) posit that an appropriate process of managing and monitoring contracts assists in the improvement of quality of commodities and causes a reduction in the cost of procurement, hence leading to achievement of three general goals, namely: product and service quality; on-time delivery; as well as budgetary effectiveness.

Davison and Sebastian (2009) determined theprobability of contract issues for a certaincategory of contract; and of w hichis likely to face thechalle ngesthe most. For instance, forconstruction contracts, orderalteration, stays, and coststatistically bear similarchance of preva lenceand significantly more proba bleas compared tothe other categories, andthat constructioncontracts are moresusce ptibleto problemsthan other forms ofcontract. Salapatas (1985) concluded that performance of project could be measured using a system for monitoring and major indicators; as is the case with all systems, a project monitoring ought to start with commitment from the management. The original methodologies for contracting are more susceptible to corruption due to the environment surrounding the processes of decision. The study by Ojok and Basheka (2016) on "Measuringthe Effective Roleof Public Sector and Evaluation in Promoting GoodGovern ance in Uganda," concluded that M&E facilitated management decision-making, accountability, learning and growth as well as better governance standards. According to the study M&E ought to not only be associated with nominal compliance but also foster decision-making that is anchored on evidence.

Process monitoring as part of M&E ought to be financed and institutionalized in order to intervene in the policy planning, implementation, and delivery of service. Hassan (2013) is of the view that M&E in the context of road project execution is key to the determination of the overall project success. Accordingly, he developed a conjecture that improperly designed M&E framework relating to road construction projects could be part of the reasons for the pervasive delays in project completion and mediocre workmanships on such road projects, hence substandard road project performance.

1.1.4 InfrastructuralConstru ctionProjects

The origins of construction projects are traceable to the ancient Egyptian Pyramids, medieval Greek settlement along the Mediterranean, the construction of temples and structures by the Roman Empire in the olden age (Wambui, Ombui and Kagiri, 2015). Nowadays, construction projects are considered to be complex sets of activities with definite start and end dates that consume resources such as equipment, human resources, and money for the sake of achieving specific objectives (Kerzner, (2006). Its broad definition encompasses the establishment of physical infrastructure such as

railways, roads, and harbors, civil-engineering works such as irrigation projects, power plants, and dams, building works in general, including housing, as well as the existing structure maintenance and repair. Con structionprojects have been classified in severalways in order to distingue ishamongst them. Shenhar (2001) argues that despite all projects having certain features such as a goal, budget and timeframe, they differ in several ways to the extent that “onesize does not fitall”.

Construction projects can, therefore, be classified based on size as small, medium, large or mega; ownership as private or public; use as residential, commercial, industrial or utility; and scope as building or infrastructural projects. Among these categories of classification, project scope provides a better classification of public construction projects. Infrastructural projects make up a minor part of the entire construction sector albeit it is a crtitical component of the sector. Such projects are normally owned by large, commercial industrial concerns including manufacturing, medicine, petroleum, and power generation. Specialized Industrial Construction normally entails overly large-scale projects consisting of a high level complexity of technology such as nuclear power plants, oil refineries, steel mills, and chemical processing plants.

Construction of highway comprises the development, change and maintainance of highways, roads, streets, runways, alleys, paths, and parking areas. Also part of the highway construction are all other construction types relating to the actual highway construction project. Heavy construction projects normally relate to projects classified as neither "building" nor "highway." For instance, sewage treatment plants and facilities, flood control projects, water and sewer line projects, dams, dredging projects, as well as water treatment facilities and plants. Accordingly, Halpin and Woodhead (2006) availed a typology under three forms: (1) institutional and commercial (2) nonresidential and residential; and (3) building and infrastructure.

1.1.5 Road ConstructionIn frastructural Projectsin Kenya

Kenya had the best infrastructure in Africa during the 1970s but due to suspension of donor funds, it has resulted to a lack of regular repair and proper maintenance leading to a serious deterioration (GOK, 2003). In spite of this, road transport has over the

years remained a key mode of transport in the country accounting for over 80% movement of people, goods, and services. Constructionand maintenance of Kenyan roadshas essen tially been supported bythe National Treasury through the annual budget allocations and also proceeds coming from Road Maintenance Levy Fund (Oirere, 2019). Despite the committment by government, it is estimated that out of the planned 61,936 KM of classified roads, it was only possible to construct or pave 8,869 KM by November 2016 equivalent to 15 percent (KeNHA, 2016). According to the budget policy statement for year 2018-2019, building onto what Kenya's Vision 2030 stands for, the government allocated a collosal amount worth 115.9 billion Kenya Shillings for classified roads (National Treasury, 2018).

According to KeNHA (2019), the classified road network in Kenya is 63,575 km from a total of 177,800 km. The classifiedroad network hasin creased from41,800 km atthe timeKe nya achieved herindependence to 63,575 km today, whichimplies that development rateis gradual andless than 600 km perannum. In the sameperiod, the length of the pavedroad grew significantly from 1,811 km to 9,273 km. As per the current estimates about 70% (44,100 km) ofthe classified roadnetwork is in good condition andis maintainable whereasthe rest 30% (18,900 km) needs rehabilitation or reconstruction. Table 1.1 givesa summaryof classified roa dnetwork inK enya.

Table 1.1: Classified Road Network in Kenya

Road class	**Premix**	**Length by Surface Type (km)**			**Total**
		Surface dressing	**Gravel**	**Earth**	
International Trunk Roads (A)	1,244.91	1,563.81	715.11	94.48	3,618.31
National Roads (B)	350.21	1,166.26	819.29	346.14	2,681.90
Primary Roads (C)	642.89	2,198.16	3,601.64	1,552.90	7,995.59
Secondary Roads (D)	76.63	1,183.10	5,701.93	4,087.73	11,049.39
Minor Roads (E)	165.81	542.04	8,215.89	17,982.57	26,906.31
Special Purpose Roads	24.88	114.63	4,929.69	6,253.78	11,322.98
All classes	**2,505.33**	**6,768**	**23,983.55**	**30,317.60**	**63,574.4**

Source: KeNHA 2019

The government recognises that professional incompetence contributes to poor project supervision and implementation. The narrative is changing with the governement allocating huge amount in infrastructure. The World Bank report indicates that governments are the biggest "spenders" worldwide on public service (Nyandika *et al.*, 2014). Mthethwa (2016) noted that the construction industry in Kenya was contributing a significant per cent to the National Domestic Product (GDP).

Evidence indicates a clear relationship among economic development, economic growth and construction activities. A survey that was conducted a few years back indicated that the total world construction spending on infrastructural projects in 2007 was $4.7 trillion, but it rose to $ 7.2 trillion in 2010 thereby itis expected torise to $12 trillionin 2020 (Global construction 2020, 2009). Despite this prediction, the overall growth of the construction sector is reported by Kenya National Bureau of Statistics (KNBS), through the economic survey 2019, to have decelerated to 6.6 per cent in 2018 compared to 8.5 per cent in 2017; moreover, for the growth in lengths of roads constructed, figures indicate that construction decreased from to 9.5 per centin 2018 compared to 30 per cent in 2017 (KNBS, 2019). Although acccording to the same economic survey it is hoped that the expenditure on the roads would rise by 23 per cent to KSh 195.1 billion in 2018/2019 from KSh 158.6 billion in the financial year 2017/2018. In terms of repair and maintenance of the road, it also hoped that there would be an increase from Ksh 53.8 billion in 2017/18 to KSh 66.6 billion in 2018/19.

Public road construction projects are on an upsurge in Kenya in the recent past. Nevertheless, cost overruns have also become common with such projects in Kenya. In this regard, analytical reports from therepu blic of Kenya demonstratethat KeNHA commonly facescost overruns. For example, theThika Super Highway construction cost went up fromthe originally budgeted 26.44 billionup to 34.45 billion(World Bank, 2014). Moreover, theoriginally planned deadline of the saidproject was July 2011 but was subsequently reviewed to July 2013. Inaddition, the initial sewerage system inLot1-RD 0530 of the project was later altered after the completion oft he project.

Roads and transport in Kenya's new system of governance is the responsibility owned by both the central and devolved government units. As such, the aggregate coordination role rests with the Kenya Roads Board (KRB) responsible for the overall oversight of the Kenyan Road network, hence coordinating the development of roads, rehabilitating andmaintaining the roads, and isthe authorized main ad viserto the Government onall issu es regardingroads (UKaid, 2015). The roadsmanagement is assigned to two roads agencies according to the Kenya Roads Act 2007, namely: KeNHA and KURA. The agencies are expected to facilitate the establishment, rehabilitation and maintenance of the network of roads in the city; according to the economy and standards in place. KeNHA is an autonomous road agency charged with the responsibility of managing, developing, rehabilitatingand maintaining international trunkroads connecting centersof international significance and crossing international boundaries, or ending at international ports; calledclass Aroads, national trunk roads connecting internationally significant centers; called classB roads, aswell as primary roads connecting provincially significant centers to one other or two higher-order roads; calledclass Croads. In the city of Nairobi, KeNHA is responsible for the development of the by-passes as well as the major highways. According to UKaid (2015) county government of Nairobi's department of roads is majorly focusing on drainage, residential roads, trafficsignals, junctions, as well as the non-motorisedtransport (NMT) and improvements.

The setting up, rehabilitation as well as maintenance of public roads in urban locations in Kenya fall under the purview of KURA, a semi-autonomous government agency charged with the responsibility of managing roads, with exception to those that fall under the category of National Roads. Set up in 2010, the Authority is responsible for roads over 12,549 km, with 2,100 km pavedwhile 10,400 km unpaved. However, the KenyaRural Roads Authority (KeRRA), which isa national corporation that fallsunder the Ministry of Transportand Infrastru cture, was developedas the Kenya RoadsAct, 2007 proposed witha responsibility of managing, deve loping, rehabilitating, andmaintaining rural roads.

However, all contractors are supposed to be registered in Kenya whether in building or road construction or civil. Locally the National Construction Authority, also known as NCA Kenya is a state agencyunder Act No. 41 of 2011 Lawsof Kenya via which contractors in Kenyaare enlisted. This is a body thatwas formed to replace Ministry of Works. Therefore, NCA is charged with the responsibility of clearing contractors and builders in Kenya as an overall strategy to eliminate indisciplined contractors and to deal with misconducts in the building and construction sector.

Still, performance of many contractors has not been effective or pleasant if anything to go by. Wambui, Ombui and Kagiri (2015) and Makori, Aduda and Ngacho (2013) observed that in Kenya institutional framework and construction policies need to be revised and that management approaches to construction [by contractors] are wanting and must be improved. According to Kimani (2017), the NCA has in the recent past embarked on the inspection of construction and building projects all over the country for work quality assurance and closure of high health-risk and potentially hazardous construction projects. In this regard, it is envisaged to avail the framework for the regulation and registration as well as constant update of contractors' roll.

1.2 Statement of the Problem

Kenya has elaborate procedures to vet contractors but there is still questionable performance of most of road projects as seen in the cost overruns, delays in completion and compromised quality. Statistics by the Engineers Board of Kenya (EBK) indicate that there are only 2,100 certified engineers in the countrythat has apopulation of 45 millionpeople against a minimum of 6,000 which is supposed to serve the country based on its population (Wanzala, 2017). The right contractor is seen to be a remedy to elusive road infrastructure project performance.

A contractor selection process should eliminate incompetent bidders and result in qualified individuals or institutions who can deliver the project within the set goals. Infrastructure being in the fore front of the government's vision 2030, road construction projects have received tremendous boost from the national government budget. This fact has led to mushrooming of many citizens who claim to be fit for construction work as contractors. Studies indicate that the main problem of the

construction industryin the country has been inability of contractors todeliver infrastructure projectson required time, withinbudget and also meet productquality upon completion (Ogweno, Muturi & Rambo, 2016; World bank, 2014; Waithera, 2017; Mwakajo & Kidombo, 2017; Wambui, Ombui & Kagiri, 2015; Hassan & Guyo, 2017). Although this is the case, the post delivery performance of the road infrastructure has not been of interest to many scholars and even experts in the road construction industry. When studies are conducted in construction, the focus is on project implementation yet it would be stated as project performance. Both outright project abandonment and poor project execution are largely attributed to lack of technical expertise on various projects (Abiodum, Segbenu & Oluseye, 2017).

Factors contributing to construction delays and post delivery performance as listed by Faridi and El-Sayegh (2006) include poor leadership, outdated equipments, shortage of equipments, poor sitemanagement, poor supervision, andshortage of skilled manpower. In Kenya, two studies by Seboru et.al, (2016a) and Seboru, Mulwa, Kyalo and Rambo (2016b) on material acquisition and labour procurement and performance of road infrastructural performance attempted to demonstrate how these two variables influence performance in terms of quality bearing in mind of potholes and cracks that the roads develop a few months or barely a year after. The most affected roads are under management of Kenya Urban Roads Authority (KURA), which areconstructed by local contractors awarded tenders by the government. However, thisstudy is out to show the influenceof contractors' capacity evaluation interms of financialability, technical ability, manage mentability and contractors' safetyrecord onperform ance of road constru ction in frastructural projectsin Nairobi Countyin Kenya.

Practically, properly designed as well as maintained roads are significant for the safety of roads. According to Manyara (2013), whenever the government communicates concerns relating to Road Traffic Accidents (RTAs), roads are infrequently cited as the cause. Instead, the government normally points an accusing finger at the driver, the vehicle's mechanical condition, the weather or even other set of factors. Improperly designedroads, suchas steep slopes, narrowroads, uneven, as well as sharpturns/ curvesand poorly maintained roadswith potholes and limited road signs make road users susceptible to accidents. Normally, dangerous overtaking is

caused by the absence of warning signs or even centerline markers. In addition, the country has recorded an upsurge in the number of novel roads, particularlyduring PresidentKibaki'stenure (2002-2013). Some of thesaid roads are, unfortunately, already in deplorable state due to bad design and lack of maintenance. Such roads are, therefore, partial contributors to the road accident menace in Kenya. Due to improperly constructed and maintained roads, mobility is constrained, vehicle operating costs rise unnecessarily, accident rates go up, isolation is augmented, poverty rises, health is put at risk (Emeasoba and Ogbuefi, 2013); an experience that affects urban dwellers as well.

The Nairobi City County Government (NCCG) enumerated some of the issues and challenges regarding safety and security of roads and transport system in the city. For example, there is need for capacity building of motorized drivers due to lack of security tolerance for pedestrians, this is according to the report by the said NCCG. Design of roads a lot of times does not take care of the needs of children and other vulnerable road users. People with disabilities find it difficult to negotiate the set infrastructure. No-functional street-lighting, improper and insecure location of the footbridges. Safety rules are weak as everyone tries to be alive on the road. The motor cyclists do not wear protective gears, with unsuitable bumps for the cyclists. Traffic snarl-ups occasionally make motorized drivers as well as cyclists to occupy the walkways.

Due to the haphazard crossing by the pedestrians and congestion by the motorcycle taxis, confusion abounds near markets, with unmarked bikeways occasionally occupied by motorbikes (NCCG, 2015). This raises doubts on effectiveness of contractors' capacity evaluation in tender award, hence, the need to study the contractors' capacity and road construction infrastructural project performance in Nairobi County. The need to award tenders to qualified bidders, therefore, continues to be the case although the same problems affecting project success (time, budget and quality) and not even project performance (hardly studied and measured in construction industry) are not adequately addressed. Accidents have been reported on our roads and the blame is heavily laid on poor marking of roads and lack or inefficient road signs. Most of the roads in Nairobi City are under the county

government. This study therefore intends to research on how contractors' capacity evaluation in tender award affectsperformance of roadconstructi on projectsin Nairobi County in Kenya.

On what appears to be a financial constraint to the local Kenyan contractors, international construction companies have dominated public infrastructure tenders. For example, the ability of Chinese firms to arrange financing for their projects and possession of superior machinery has seen many of them prequalified to build roads across the country (Juma, 2017). The inability of contractor to undertake road construction works lies in the financial ability status of the contractors (Mwakajo & Kidombo, 2017; Kithinji & Kamaara, 2017; Igochukwu & Onyekwena, 2012). Similarly, Densford, James and Ngugi (2018) have studied that local contractors in Kenya are facing challenge in financial resource mobilization. Though these studies have proved the fact that financial ability of the contractors affect completion of infrastructure projects, the extent to which the same influences project performances creates a gap hence the need to empirically carry out a study to evaluate the extent to which financial ability of contractors influence performance of road construction infrastructural projects.

Studies have also demonstrated that management capacity of contractors has been empirically shown to affect perojects. Some of the issues related to management capacity of contractorsinclu de poorplanning andsched uling, management of personnel, lack of materials and equipment to meet schedule, poor job-site supervision, inadequate management knowledge and contractor experience, lack of team work and proper guidance by the supervisors (Naik, Sharma & Kashiyani, 2015;Omran, Abdalrahman & Pakir, 2012; Aje, Odusami & Ogunsemi, 2009).

The technical abilities of contractors has been cited as another source of inadequacy by contractors to undertake road infrastructural projects (Seboru, et.al, 2016a; Atieno & Muturi, 2016; Nyangwara & Datche, 2015). These studies have enumerated technical capacities lacks in terms of quality of raw materials and equipments used, availability of skilled personnel, contractors competency and timely availability of construction of resources. The predictor variable technical ability in this study is used

to test performance of the road construction as opposed to implementation as done in other studies. Contractors' safety record appears to influence both the implementations and road construction infrastructural project performance. The issues around safety include: lack of adequate regualtions, lack of resources (personnel or fianance) lack of management knowledge, lack of managment commitment, inadequate use of signage and barricades to minimize accidents, compliance behaviour and adequacy of standards in addressing safety outcome (Jannadi & Bu-Khasim, 2002); Diugwu, Baba & Egila, 2012; Weil, 2001). Although the indicators under this predictor variable have been used to explainperformance in implem entation phase of the roadproj ects, the current study is outto investigate how this predictorvariable purely influence performance of the road during post-delivery phase.

The outer ring road in Nairobi County, for instance, which was recently completed has now design variations which stand out to pose significant challenges not only to motorists but also to pedestrians. The drainage covers are broken due to heavy human traffic, cyclists and motorbike riders 'also known as boda boda' have few cycling lanes and walkways are not adequate. Although travel time has significantly reduced, the road does not provide adequate bus stops and road signage hence the PSVs or matatus have transformed the service lanes into parking and loading zones. The 13km stretch had 11 foot bridges planned for in the design (Achuka, 2017). Lack of footbridges is forcing pedestrians to dangerously cross the road by jumping over the guardrails and use trenches. The ministry of infrastructure has recently cited poor performance of roads due to incompetent contractors.

The Permanent Secretary (PS) for infrastructure in Kenya noted that most of the roads within Nairobi are in the hands of careless contractors who have failed to ensure standards are met and that there was need to entrench a performance-based systems of contracts to weed out contractors who do shoddy work (Kinyanjui, 2018).This therefore begs the question as to whether contractors' capacity to undertake road construction works is thoroughly ascertained and hence poor performance of a road after construction. Despite having a performance based framework for evaluating suitable contractors for road works, the performance of road construction is

overlooked and attention is only drawn on implementation stage of the projet. From empirical literature reviewed the influence of individual variables of contractors' capacity evaluation in tender award (finacial ability of contractors technical ability of contractors, management capacity of contractors and lastly contractors' safety record) has been established in most of construction infrastructural projects up to implementation stage.

However the combined influence of contractors' capacity evaluation in tender award has not been established neither on implementation nor performanceof road construction infrstructural projects. This study therefore soughtto establish how contractors' capacity evaluation in tender award, process monitoring, influence performance ofro adconstruct ion i nfrastru ctural in Nairobi Cou nty in Ken ya. Also previous studies have methodologically relied on either qualitative or quantitative approaches in research. This study however sought to adopt a pragramatic approach to be able to collect data quantitatively and qualitatively. It is an alternative paradigm because philosophically it accepts that there exist singular and multiple realities.

1.3 Purpose of the Study

The study aimed at establishing how contractors' capacity evaluation in tender award, process monitoring influence performance of road construction infrastructural projects in Nairobi County in Kenya.

The study also aimed at establishing the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in Nairobi County, Kenya.

1.4 Objectives of the Study

The following objectives guided the study:

i). To determine the extent to which financial ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya.

ii). To assess how technical ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya.

iii). To establish how management ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya.

iv). To examine how contractors' safety record influence performance of road construction infrastructural projects in Nairobi County, Kenya.

v). To determine how the combined contractors' capacity evaluation in tender award influence performance of road construction infrastructural projects in Nairobi County, Kenya.

vi). To assess the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in the county of Nairobi, Kenya.

1.5 Research Questions

The questions that the study sought to answer are:

i). To what extent does financial ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya?

ii). How does technical ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya?

iii). How does management ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya?

iv). How does contractors' safety record influence performance of road construction infrastructural projects in Nairobi County, Kenya?

v). How does combined contractors' capacity evaluation in tender award influence performance of road construction infrastructural projects in Nairobi County, Kenya?

vi). In what is ways does process monitoring moderate the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in Nairobi County, Kenya?

1.6 Research Hypotheses

The study sought to test the following hypotheses:

1. **H_0**: Financial ability of contractors does not significantly influence performance of road construction infrastructural projects in Nairobi County, Kenya.
2. **H_0**: Technical ability of contractors does not significantly influence performance of road construction infrastructural projects in Nairobi County, Kenya.
3. **H_0**: Management ability of contractors does not significantly influence performance of road construction infrastructural projects in Nairobi County, Kenya.
4. **H_0**: Contractors' safety record does not significantly influence performance of road construction infrastructural projects in Nairobi County, Kenya.
5. **H_0**: The combined contractors' capacity evaluation in tender award does not significantly influence performance of road construction infrastructural projects in Nairobi County, Kenya.
6. **H_0**: Process Monitoring does not significantly moderate the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in Nairobi County, Kenya.

1.7 Significance of the Study

This research hoped to add value in terms of knowledge exposition to the project management especially in the evaluation process of selecting effective contractors who would contribute to the road construction infrastructural project performance. The study focused on how contractors' capacity evaluation in tender award influences performance of road construction infrastructural projects in Nairobi County in Kenya; thus it is hoped, it provided the unavailable knowledge on the subject. This would thereby enrich the existing literature on the subject that readers and researchers can utilize for further analysis.

Successful performance of infrastructural projects has significant economic and social benefits. The GOK singled out infrastructure as a major beacon for the achievement of the vision 2030 as one of its key pillars, further it set out to have 10000Km new

roads through Public private Participation (PPP) and carry out maintenance of existing infrastructure to help ease access to rural areas to enhance economic growth of key sectors of economy.

The study is hoped to have provided information that may be of significance to performance of infrastructure project, which ultimately expected to improve the economic and social status of the Kenyan citizenry. The findings of the research may provide critical input for decision-making in light of the utilization of evaluation report of contractors and performance of infrastructure projects. Recommendations made can inform on policy formulation at both the county and national level and other organizations in general because they were developed through valid research data.

Industry stakeholders may immensely gain from the study revelations. The research findings may also present considerable input in the academic field by putting forth the existing literature gaps in the road construction sector, enhancing discussion from the observations made in reference to the already undertaken studies, drawing conclusion from the study and pointing out salient recommendations for continued research.

1.8 Limitations of the Study

The use of structured questionnaires and the method of administering them may have had led to a delay in getting the feedback quickly to start data analysis process considering the broader geographical area where the study is to be conducted (Nairobi County 684 Square Kilometres). Due to this constraint, four research assistants were temporary contracted to assist in administering the questionnaires. Also, since most of the contractors are scattered and mobile, the study used a drop and pick techniques of collecting information from the respondents whereby contractors were allowed sufficient time to fill up the questionnaires and return them for analysis. On the other hand, the mattatu drivers were guided through the interview schedules and hence a good response rate for the study.

Moreover, the research team used persuasion and frequented the contractors' offices until they got in touch with them to answer the research questions to yield reliability of the study. Moreover, the study purpose was explained to the respondents using authorization from National Council of Science Technology and Innovation,

University clearance letter, transmittal letters and assurance on confidentiality issues with the hope they would be convinced to take part in the research exercise. This eventually increased respondents willingness and confidence to participate in the study after getting satisfied that the study was purely academic.

1.9 Delimitation of the Study

This study confined itself to contractors' capacity evaluation in tender award, Process Monitoring and road construction infrastructural project performance. There are various contractors' capacity evaluation in tender award variables found in literature but this study categorizes most of these into four outlined in the conceptual framework and used the ones that are related as indicators of each category. Due to the fact that there are many evaluation frameworks and models suggested for carrying out evaluation process to ascertain the suitability of the contractor, the study is not based on any single framework but used the common elements in a number of them to formulate a conceptual framework that guided the study.

The study conceptually focused on the financial ability, and technical ability of a contractor. The other concepts were, the management ability of a contractor, the contractors' safety record and the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award and the level of performance of road construction infrastructural project through descriptive survey design in Nairobi County, Kenya. This study also focused exclusively on performance of road construction infrastructural projects undertaken by KeNHA.

In the identified geographical locality which was measured by quality of completed road in terms of its drainage and or water table, absence of potholes; mobility and speed experienced due to delays, congestion, average speed; comfort and convenience in terms of smoothness and roughness of the road; user benefits in terms of cost reduction, travel time reduction, vehicle operating cost reduction; safety as evidenced by properly constructed footbridges, pedestrian walkways, cycling lanes, road properly marked, adequate road signs and bus stops.

The study also delimited itself to human capital theory, top management theory, resource dependence theory, domino accident theory of accident causation, and pragmatism philosophical direction and a mixed mode approach to conduct the study. In addition, the study variables were limited to those in the conceptual framework. The National Construction Authority (NCA) in Kenya has categorized or classified contractors from NC1 to NCA7 as per their financial capabilities and subsequently the study uses only NCA1. Despite this initiative traffic jam still remains a nightmare on the outering road joining the Eastern Bypass especially by matatus plying the roads. It is on this basis that the study focused on the roads.

1.10 Basic Assumptions of the Study

The fundamental assumption was that the contractors' capacity evaluation in tender award, process monitoring influence performance of a road construction infrastructural projects. The study assumed that the respondents would give accurate responses to the questionnaires without bias. It was also assumed that accessing the respondents would be easy since they are all based in Nairobi. It was assumed that the information gathered would demonstrate a relation exists between the contractors' tender evaluation results and performance of roads construction infrastructural projects. That further, the information provided would highlight the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects.

1.11 Definition of Significant Terms Used in the Study

The following concepts were defined as used in the study. It is acknowledged that they may be used elsewhere to mean different things.

Contractors' Capacity Evaluation in Tender Award–This is evaluation carried out during the tendering processes that is used to determine the suitability and abilities of an individual road construction contractor for award of the tender prior to commencing ground work and which may influence performance of the road during the life of the project (post-delivery performance of the project). It includes financial ability of the contractors, technical ability of contractors, management ability of contractors and contractors' health and safety record.

Process Monitoring– This is a continuous assessment of the contractor and construction and the extent to which all the construction processes comply with construction specification, comply with regulatory bodies' requirements, comply with County by-laws, resolution to complaints management, and finally adherence to allocation and utilization of resources for accomplishment of project's objectives.

Performance of Road Construction Infrastructural Projects–This refers to public projects that benefit the society and whose performance are measured in terms of: Quality of completed road in terms of its drainage and or water table, absence of potholes; Mobility and speed experienced due to delays, congestion, average speed; Comfort and convenience in terms of smoothness and roughness of the road; User benefits in terms of cost reduction, travel time reduction, vehicle operating cost reduction; Safety as evidenced by properly constructed footbridges, pedestrian walkways, cycling lanes, road properly marked, adequate road signs and bus stops.

Financial ability of contractors–Contactors' state of finance and financial management in terms of credit rating, bank's good will, flexibility of the loan agreements, turnover, profits obligations, amounts due, owned financial funds,cash in the bank and their influence on post-delivery performance of a road construction project.

Technical ability of contractors–This is contractors' competency to undertake a road construction infrastructural project that lies in their experience in terms of catchment of local and/or national projects, plant and equipment, quality of materials used, past experience from completed projects, and availability of technical manpower/personnel.

Management ability of Contractors–This is contractors ability to undertake management tasks in road construction projects and normally judged by their performances in other projects, their quality control policies, management knowledge, project management system, and expertise of the management personnel assigned the construction and whose influence can be noticed in performance of a road during its life (post-delivery).

Contractors' Safety record –This is the capability within contractors' and their firms to manage and cab any and safety issues that may arise during the life of the project (post-delivery) as a result of contractors' past workmanships and may have influence on the future performance of the road infrastructural performance. The record includes ensuring adequate Health and Safety policy Management system, Insurance policy, Compliance behavior, Adequacy of standard in addressing safety outcome like proper use of road signage, Certification in OSHA.

1.12 Organization of the Study

The study was organized into sections: the first section entails the introduction, background of the study where all the variables are explained, the research problem, the study purpose, the objectives, the research questions and hypothesis, the significance of the study, the assumptions, the limitations, delimitation and the definition of key terminologies featured in the current study.

The second section entailed a synthesis on literature review related to the study using on themes from objectives. The thematic areas included: performance of road construction infrastructural projects, the concept of contractors' capacity evaluation in tender award, financial ability of contractors and performance of road construction infrastructural projects, technical ability of contractors and performance of road construction infrastructural projects, management ability of contractors and performance of road construction infrastructural projects, contractors' safety record and performance of road construction infrastructural projects, process monitoring and performance of road construction infrastructural projects, theoretical framework, conceptual framework and knowledge gaps.

The third section describes the research paradigm, the study design, the target population, sample size and sampling technique, instrumentation, procedures for data collection, data analysis techniques, considerations for ethics, as well as operationalization of the variables. The fourth section presents data analysis, presentation, interpretation and discussion. Chapter five, the last section summarizes the study's findings, concludes the study, outlines recommendations, contribution to existing body of knowledge and areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews theoretical and empirical literature related to the study based on themes drawn from the objectives. The thematic areas include: performance of road construction infrastructural projects, the concept of contractors capacity evaluation in tender award, financial ability of contractors and performance of road construction infrastructural projects, technical ability of contractors and performance of road construction infrastructural projects, management ability of contractors and performance of road construction infrastructural projects, contractors' safety record and performance of road construction infrastructural projects, contractors capacity evaluation in tender award, process monitoring and performance of road construction infrastructural projects, theoretical framework, conceptual framework, summary of literature and knowledge gaps.

2.2 Performance of Road Construction Infrastructural Projects

A project refers to a non-routine, complex, one-time endeavor that is limited by budget, time and assets as well as expected performance standards developed to gratify the needs of clientele. A construction project is normally accomplished via an aggregate of several interactions and events, premeditated or spontaneous, throughout the life of a facility, with dynamic players and procedures in an ever dynamic ecosystem (Babu & Sudhakar, 2015). According to Chitkara (2005), construction projects are viewed as high-worth, time-specific, as well as special-purpose construction missions with defined expected output. Kenya has massively invested in road infrastructure projects since the launch of the country's economic recovery plan 2003-2007 by the former president, Mr. Mwai Kibaki.

The government of Mr. Kibaki took cognizant of the fact that the country lacked professional competency or manpower; hence, the Engineers Registration Board was tasked with updating its register to get rid of errant engineers (GOK, 2003). According to Wanzala (2017), Kenya has a paltry 2,100 certified engineers serving 45 million persons, this being against the expected 6000 minimum. This is indeed a clear

demonstration that the industry needs to build up its capacity in terms of increasing the number of professionals so that improvement is registered on performance of our roads.

Substandard performance of construction projects has degenerated into an economic condition in which the industry is incapable of managing, with major stakeholders in the industry having no idea of documenting the issues for posterity (Babalola, Oluwatuyi, Akinloye & Aiyewalehinmi, 2015). Pekuri, Haapasalo and Herrala (2011) posit that the terminology "performance" is often confused with "productivity". These authors put a distinction by arguing that productivity is a more specific concept regarding the output-input ratio. However, the authors have defined performance as a general concept covering both economic as well as industry-specific operational aspects. To them, performance imputes operational excellence; entailing profitability as well as productivity, among other qualitative attributes, including delivery and flexibility, quality, and speed.

Project performance presented by Baccarini (1999) is explained using two success concepts. Firstly, accomplishing a project successfully, remaining attentive to both quality and cost, which is measureable from budget perspective, schedule, as well as compliance with operational and technical standards respectively. Secondly, the impact of three-pronged project output, namley: to satisfy the project goal; purpose; and stakeholder expectations. Measurement of performance, if well undertaken through a review of the organizational performance and identification of the appropriate and relevant key performance indicators (KPIs) is capable of leading to great advantages as well as improvements (Onatere, Nwagboso & Georgakis, 2014). A performance framework by Atkinson (1999) differentiates success factors as follows: delivery and post-delivery activities; providing an avenue for the acknowledgement of success conditions: the iron triangle; information system; firm-level and community advantages.

Cost, time as well as quality criteria relate to the 'iron triangle'. Post-delivery levels consist of (Atkinson, 1999): (1) information system, whose conditions are: reliability; maintainability;validity; and information quality utilization (2) the conditions for

firm-level benefits are: better efficiency; superior effectiveness; better bottomline; long-term goals; institutional learning as well as waste reduction(3) the benefits that accrue to the community are: consumer satisfaction;social and ecosystem impact; personal growth and development; knowledge acqusition; better profits to the contractor and suppliers of capital, as well as overall economic impact accruing to the general community. The model by Atkinson covers the whole project life cycle as well as the post-delivery component; thereby lending itself for continuous evaluation.

Measuring performance of transport system cannot and should not be assumed. Onatere, Nwagboso and Georgakis (2014), in a study on performance indicators for urban transport development in Nigeria listed a number of safety performance indicators, which include damaged roads with potholes, damaged or collapsed bridges, number of road signs and traffic measures, number of people killed or seriously injured in road traffic accidents, and inadequate headways. According to Onatere, Nwagboso and Georgakis customers' satisfaction is not really been put into consideration in the Nigerian transport system especially public transport. The authors therefore highlight some of the KPIs to show customer (road user) satisfaction: overall journey experience, comfort ride, satisfaction with road system, customer (road user) satisfaction with completed projects, percentage of complaints, cost of journey, complaint handling and effective complaint resolution.

The use of the traditional iron triangle to describe what constitute good or poor performance in project management has led to numerous poor performances in infrastructural projects. Khosravi, Afshari (2011) opine that this model recommends lagging indicators only thereby provides no room for unremitting assessment and monitoring of the construction projects. Project completion and performances cannot be the same thing, for the former suggests that a project has successfully been implemented if it is delivered on-schedule, within budget, has achieved initial set goals and clients show acceptance of it and also can use it (Mbaluka & Bwisa, 2013). Since 1980 other performance measures have been developed to redefine factors that constitute project performance. Because of this, the measurement of project performance has become a multidimensional aspect evaluated from different approaches (Shenhar & Dvir, 2007).

The success of a project can only be measured after the completion of the project (Morris & Hough, 1987). Cooke-Davies (2002) assert that the use of project performance can only be done during the life cycle of a project which became area of focus in this study on performance of road construction of infrastructural projects. Many studies conducted in Kenya on project performance and more specifically construction projects have used indicators of project completion to explain or define what performance is whereas that would make sense if project success is used.

Scholars such as Githenya and Ngugi (2014) conclude that a good project implementation is essential and it must be formally defined in terms of its milestones. For example, a study by Kihoro and Waiganjo (2015) that evaluates the factors that affect project performance in Kenya with a special attention on construction projects shows that 63% of the respondents agreed that their projects performed well while 27% of the respondents indicated that the projects performed poorly. The study population comprised of property developers who had invested and completed projects in gated community development. A small sample population of 200 project managers in the study was calculated by normal approximation to the hyper-geometric distribution to obtain a sample size of 130. The study adopted a semi structured open and closed questionnaire as data collection instrument. A pilot study was conducted on 20 property developers in Kiambu area which is the second largest with gated community. Feedback from pilot study was used to refine the questionnaire to enhance its reliability, and Explatory Factor Analysis (EFA) was utilized to enhance construct validity by clustering factors that correlated with each other.

As concluded by Kihoro and Waiganjo (2015), performance as a dependent variable can be evaluated by different independent variables. Most of the property managers strongly agreed that planning as well as stakeholder management and project manager's competence were essential in the performance of projects. The study advocated for the use of multi criteria analysis during the planning process together with efficient management relationships among all stakeholders. Although the authors used project performance as a dependent variable, the performance indicators they used are meant for project success (Morris and Hough, 1987): completion time, cost

management and quality. Quality can also be a performance indicator for a post delivery project if only the indicators are clearly stated to mean the same. To measure performance of the road upon its completion was dependent on a number of effective criteria or indicators designed. Seboru, Mulwa, Kyalo and Rambo (2016a) conducted a study on the materials' acquisition influence on road construction projects' performance in Kenya: a case of the Nairobi City County. The main deliverable of the research was to examine the degree to which materials' acquisition influences road construction projects' performance in Kenya. The following results emerged from the study: $R^2=0.246$, $F(6,40)=2.173$, $p=0.066>0.05$.

Accordingly, alternate hypothesus was rejected leading to a conclusion that materials' acquisition was statistically insignificant with respect to the influence on the road construction projects' performance. In spite of this, material quantity requirement was statistically significant; hence influenced road construction projects' performance.It appears the authors did not list substantive indicators to show how performance of roads construction was measured; though the indicators for roads performance were not outlined, it can be deduced from the statement of the problem that performance was measured in terms of potholes and traffic congestion.

This study was therefore complimented by this new study on contractors' capacity in tender and performance of road construction infrastructural projects. The study by Seboru *et al.* (2016a) supports Haas, *et.al* (2009) study which emphasizes that indicators of performance in road construction ought to be directly associated with the transport system expectations, in resepct to the values of transportation due to the derived-demand nature of transportation.

Majority of transportation values assume negative figures. For instance, users of road would wish to reduce the time taken to travel and the safety risks. According to Haas *et al.* (2009) the following is a case list of transportation values, with the most frequent measurement units that could be used to conceptualize performance: injuries and, or deaths per unit of transportation, such as per trip, per bridge crossing, or per 100 million vehicle km, for safety; delays, congestion, mean travel velocity for mobility and speed; standard deviation of unit transport time and link speed for

reliability; green house gas levels in the atmosphere for ecosystem conservation for eco-protection; number of transportation per unit of cost for productivity; cost and acccident minimization for user advantages; depreciation rate for asset value; smoothness of the road for comfort/convenience; project stays; financing; traffic challenges due to on-going works for program delivery; and finally incident response time.

In the Gaza Strip, Palestine construction projects are highly affected mostly by myriad issues. To establish some of these issues Enshassi, Mohamed and Abushaban (2009) conducted a study on factors that affect the local construction projects' performance as well as the perceptions in light of their comparative significance. The study's population was 120, hence a similar number of questionnaires was distributed to three major cluster participants in a project. The distribution was as follows: 25 to project owners; 35 to project consultants; and 60 to actual contractors. Only 88 questionnaires were filled and returned, representing 73% response rate, as follows: project owners,17%; project consultants, 25%; and contractors, 46%. The findings of the studydemonstrated that all the three groups concurred that the overriding factors to project performance are: delays occasioned bytheclosure of borders/roads resulting to the shortage of materials; asset defficiencies; and poor project leadership skills.

The other indicators include material price escalation; lack of experience by key personnel; as well as substandard equipment and raw material quality. It follows therefore, according to the study findings, that: 1) project owners and contractors ought to actively collaborate to enhance timely payments so as to overcome time-stays, and to reduce disputationsas well as claims; 2) project participants ought to be involved actively in making decisions; and 3) healthy relationship among project participants are necessary throughout all cycles of projects for better problem solving and superior project performance. The dependent variable in this study read 'project performance' though the authors focus was on project completion.

Further, Nyangwara and Datche (2015) did a research focusing on the factors that affect the performance of construction projects in the context of Coast region, Kenya. The key study objectives were: firstly, to assess the determinants of construction projects' performance for the assistance of key stakeholders to address performance challenges as well as to bolster performance of such projects; secondly, to examine the external environmental influence on the project performance; and thirdly, identify the most impactful project procedures on projects' performance; and finally, to assess project management actions' impact on project performance. The study population entailed project managers' clientele, the contractors as well as consultants in construction organizations in the entire Coast region in Kenya. A sample was then drawn from the said population. The research assumed a mix of descriptive cross sectional survey design with correlational focus. The extent of concurrence between parties about the ranking of determinants was assessed with Kendall's Coefficient of Concordance.

In terms of tooling, the research utilized a mix of questionnaires, interview schedules, case studies as well as modeling for data collection. A questionnaire survey was undertaken with forty determinants identified, classified into eight classes, assessed and ranked accordingly: consultants, owners and constructors orientations. Finally, 180 questionnaires were delivered to all the categories, with 132 completed and returned. The extent of concurrence among parties about the determinant ranking was established by use of Kendall's Coefficient of Concordance (Nyangwara & Datche, 2015). For productivity, cost, clientele satisfaction, quality, time, learning, innovation and people determinants, and all groups collectively, a significant extent of concurrence among the key stakeholders was observed. Conversely, in the case of regular and community rate of satisfaction, as well as ecosystem determinants, discordance among the key stakeholder overtly emerged. The practices relating to project performance including time-factor, financial outlay, project owner gratifications were examined so as to identify the key practical challenges of such projects' performance in the Coastal Kenya context. Recommendations for performance improvement were then articulated accordingly.

A conclusion were drawn that projects tended to delay and cost overruns were experienced due to political dynamics with delayed payments resulting to material unavailability. Nonetheless, general safety factors had moderate implementation among the organizations included in the study. The dominant points of agreement among the three categories of stakeholder in the study were average delay due to closures and shortage of materials; resource availability as envisaged throughout the project period; project manager's leadership skills; material price inflation; availability of experienced personnel; as well as the equipment raw materials' quality in the project (Nyangwara & Datche, 2015).

The choice of correlation and regression analytical approaches justified since the conflation between the variables would properly be examined and the degree of predictor-criterion relationship determined Nyangwara & Datche, 2015). Therefore, this current study adopted the same methodology to investigate the variables within contractors' capacity evaluation in tender award, process monitoring and performance of road construction projects in Nairobi County. In addition, whereas in this study the characteristic of the sample population of interest were the main stakeholders in construction project, the current study on contractors' capacity evaluation in tender award, process monitoring and performance of road construction infrastructural in Nairobi County, Kenya, opted to replace Owners of construction projects with the PSV Matatu drivers.

The current study may have used the owners of PSV Matatus but chooses to have the drivers sampled since they are the ones who are mostly using the roads as a daily activity and their experiences are necessary to gather the views on road-user satisfaction as a measure of performance of roads. The current study also used Karl Pearson's coefficient of correlation to discern the extent of conflation among the variables as opposed to Kendall's Coefficient of Concordance as adopted by Nyangwara and Datche (2015).

2.3 The Concept of Contractors Capacity Evaluation in Tender Award

In Kenya, tendering process is conducted by Public Procurement Oversight Authority (PPOA), which begins with prequalification. Prequalification is an elementary level in the process of tendering, and it is envisaged to generate a short-list of bidders capable of complying with the set technical criteria of the project, regardless of the quotation considerations at this point in time (PPOA, 2010). Normally the prequalification takes into account: prior performance and experience contracts of similar scope; technical capacity; as well as, financial capacity. The process is therefore narrowed down to those companies that have made it to the short-list.

Awarding a contract to the most deserving contractor in road construction and any other infrastructural project should be a top key priority. Dwarika and Tiwari (2014) point out that the foregoing process is typical of construction contractor tendering processes. They argue that tendering undoubtedly offers a customer the advantage to choose in the award of a contract to the lowest bidder, and a company with the shortest cycle time. However, it is also argued that such a system does not precision in the tendering process. In spite of this, cases of tender evaluation focusing primarily on the price are immense.

Recently, majority of clients have utilized the method widely. Conversely, the study findings demonstrate that the lowest tenderers commonly experience challenges in the completion of a project. It is therefore argued that going for the lowest tenderer exposes the project to poor quality since low prices suggest substandard material use. These problems may go way beyond completed projects (post-delivery), whereby road performance can be compromised during the life of the project. This is why it is imperative to evaluate contractors' capabilities.

Globally various frameworks have been designed to measure performance in construction projects. Nguyen (2015) notes that it is important to use framworks created to evaluate contractors' bids to weigh the ability of a contractor so that construction projects can effectively be managed. A process of bid evaluation starts with categorizing the suitability of the canditate, subsequenly the authorities can then lock out the tenderers who meet the exclusion criteria (Muhwezi, 2013). In Kenya, for

example, the Public Procurement Oversight Authority (PPOA) spells out the strictness to environment in construction that:

> "Possible bidders ought to be cognisant that because Kenya is a signatory to the Kyoto Protocol, eco-factorsmay be integrated into the tender and assessment of bids. Instances of such determinants entail but are not limited to carbon footprint, extent of forest over-exploitation, spillage and emission of chemicals that are toxic, spillages of crude oil on land or in the waters, degree of non-biodegradable disposals, threats to biodiversity and degree of radioactive substances."(PPOA, 2010)

Three dominant issues are involved in the prequalification and bid analyses, namely: (1) contractors' general information, (2) prequalification conditions, and (3) bid evaluation conditions (Hatush & Skitmore, 1997).

2.3.1 Criteria for Prequalification Process

A criteria structure for contractor prequalification was introduced by Holt, Olomolaiye and Harris (1994). The criteria were founded upon the organization of the contractor, fiscal considerations, management asset, as well as past experience and performance of the contractor. In regard to the contractor's organization, the study singled out age of the organization, its size and reputation, policy for quality control, safety and health policy, as well as tendency for litigation.

Ratio analyses, reference from banks, references from credit bureaus, as well as history of turnover were identified for the fiscal aspect of the tenderer. Contractors' qualifications, key personnel's credentials, length of experience with the firm, as well as the regime for formal training were identified under management resource. Past experience condition comprises the scope of projects successfully completed, the magnitude of such projects, as well as the experience at national level. Others include contract failure, time-overrun, cost-overrun, as well as the past actual quality output.

The process of prequalification is employed to examine the contractors' capabilities to undertake a job, should it be awarded to them (Hatush & Skitmore, 1997). Previous empirical studies have advanced certain aspects of the process (Zedan & Skitmore 1994, Ng, 1992; Merna & Smith, 1990; Russell & Skibniewski, 1988). The process avails to a customer, a list of such contractors normally invited to tender as and when

it occurs. This process also happens to be the most popular among various countries, with several and variegated types of conditions considered in the evaluation process (Hatush & Skitmore, 1997). To be shortlisted, a contractor initially applies; the application is evaluated against the standards such as fiscal capacity; managerial capacity; structure of the organization; technical capability; as well as experience in work of similar scope (Merna & Smith, 1990).

Simillarly, Hunt *et al.* (1966) argue that all the foregoing conditions are necessary for in the prequalification process. They consist of the applicant's permanent physical address, adequate technical capability to properly and expeditiously undertake the work, financial strength, experience in similar engagement, and prior undertaking of job of the same broad type and on a level equal to or exceeding 50% of the amount of the current/proposed contract. The others include failure and cost/time-over-run history, the present disposition for project delivery, as well as the contractor's association with other key stakeholder such as employees and subcontractors. Samelson and Levitt (1982) conducted a study focusing on the construction cost reduction through accidents, and control of costs via safety consideration during selection of contractors.

The conditions for prequalification are a requirement by many owners at both negotiated and even competitive bid contracts. Other common considerations include issues to do with experience modification rating (EMR) as well as Occupational Safety and Health Administration (OSHA) rate of incidence; and conditions for safety.

2.3.2 Criteria for Bid Evaluation

Hatush *et al.* (1997) have described "evaluation" to mean the procedure involving analysis of tender bids by prequalified tenderers. A multi-parameter system for bid appraisal was proposed by Herbsman and Ellis (1992). In this regard, they proposed consideration of primary and secondary parameters, the primary ones being: amount of bid; time to completion; and previous work quality. Apart from the said primary parameters, some secondary parameters could also be under consideration. Some of them would include: weights proposed by the customer, and some of which would be

precise to particular projects. The specific extra criteria are durability, safety, security as well as maintenance.

From these two words “prequalification” and “bid”, it is practically possible to use the two in evaluation of the construction contractors for road construction infrastructural project performance. According to Kimani (2017), the NCA regulations stipulate that Kenyan contractors ought to register under several constructions work categories so as to determine their financial ability to undertake construction work. The NCA1 is applied for by those contractors who have the capability to construction roads classified as national or international. Below is a detailed classification in a self explanatory manner:

> NCA1: Unlimited contract value: which has various classes: Unlimited contract value [Contractors – Building] Unlimited contract value [Specialist Contractors] Unlimited contract value [Roads and other Civil Works]
> NCA2: Up to 500, 000, 000 [Contractors – Building], Up to 250, 000, 000 [Specialist Contractors], Up to 750, 000, 000 [Roads and other Civil Works].
> NCA3: Up to 300, 000, 000 [Contractors – Building] Up to 150, 000, 000 [Specialist Contractors] Up to 500, 000, 000 [Roads and other Civil Works]
> NCA4: Up to 200, 000, 000 [Contractors – Building] Up to 100, 000, 000 [Specialist Contractors] Up to 300, 000, 000 [Roads and other Civil Works]
> NCA5: Up to 100, 000, 000 [Contractors – Building] Up to 50, 000, 000 [Specialist Contractors] Up to 200, 000, 000 [Roads and other Civil Works]
> NCA6: Up to 50, 000, 000 [Contractors – Building] Up to 20, 000, 000 [Specialist Contractors] Up to 100, 000, 000 [Roads and other Civil Works]
> NCA7: Up to 20, 000, 000 [Contractors – Building] Up to 10, 000, 000 [Specialist Contractors] Up to 50, 000, 000 [Roads and other Civil Works]

2.4 Financial ability of Contractors and Performance of Road Construction Infrastructural Projects

One of the factors of production is finance. Nwanyanwu (2015) pointed out that the cash flow of an organization establishes its capacity to execute projects and ability to acquire raw materials required for manufacturing activities. Olang'o (2018) noted that several road construction projects in Kenya have had time overruns in their completion due to poor cash flow management. Hence, Nwanyanwu (2015) warns that a low inflow (cash receipts) resulting to excess outflow (cash expenditures) over inflow lessens organizational operations. Igochukwu and Onyekwena (2014) evaluated the participation of the Nigerian indigenous contractors in public sector and their challenges of managing working capital. The study adopted a survey design.

Field survey of the activities of indigenous contractors were carried out and from review of existing literature, interviews and discussions with indigenous contractors and their accountants or financial managers on indigenous contracting and issues bothering on managing working capital. From this, it was possible to identify a number of factors that pose challenges to Nigerian contractors in managing their working capital requirements for construction projects.

The indigenous contractors, who were the target sample of the population selected through systematic random sampling for the survey, were all located in one location (Imo state) and had not less than five years practical experience (Igochukwu & Onyekwena, 2014). Furthermore, the construction firms selected for the survey met two specific criteria: experienced and qualified staff and professionals in their employ who had an adequate knowledge of what working capital entails and an annual turnover above twenty million naira. The respondents' selection was based on their experience and their un-scattered geographical location can be considered key to enhancing reliability and therefore this study is out to also ensure the target population is selected on the same criteria whereby all the contractors were within Nairobi County, and meeting the NCA1 requirements. The consulting firms also had to be those currently dealing with road works.

From the findings of the study and with respect to issues that hinder proper working capital management, respondents ranked problems associated with one-man business ideology; inadequate manpower; poor technical skills, and absence of corporate organization as the major factors (Igochukwu & Onyekwena, 2014). It thus calls for the indigenous contractor to engage competent people in management of their financial resources, preferably under the leadership of financial directors and or managers. In addition, corporate image should also be enhanced, to make the contractors attractive to both clients, who in turn will regard them in high esteem. According to Igochukwu and Onyekwena, other challenges facing these contractors in capital management as obtained from oral interviews could be traceable to the following factors which are by no means exhaustive: lack of sufficient knowledge on working capital management, usually a one man business and in most cases with poor technical skill, inadequate manpower with no corporate organization, cash flow challenges, high cost of construction finance, reckless spending, poor funding, undercapitalization, diversion of contract funds by uses other than the project and poor project planning and control. This therefore signifies that road construction companies or contractors need a strong financial backing to support their work in terms of producing good results that may be extended even in the future. The study by Igochukwu and Onyekena (2014), however, did not clearly test the relationship between variables. The survey design was adopted to the study of contractors' capacity evaluation in tender award, process monitoring and road construction infrastructural project performance in Nairobi County in Kenya.

On studying the effect of project resource mobilization on performance of road infrastructure projects constructed by local firms in Kenya, Densford, James and Ngugi (2018) found out that the local contractors or construction firms continue to experience challenges related to finance whereby they are unable to complete road projects within specified budget cost, time and inability to attain desired quality. This study was conducted in the Lake Basin Region of Kenya whereby a total of 41 roads infrastructural projects had been constructed by local construction firms. From the regression analysis, the result indicated that 21.1 per cent unit change in resource mobilization, while other factors held constant, explained performance of road infrastructure in the region. With a p value of 0.036 less than 0.05, it could be

concluded that financial resource mobilization has significant influence on performance of roads. Due to uniqueness of geographical aspects and varying stakeholders' needs, the current study on contractors' capacity evaluation in tender award was conducted in Nairobi. Further, the relationship and strength of the predictor variable, financial ability of contractors against the dependent was tested using correlation and inferential statistics.

On the other hand, Mwakajo and Kidombo (2017) studied factors influencing projects performance in road infrastructural projects in Manyatta constituency in Embu County in Kenya. One of their study's objectives was to determine how project financing influence project performance in road infrastructural projects in Manyatta constituency. This research used a descriptive survey design and targeted a population 153 which included active road contractors, contracted staff, directors, engineers, technical staff and clerical and support staff.

The study by Mwakajo and Kidombo (2017) only sampled active road contractors using simple random sampling method, and Yamane formula to determine the size of the sample. The study used 126 respondents as a total sample size including active road contractors. Data was collected using semi-structured questionnaire. Both percentages and frequencies were utilized for descriptive data whereas coded broad sheets were thereafter used to extract data from the returned questionnaires. The researchers analyzed the data using SPSS after they completed variable view and utilized extracted data aptly on data view. Though the study used a simple random sampling as this current study did, the selection of contractors was focused on the active ones only whereas the current study drew its sample from all the road contractors who happen to have practiced even in the past.

The current study also used Morgan and Krejcie method for obtaining sample size as opposed to Yamane formula used by Mwakajo and Kidombo (2017), although both formulae are applicable in calculating the sample size. The study findings by Mwakajo and Kidombo (2017) established that all the 118 respondents collectively concurred that the level of financing was a basic factor of task execution. The way of subsidizing is additionally an urgent factor, with 73% respondents expressing that

assets were discharged in stages while concurring that without a doubt the undertakings were financed, but in various behavior.

Budgetary arranging was found to be an essential factor of undertaking execution, as authenticated by 54% of the dominant part of respondents. The study concluded that availability of finances enable resource acquisition. This study, however, highlights aspects of financing up to completion and not beyond. Therefore, this current study on contractor' capacity evaluation in tender award and performance of road construction infrastructural projects filled the gap by studying how finance (financial ability of a contractor) influences project performance and not project completion only.

While finance is a requirement in ensuring road construction projects are successfully completed, there is also need to establish the influence of this variable on the quality of the project in terms of the road performance (during post-delivery stage) hence the need for this current study. The construction sector predominantly comprizes medium as well as small contractors faced with emerging and specific problems in the course of project execution. A study by Kulemeka, Kululanga and Morton (2015) focused on the examination of impeding elements that influence performance of the medium and small contractorsin light of the"tender estimation," "quality of work," "timely completion of construction projects" and "tender preparation," in the context of Malawi.

A research questionnaire was issued to 370 participants in the construction sector; including clients in the public sector, consultants, contractors, as well as construction asset trainers so as to gather data from 118 variables, identified by way of a detailed review of literature. The inhibition elements predominantly were economic issues, which fell under the emerging trend in light of what had previously been reported in the sub-Saharan Africa. The highest ranking of the said factors included: high lending interest rates; prohibitive capital access conditions; forex instability; prohibitive conditions for access to bonds; and high rates of tax.

The study forms an underpinning for continued knowledge search about inhibitors to the performance of medium and small contractors against the backdrop of global dynamism. This study, however, left a gap to be studied in terms of the influence of contractor's finance on post delivery performance of the road construction projects. Kithinji and Kamaara (2017) embarked on studying the factors influencing completion of government road infrastrcucture in Kenya. One of their study's objectives was to determine how project finances and technology influenced completion of infrastructure projects of government. The scope of the study was infrastructure projects in Meru County. The study's research design was descriptive design whereas the target population included contractors and construction project managers . The study also used a census survey technique method was adopted and sample size was 80 respondents. A questionnaire consisting of both open and closed ended questions was utilized to collect primary data. Both quantitative and qualitative approaches were used for data analysis.

The descriptive statistics were utilized to analyze quantitative data with the help of SPSS version 23. Qualitative data adopted content analysis while inferential statistics was applied to identify a relationship between variables using multiple regression analysis, which was utilized to determine the degree of statistical relationships between the study variables. The finding indicated that project finance, and project technology innovation largely influenced infrastructure project completion. The choice of the research design and the statistical tools used in this study were sufficient and reliable. Though this study used a descriptive research design, it would have also been better for the authors to consider a correlational design which the current study incorporated to in its study to measure the independent variable as noted by Dooley (2007). That is, the descriptive analysis used was deemed appropriate to describe the population characteristics rather than meausure the relationship of the variables in the study as it is the case of correlational research design.

Sources of funding are critical in road construction and if performance issues have to be dealt with. Akali and Sakaja (2018) studied the influence of contractors' financial capacity on performance of road construction. The study used a descriptive survey design whereby it target a population of 203. A sample size of 135 (102 contractors

and 33 supervising engineers) was obtained using Yamane formula. Futher stratified and simple random sampling was used in selection of respondents. Data was collected through questionnaires and interview schedule and was analyzed using descriptive and inferential statistics and thematic were applied to analyze data. Descriptive statistics utilized mean and standard deviation. Content validity was used to test validity and was subjected to scrutiny by the research supervisor and discussing with lecturers. Test-retest was done to establish reliability of the research tools through which Cronbach's Alpha coefficient of 0.754 was obtained. The study findings indicated that to a large extent 40% of the road contractors had access to capital sources and loans while 30% to moderate extent. Similarly, 60% (moderate extent) and 30% (large extent) of contractors said that they had capacity for accessing funding hence performance of road projects. The study recommended that contractors should establish banks that would easily facilitate access to credit at fair interest rates so that they could improve their own operating working capital. This study would have adopted a correlational research design to measure strength and relationship among the predictor and the outcome variable but failed hence the current study.

A study by Rahman, Memon and Karim (2013) focused on significant factors causing cost overruns in large construction projects in Malaysia. A total of 262 responses were received out of the 400 questionnaires distributed to contractors, consultants and the clients directly involved in large construction. Analysis of data was performed using SPSS for determination of hierarchical factor of cost overruns. To rank factors, a value of Relative Importance Index (RII) was calculated indicating that with a value 0.78, the second major factor was cash flow and financial challenges or difficulties as agreed upon by most of the contractors and clients although consultants ranked it the sixth. While studying capital budgeting practices in developing countries, a case of Rwanda, Mbabazize (2014) noted that most firms in developing countries finance their projects using debt and equity. This an indication that cash flow is a global issue faced by contractors hence poor performance in construction. However, there is need to study it under financial capacity of the contractor and establish whether a link exists between it and performance in the post delivery of road projects.

2.5 Technical Ability of Contractors' and Performance of Road Construction Infrastructural Projects

It is fundamental not to ignore the importance of technical aspect in construction for this is core in ensuring that ground work is well done to meet the quality mark and hence improved road construction infrastructural project performance. According to Hatush and Skitmore (1997), the criteria for selection fall into a five-pronged typology, namely: financial stability; managerial capacity; technical capability; reputation and safety. Also, Holt, Olomolaiye and Harris (1994) posit that said typology ought to include the contractor's institution; financial factors; as well as management assets; prior experience; previous performance record; project particularities, among others. This demonstrates points of convergence among researchers in light of the selection criteria. Others such as Hatush and Skitmore (1996) propose that virtually all clients use the same set of criteria with minor contextual modifications, and more so the use of subjective measures. This is the case with construction projects, and especially because of the commonality of such projects, and the subjective measures thereof, and it can be attributed to absence of a grounded framework.

Having a clear selection framework would assist in cutting off contractors who do not meet minimum requirement. Hence, Minchin and Smith (2005) as a possible grounded framework for selection process established Quality-Based Performance Rating (QBPR) model. Accordingly, the major input of the said model was founded on the information collected from the classical subjective indicators, and mainstreamed with the objective input data. The latter was found from the material test results and the quality of workmanship. Essentially, the model employs both forms of data input to individually score the projects.

An index-based scoring of contractors is then developed based on the technical quality dimension. Below is a set of previous empirical studies on this phenomenon. One aspect of measuring a contractor's techinical ability would be through materials used in construction. A study by Seboru, *et.al.* (2016) focused on the degree to which material acquision influnces performance of Kenyan construction projects. The study employed pragmatism paradigm with mixed method. Hence, a hybrid of cross-

sectional survey with correlational analysis was utilized in the study. The sample comprised of 74 senior engineers distributed as follows: 30 came from consulting engineering organizations; and 44 were senior engineers from construction concerns.

Also included in the sample were: 74 managing directors distributed as follows: 30 from consulting engineering concerns; and 44 from construction organizations. A 5-point Likert scale questionnaire was utilized to collect quantitative data whereas interview schedules were utilized to collect qualitative data. The descriptive data was analyzed and tabulated using standard deviation, arithmetic means, frequencies and percentages whereas inferential data analysis was conducted using linear regression and Pearson's Product Moment Correlation. Hypothesis testing was done using Fisher (F) test. The study findings were as follows: $R^2=0.246$; $F(6,40)=2.173$; and $p=0.066>0.05$. Therefore according to Seboru, *et.al.* (2016), hypothesis-H1 was rejected leading to a conclusion that material acquisition had no significant influence on construction project performance. The requisite amount of materials however had significant influence on project performance. Among these indicators, their indicator of quality of materials is an indicator of the technical ability of contractors and performance of road construction infrastructural projects in the new study.

It is clear that the study by Seboru, *et.al.* (2016) measured performance vis a vis quantity of materials; the current study measured the extent to the which technical ability (particularly quality of materials used) of contractors' influence performance in terms of quality of completed road. The methodology used clearly demonstrated how the variables are related by use of Pearson's Moment Correlation and Linear Regression hence the need to incorporate the same in the current study. However the study did not clearly show the results for the descriptive statistics, such as the percentage of those respondents who agreed and those that did not agree that acqusition of materials influenced performance of road construction projects.

While designing a performance tool to gauge the suitability of a contractor, various results areas need to factored in. Atieno and Muturi (2016) while evaluating the factors that influence the performance of road construction projects in the Kenyan arid and semi-arid areas focused on the Isiolo – Moyale (A 2) and Garissa – Modogashe

(C 81) road projects. The study sought to establish whether contractor's competency, construction parties' financial management, construction resources, and conflicts affect were the factors that influenced performance of projects in the areas. The authors utilized a descriptive research design with a small population of 77 and thus no sampling was done, a census was carried out. Regressions and ANOVA (Analysis of Variance) test were used to assess the factors affecting performance of road construction projects. The study's findings revealed a positive correlation between contractor's competency, construction parties' financial management,timely availability of construction resources, and conflicts towards the realisation of increased performance of road construction projects in the Kenyan arid areas.

The study by Atieno and Muturi (2016) showed that independent variables explained 82.7% of variance of the dependant variable, which was the performance of road construction projects in the area. The study found that the contractor's competency variable would lead to the greatest change in performance followed by the conflict variable, construction parties' financial management variable and timely availability of construction resources. Though the study was not conducted in urban setting and that performance was not measured beyond completion of the project (post delivery), the study demonstrated that competency is key in project performance. The choice of respondents was appropriate for the study. The current study however chose the urban setting where performance of road construction has been cited to be not doing well as well.

Performance of road construction projects appears to be marred with various challenges, especially around contractor's ability. Abiodum, Segbenu and Oluseye (2017) focused their study on the determinants of performance of contractors in the delivery of construction projects in the context of Akure, Ondo State. Among the key areas of focus in the study were the success criteria for project performance; non-performance causes among contractors; and factors affecting the improvement of the said contractors. To harness information from the respondents, Abiodum, Segbenu and Oluseye utilized a structured questionnaire for the study. Further, data analysis was conducted using mean item score as well as the single factor variance analysis. The top three criteria for performance among contractors according to the study were

timely completion, budgetary efficiency and requisite quality. The study findings also demonstrated that factors related to quality, those that relate to project management and procurement had the highest impact on contractor performance. It was concluded that good planning, competent leadership and good communication ought to be enhanced to improve performance of contractors on construction projects. Although the findings are clearly informing us on how to improve performance in the construction projects, the research design is clearly stated. This could have been a descriptive research design. In addition, the study just mentions "stakeholders" as the main respondents for the study but does not define the characteristics of these respondents sampled for the study. Koppinen and Lahdenpera (2004) listed, by examples, the three types of construction stakeholders: road users, society and industry.

The study on contractors' capacity evaluation in tender award and performance of road construction infrastructural projects incorporated in its target population the construction firms and contractors registered by the Kenyan government to undertake road works, and public vehicles drivers (also known as matatu drivers in Kenya). Similarly in another study, Obare, Kyalo, Mulwa and Mbugua (2016) investigated further the extent to which diversity in project team training influenced the link between performance of road construction projects in rural areas and implementation of project control systems. The study methodology adopted for this study was wrongly indicated as "cross-sectional correlational survey design." This may be restated as a descriptive cross-sectional survey design and correlational survey design. The research instruments, however, were properly outlined as structured questionnaires, interview guide and focused group discussion. The study sampled workers in rural roads construction projects and not road contractors. However the finding of the study are intended to inform the contractors on importance of hiring training manpower or personnel of quality performance of the road construction projects.

The study by Obare *et al.* (2016) utilized both inferential and descriptive statistics to analyze the data. Descriptive statistics from the study indicated that majority of the participants were of the opinion that more training was required, and that both formal

and informal training impacted their performance. Conversely, inferential statistics from the same study revealed that the diversity of project team training strongly and positively influenced the performance of construction of rural roads. With r = 0.804, F=0.647, p<0.05, a conclusion was drawn that project team training diversity positively influenced rural roads' construction performance in Kenya.

Based on the findings from Obare et al., (2016) study, the analysis were presented as follows; at F (1,193) = 142.975; p=0.144>0.05; r= 0.830; and R2 = 0.690, it was concluded that execution process and performance of rural roads construction projects were correlated and that such correlation had no reliance on the diversity of the project team training. Further, It was concluded that road contractors ought to employ diverse workforce in light of the intensity of training, qualification specialty, colleges attended, and training frequency because as such, it would overtly and positively impact the performance of such projects. Though the methodology was not clearly stated in the beginning, the study was able to show relationship between variables.

The current study was guided by the second objective, which is out to assess how technical ability of contractors influence road construction infrastructural project performance in Nairobi County, Kenya. Under this objective availability of technical manpower or personnel is selected to assess how it influences performance of road construction projects and hence the need to compare this study with current one. Like other parts of the world, Nairobi County has its unique challenges when it comes to effective systems in road construction. Wambui, Ombui and Kagiri (2015) did a research on the determinants of road project completion in Nairobi City.

This was a case study of the KURA projects, and its specific object was to appraise competency of the project manager, project equipment, project funds, as well as information technology in light of its influence on the efficiency of the completion of such projects. The target population was majorly staff members in Finance, HR, IT, and Construction departments. It utilized descriptive research design, with a target population of two thousand members of staff in KURA, Nairobi City County. Stratified random sampling was utilized to pick a sample of a hundred and thirty eight respondents.

Data collection was done using research questionnaires, with a pilot study done to ascertain and enhance the validity and reliability of the said tool. Data analysis was done by the use of descriptive statistics, supported by SPSS version 20. It was finally revealed that the completion of a road construction project is significantly impacted by: equipment used; competency of the project manager; availability of project funds; as well as technology used in the project. This measurement framework was used in the current study, with the foregoing indicators used to measure the extent to which tender evaluation results influence the performance of roads even after completion (post-delivery stage).

2.6 Management Ability of Contractors and Performance of Road Construction Infrastructural Projects

Kenya appears to have made tremendous progress in terms of infrastructure, however, according to Wambui, Ombui and Kagiri (2015) construction industry in the country faces a lot of challenges and complex issues in their performance. Many realistic justifications account for this, namely: closures, amendment of drawings as well as design, and delays in the disbursement of requisite funds.

Other impeding factors in this regard are: mediocre leadership and management; inappropriacy of participants; bad coordination and inter-personal relations; lack of control, motivation, monitoring or systems to aid decision making; infrastructure inadequacy and political challenges; socio-economic challenges. It was observed by Watt, Kayis and Willey (2008) that appraisal is a demanding task characterized with diverse uncertainties. They came up with the following evaluation criteria typology, namely: workload/capacity; organization ability; physical assets; as well as firm reputation, technical expertise, supplier-client engagement, and method/technical solutions.

It was suggested by Wambui, Ombui and Kagiri (2015) that there is need for continued research on the Key Performance Indicators (KPIs) so as to develop a framework for the causal relationships between the variables in question. In this regard, the current study further pursued the influence of those indicators on post-

delivery of road construction infrastructural projects in Nairobi, Kenya. Factors relating to management have been identified by Naik, Sharma and Kashiyani (2015) as follows: inadequacy of relevant information; weak scheduling and planning; inadequate coordination among participants; and poor agility in decision making. The other factors include coordination with other primes; subcontractors' coordination and control; professional misconduct; human resource management; provision of enough workforce, as well as materials and equipment to meet the plan or schedule; on-site supervision quality; daily work log adequacy; conflict resoluton; minimization/avoidance of claims; as well as conformance with regulations, laws, inspections, permits, and testing.

Others such as Aje, Odusami and Ogunsemi (2009) evaluated the impact of contactors' management capacity on the time and cost of performance of construction projects in Nigeria. The statistical findings showed that contractors' management capability is a significant criterion in the appraisal of potential construction contractors' performance in the course of prequalification as well as tender assessment. Previous performance and quality thereof, experience of the contractor, management knowledge as well as programme for quality control were also identified as the major yardsticks for assessing contractors' management ability.

It was also discovered that contractors' management capacity significantly impacted cost performance and time, with a p-value of 0.039 and 0.042, respectively; thereby supporting earlier findings that management capacity is among the significant criteria for contractors' prequalification in the Nigeria context (Aje, Odusami & Ogunsemi, 2009). The study findings further revealed that the cost and time of a construction project and performance had a strong correlation with contractors' management ability. Hence, models for prediction of the project completion cost as well as actual time-frame for building projects was validated.

According to Aje, Odusami and Ogunsemi (2009), the above study was intended to facilitate clientele and consultants to measure the time and cost of performance of construction projects in line with the prequalification apparisal of contractors on management capacity, the contract period as well as tender quotations. It therefore

implies the possibility to project the actual cycle period and cost of projects from the very beginning based on the foregoing variables. In spite of this, the focus of the study was on building construction, even though the variables are the same as those of the current study on road construction infrastructural projects.

A case study by Omran, Abdalrahman and Pakir (2012) on project performance in the construction industry in Sudan comprised a total of 75 structured research questionnaires distributed randomly, from which 52 were completed and returned. The study utilized the relative importance index (RII) to rank the determinants of project performance. In addition, Spearman's Correlation Coefficient indicated the strength of relationship between the most significant determinants, with the Kruskal-Wallis test being an indication that there were comparison and opinion variations between the respondents. It was established that the most significant five determinants of project performance were: planning effort; experience of project team leader; design and specification adequacy; monitoring for cost progress; as well as the leadership skills.

The study further determined that project managers ought to put together an effective team, and develop a learning culture for better leadership, since good leadership skills can lead to improved productivity by the workers. A conclusion was then drawn that project manager sought to also be aware of the project characteristics, including missed or unclear aspects. Moreover,such managers ought to have adequate experience for the management of the project for problem-solving in the course of project implementation. The study hence avails positive information as to the relationship between management capacity of contractors and performance of road construction projects.

One main reason why quality in road construction is compromised is due to rogue contractors. Ntuli and Allopi (2014) also argue that regardless of the amount of resources dedicated to the contractors, it would add no much value if the tender awards are given to those who do not qualify. Others such as Mwakajo and Kidombo (2017) also did a study of the determinants of project performance among county road infrastructural projects in Manyatta constituency, Embu county, Kenya. The said

study revealed that project leadership requires the capacity to undertake tough decisions, deal with human resource issues, and to invoke authority as and when may be necessary in pursuit of a project in light of various constraints. The findings of the research demonstrated that 88% of the respondents concurred that the projects were professionally and accurately led albeit it was only confined to the project completion rather than in the post-delivery phase.

Management commitment is key if the planned design is to be implemented in construction. El-Maaty, Akal and El-Harawy (2016) focused their study on the management of highway projects in Egypt by examining determinants of quality performance.Accordingly, 39 such factors were singled out via a detailed review of literature. The factors were then tabulated in form of a questionnaire, and dispatched to thirteen owners of divided highways, twenty seven owners of regional roads, as well as fifteen consultants. Respondents' perspectives were then analysed through the use of fuzzy triangle.

The findings by El-Maaty, Akal and El-Harawy (2016) showed that the most critical parameters that positively impact quality are:owner's inspection team efficiency; owner's clarity of responsibilities for each key stakeholder; unstandardized pavements; experience of the staff involved in the entire project cycle; as well as quality and type of asphalt applied in process of construction. The research nevertheless failed to clearly articulate the data analysis method nor did it demonstrate a linkage among the key study variables. As a result, the intensity of monitoring as well as road construction performance, a conflation between variables was undertaken through inferential statistics.

In a study on the impact of experience and skill inadequacy in the construction sector in Kwazulu-Naatal, South Africa, Ntuli and Allopi (2014) investigated the challenges facing civil engineering contractors for enterprise sustainability. In effect, various challenges were identified, namely: inadequate understanding of the processes involved in tendering; capacity building; cash-flow challenges due to late payment; corruption; procurement policy ignorance; lack of business planning; ignorance of the role of the Construction Industry Development Board (CIDB); inadequate operational

as well as managerial skills among contractors; poor pricing; misunderstanding of the general contractual provisions; and challenges relating to sub-contracting. The said study results indicated that there were shortage of skills in the construction sector thereby informing the need for continuous capacity building of those contractors and their employees. The study further proposed that the government, in liaison with relevant stakeholders, ought to set up and execute contractor capacity building programs to cure the skill gap problem.

2.7 Contractor's Safety Record and Performance of Road Construction Infrastructural Projects

Another variable of concern regarding a construction contractor is safety performance. To adjust the safety performance of personnel, an array of activities is undertaken by safety practitioners as well as management. Some of those activities include safety communication; safety training; and safety rules and procedures. Griffin and Neal (2000) posit that safety performance is employees' personal conduct through which own safety as well as that of colleagues would be assured. Two dimensions of safety therefore emerge, namely: compliance with safety safeguards, including the use of personal protective equipment (PPE), adherence to safety rules and procedures, and safety participation, including voluntary participation in such activities, including meetings for safety strategy. Many studies have demonstrated that motivation and employees' knowledge positively impacts on safety performance. This argument has been emphasized by Hall and Holt (2003) in the below comment:

> "Despite the notorious reputation of the construction industry for poor health and safety, project financiers almost never thought of it as their duty to facilitate the safety and health practices of suppliers where appropriate at the site. Therefore, upon occurrence of an incident, it could significantly impact budgetary as well as programmatic performance, despite all other parameters being in place. It was established that the procedures for the choice of suppliers were imperative for health and safety assurance, given that project sponsors never concerned themselves with the matter, as long as work was on course." (Hall & Holt, 2013, p. 266)

The circumstances are even worse in the developing country contexts such as Iran, being an outcome of numerous dynamics, including absence of rules and regulations, mediocre inspection by government machineries, unskilled labour, poor motivation of employees, time and economic pressures, as well as lack of an integrated system for accident recording and reporting (Koehn, Kothari & Pan, 1995). Others such as Kartam and Bouz (1998) discovered that weak systems for accident recording and reporting are a conduit for hiding the pervasive safety gaps.

The culture of keenness to safety issues has also been said to critically set the attitude and the significance of organizational safety (O'Toole, 2002). Several other factors affect injury rates over and above the OSHA regulatory activities (Weil, 2001). The factors determining OSHA performance can be analyzed by dissecting the process into three key elements, namely: compliance behavior, enforcement related aspects; and the sufficiency of standards to address safety output. The three components are further broken down into: safety practices and investments by the employer; on-site training of the worker on safety; integrated management of the site; the role played by the unions as well as off-site activities; technological effects; and practices related to the actual work. In addition, the negative economic as well as social outcomes of accidents are undeniable. Others such as De Saram and Tang (2005) examined the non-material accident costs, including pain and suffering, and loss of quality of life. Accordingly, they reported that the said costs comprised approximately thirty percent of direct costs of accident.

Consequently, the emergent key index has been "safety", alongside others such as the triangle of time, as well as quality, in the appraisal of construction project success; hence the undeniable need for its improvement (Ngacho & Das, 2014; Alzahrani & Emsley (2013). A research by Jannadi and Bu-Khamsin (2002) focused on safety determinants in the Saudi Arabian context. The research methodology was as follows: (1) literature review was undertaken for the identification of variables; (2) a list of variable dimensions and their respective indicators was developed; (3) expert interviews were then undertaken to enhance construct validity; (4) a research questionnaire based on variables and dimension indicators that were identified was developed; (5) data was the collected; (6) data analysis was undertaken; and (7) a

summary of the results was developed (Jannadi & Bu-Khamsin, 2002). The said study subjected the industrial contractors to research questionnaires and a formal interview with each contractor's official in charge of construction safety in the Saudi Arabian Eastern Province. The survey intended to collect data relating to the key determinants of industrial contractors' safety performance.

A total of 28 concerns were surveyed because they met the criterion of involvement with large-scale industrial construction activities the said province (Jannadi & Bu-Khamsin, 2002). Twenty key factors as well as eighty-five minor-factors were identified as determinants of construction contractors' safety performance. The major determinants in this regard were: housekeeping and site planning; signaling and barricades; disaster and emergency preparation and planning; welfare facilities; crane and lifting equipment; signage, concrete and related framework; and cutting and welding; chemical handling. The other factors included electrical equipment; transportation handling, and disposal of risky material as well as waste; equipment for personal protection; prevention of fire; excavation, scaffolding and ladders; transportation; trenching and shoring; hand and power tools; ionization radiation, mechanical equipment; and involvement of management.

From Jannadi and Bu-Khamsin (2002),the respondents concurred on the priority listing of the foregoing safety factors. The data were utilized for the identification of the key and sub-factors affecting the construction contractor's safety performance. The scale of significance attached to the major and sub-factors was arrived at based on their relative priority. Each item in the questionnaire comprised five options, via: 4 points for "very high impact"; 3 points for "high impact"; 2 points for "moderately high impact"; 1 point for "low impact"; and 0 (zero) points for "no impact". It was concluded that each of the variables under review were the most significant determinants of the safety performance of industrial construction contractor. In this regard, there was a total concurrence on three main factor, namely: engagement of management; protective equipment; and emergency/disaster preparation and planning (Jannadi & Bu-Khamsin, 2002). This conclusion was driven by the reported highest impact and weights (6.0) of each of the said determinants. Hence, engagement of the

management is critical to any successful safety program; this is in addition to personal protective equipment as well as emergency or disaster preparation and planning.

Some contractors have not been keen on observing regulations in the construction industry. Diugwu, Baba and Egila (2012) conducted a study on level of awareness and effective regulation in the context of Nigerian construction industry. A random distribution of questionnaires was done, without regard to the enterprise size band. The objective here was to avoid a skewed analysis through acquisition of a representative view on each item. This being an economical sampling strategy without losing the desirable attributes of probability sampling. Out of the 495 questionnaires dispatched, a total of 312 were returned comprising 271 and 41 valid and invalid questionnaires, respectively; representing 69% response rate. An analysis of the valid responses indicated that 91% were of the opinion that poor safety and health impacted operations of their businesses, the balance were of the contrary opinion. Specifically, 74% reported that poor safety and health standard impacted their corporate reputation, with the balance expressing the contrary opinion.

Overall, approximately 55.9% of the respondents reported that they had no safety and health policies in place. According Diugwu, Baba and Egila (2012), therefore, despite several construction concerns being probably aware of the safety and health impacts of their activities, they still had no safety and health policy in place. Summarily, the research concluded that health and safety management constraints, inadequate support, asset limitations, lack of knowledge of details as well as implications, and management non-commitment impacted the safety and health strategies.

In regard to compliance measurement, it has been asserted by Weil (2001) compliance with standards of OSHA by construction contractors is only observable by the time of actual OSHA inspection by an authorized OSHA personnel on-site. The inspector identifies non-compliant on-site activities and ranks them according to the degree of severity. This inspection procedure would provide an objective measure of the degree of compliance with health and safety safeguards.

The construction industry is said to rely on the contractors' effort to significantly reduce accidents on construction sites voluntrarily. Feng (2013) sought to study the effects of contractors' safety investments on safety performance and identify the factors influencing the effects of safety investments on safety performance. The researcher adopted a regression and correlation research design to be able to fill the gap. Data collection tools involved the use of structured interviews, archival data and questionnaires. The study targeted a total of 47 completed building projects. The main data analysis techniques were bivariate correlation and moderated regression techniques. The findings revealed that basic safety investments effect on safety performance did not hold constant considereing other prevailing project conditions. According to Feng's study, basic safety investments showed a stronger positive effect on accident prevention where a higher safety culture level was being exercised and also project hazard level had been put in place. This implies that despite a contractor's keeness to more protection and safer environment, safety culture has a significant role to play in construction projects. Although this study was focused on building projects, the current study specifically focused on road construction infrastructural projects in Nairobi County in Kenya.

2.8 Process Monitoring and Performance of Road Construction Infrastructural Projects

The use of monitoring and evaluation as a discipline has widely been acknowledged and utilized among many organizations. M&E as well as other control mechanisms play very key management roles to ensure that project objects are fully pursued and maintains trajectory (Mwangu & Iravo, 2015). United Nation Development Programme (UNDP) defines monitoring and evaluationas: the continuous process through which stakeholders get upto date feedback on the progress of set goal and objective (monitoring) pursuit; includingan independent and rigorous appraisal of completed or continuing activities to establish the extent of their alignment with the objectives and contribution to key decision making (evaluation), (UNDP, 2009). According IFC (2017), when monitoring in construction is taking place, the following need to be checked: explicit commitment to compliance with the project committments as captured in the committmet register; adherence to the project code of conduct; adherence to the project security forces management plan, if applicable;

monitoring of Environmental and Social (E&S) and other personnel, including training on HR policy provisions, grievance mechanisms, health and safety, material management among others.

Effective implementation of road construction infrastructural projects and future performance demands a strong M&E system observed throughout the process. Bulle and Makori (2015) focused their study on the strategic planning influence on urban road projects' performance in the Kenyan context. A key object of the study was to determine the influence of M&E in strategic planning on the urban road projects' performance. Descriptive survey design was adopted in the study, with a sample of 70 employees involved in the implementation of KURA projects in Nairobi City County. Data was collected by the use of research questionnaires.

Secondary data was also gathered from published sources, including magazines, journals, reports, and periodicals as a supplement to the primary data. To assure validity and reliability of data collection tool, a pilot study was undertaken to pre-test the research questionnaire. Data analysis was performed using SPSS version 22 as well as Excel. It was established that M&E in strategic planning has a great influence on the performance of urban roads in KURA. The study by Bulle and Makori (2015) therefore failed to provide statistical tools of testing relationship between variables. This however would have been made possible by use of regression and correlational analysis.

Although the study concluded that M&E influences performance of roads, the current study is going to use the tools of analysis to establish the extent to which this variable influences road performance through its moderating effect (process monitoring). Nowadays, M&E has become a powerful tool for public sector transformation and service delivery (Hlatshwayo & Govender, 2015). A study entitled "contractor monitoring and road infrastructure projects performance in Uganda," undertaken by Byaruhanga and Basheka (2017), had one of the objectives that was out to evaluate the linkage between monitoring of contractors and national road infrastructure projects' performance in the context of Uganda.

Though the study by Byaruhanga and Basheka (2017) did not clearly point out the research design used, from the tools of analysis given, it can be concluded that the study used a descriptive survey and correlational designs. The study however clearly stated that non-probability sampling design was utilized in the selection of engineers and procurement professionals. Simple random sampling was used to select members of parliament, private consultants, and civil society organizations. A mix of both closed ended questionnaire and interview guide was used to collect data.

Further analysis was undertaken through the application of regression method to look out for association. A simple correlation between the key study variables was identified; with R2 value demonstrating the extent to which the focal criterion variable, performance could be explained by the focal predictor variable, contractor monitoring. Accordingly, 0.159 could be explained by the predictor variable, large enough. The recorded standard error was 0.1204 while the adjusted R square value was 0.841; implying that contractor monitoring is a predictor of road infrastructure projects' performance (Byaruhanga & Basheka, 2017).

Put differently, road infrastructure performance relies on contractor monitoring variable by 84.1%. It was also demonstrated that the regression model is an accurate predictor of the criterion. The statistical significance of the regression model was considered, with $P < 0.0005$ was less than 0.05; indicating that there was a significant conflation in the prediction of the criterion variable. Critical F-value of 6.90 was less than the actual F-value of 31.223 at the 0.01 level of significance (Byaruhanga & Basheka, 2017).

From the foregoing, it can be concluded that there exists a positive linkage between contractor monitoring and road infrastructure projects' performance. The alternative hypothesis was therefore upheld. The findings of the research also revealed that 96.3% of the respondents concurred that there exists no overt mechanism for dispute resolution for road projects, with 80.5% further indicating that contractor performance appraisal was non-existent throughout the execution process. Further, the research established feeble procurement regulations leading to the award of contracts to non-deserving contractors, unqualified personnel handling the procurement process; non-

existent contractor as well as contract supervisors' performance appraisal framework; weak internal project M&E system at the Uganda National Roads Agency (Byaruhanga and Basheka, 2017).

The findings by Byaruhanga and Basheka (2017) collaborates with the anecdotal findings of the UNDP (2009) that projects and programmes underpinned by firm M&E components seem to remain on track. Moreover, challenges are commonly detected in advance thereby reducing the probability cost as well as time overruns. With all these indications, monitoring of road construction projects cannot be overlooked if performance has to be realized. The methodological approach used in this study was appropriate such that the data the relationship between variables was tested.The current study measured the moderating influence of process monitoring and therefore the predictors in this study were used to compare the outcome.

Similarly, Mwangu and Iravo (2015) did a study on the effect of M&E on the success of CDF projects in Kenya. The main aim was to determine the impact of project supervisors and contractors on projects' outcomes. The study was inclined to the field survey design, sampling 45 respondents selected through stratified random sampling method. The process of collecting data was conducted using structured questionnaires while analysis was undertaken through SPSS Version 16.0. The study findings demonstrated that project supervisors and contractors utilise monitoring instruments to some extent in the operations of their project, thereby generating satisfactory degree of success. It was also determined that majority of CDF projects in Gatanga Constituency in Kenya had minimal time and cost overruns, a characteristic that was considered key for success of those projects. Therefore, project monitoring affects positively project success. Although these findings are focused on project implementation, monitoring of a project is not limited to implementation only but also on performance after delivery of the same project (UNDP, 2009).

The current study therefore uses this indicator of monitoring (stated as process monitoring) to assess its moderating influence on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in Nairobi County in Kenya. Researching beyond project

implementation would establish its usefulness and influence on post-delivery of road construction infrastructural projects and contribute further to the current body of knowledge as far as monitoring and evaluation of road construction projects is concerned.

Monitoring of all infrastructural projects is significant to realize quality product. Umugwaneza and Kule (2016) evaluated the role of M&E processes on projects sustainability in Rwanda. The study adopted a descriptive research design with a target population of 104 respondents comprised of 100 monitors of Rwanda Electricity Access Scale-Up and Sector-Wide Approach (SWAP) development project and four directors of REG in Kayonza, Bugesera, Karongi and Gatsibo. Slovin's formula was used to determine the sample of 83 respondents. Purposive sampling method was used to select four directors, while for SWAP staff simple random sampling method was used. Both primary and secondary data were utilized in the study: a well-structured questionnaire was utilized to collect primary data. The study utilized questionnaires as an instrument for data collection. The SPSS version 23 was utilzed to analyze the data with a special attention to regression analysis, percentags, arithmentic means, an correlation. Findings of the study was presented using frequency distribution tables. The study findings indicated that accountability ($r=0.347$, $p<0.01$), effective communication ($r=0.466$, $p<0.01$), partnership for planning ($r=0.506$, $p<0.01$) and supportive supervision ($r=0.612$, $p<0.01$) significantly correlate to the sustainability ofprojects in Rwanda.

The study recommended that commitment by the management in overseeing the M&E exercise in the project will enhance project sustainability in Rwanda (Umugwaneza and Kule, 2016). The study also recommended that organizations should consider M&E as mandatory at all levels of the projects. Althouth the focus was on sustainability, it can be deduced that perfomance of road construction infrastructural still relies on a strong M&E system, more specifically process monitoring. Minyiri and Muchelule (2018) also found that the organization would be able to practice monitoring intensity so as to enhance performance in procurement and further recommended that contractors should be allocated with the right amount of resources for project completion.

Further, Ng'etich and Otieno (2017) pointed out that the fast worsening state of roads in Kenya calls for more M&E processes during road construction. The study focused on factors that influence M&E processes of county road projects in Turkana county government. The authors expressed concern that monitoring and evaluation has not been bought well by the relevant bodies or stakeholder like the contractors and ministries handling the projects via various funding bodies. The study sought to evaluate the extent to which availability of funds, stakeholder participation and involvement of technical persons affected performance of monitoring and evaluation processes of county road projects in Turkana County Government.

The study by Ng'etich and Otieno (2017) was delimited to road infrastructure construction projects within the County government of Turkana and the major limitation of the study proofed to be the cost and time constraints. This study utilized a descriptive survey design where self-administered questionnaires and secondary sources were used for data collection.The subjects of study were drawn from the 35 ongoing road projects per financial year and within the geographical precincts of the unit of study. The 50 respondents were selected from employees who have worked in the construction and maintenance of roads since the county government came in place.

This comprised of the technical staff in the Ministry of Roads, Transport and Public works (Turkana County), contractors team and the Monitoring & Evaluation Committee from Ministry of Finance and Planning. The study employed a stratified random sampling technique, which is a probability sampling technique. Numerical data collected using questionnaires was coded and entered and analyzed with the help Microsoft Excel package as opposed to SPPS that was used in the current study to measure relationships and strenghths within variables.

A descriptive analysis with frequency table and varying percentages was used to present the findings of the research. The data was also analyzed using Excel 2013 data analysis: Anova tests to establish if there were any statistical differences between the means of the independent groups. The ANOVA tests yielded P-values greater than the

0.05 level of significance indicating that there was no significant relationship between availability of funds, stakeholder participation, involvement of technical personnel and the monitoring and evaluation processes. Hypothesis testing was further analyzed using Excel 2013 data analysis; two sample t-test, assuming unequal variances. The study concluded that funds available for M&E of most of the county projects are not adequate, unplanned and that there is no timely disbursement (Ng'etich & Otieno, 2017). It was further concluded that stakeholder participation is essential in project management as they have significant influence over the project deliverables and finally involvement of technical persons is key in carrying out M&E activities.

The study findings therefore indicated that there is a great influence of availability of funds, stakeholder participation and involvement of technical persons on M&E processes of county road projects (Ng'etich & Otieno, 2017). However, the study did not demonstrate the extent to which monitoring is conducted hence the need to assessin the current study the extent to whicn process monitoring moderates contractors' capacity evaluation in tender award and performance of road construction infrastructural project in Nairobi County in Kenya.

A study on the influence of monitoring and financial capacity on quality of housing projects in Nakuru County, Kenya was conducted by Asinza, Kanda, Muchelule and Mbithi (2002). The study's objective was to investigate the effect of monitoring and financial capacity on quality of projects in Nakuru County, Kenya. The authors used questionnaires for data collection. The target population comprised of thirty-two construction companies in the county and completion of projects was utilized as the unit of analysis. The target population comprised of 147 members consisting of project engineers, managers and contractors in the 32 companies that were selected randomly using stratified sampling. A sample of 96 people was selected to participate in the study. The study's response rate was at 90.6% and both inferential and descriptive statistics were utilized to analyze the data. Monitoring factors considered for the study were extent of monitoring and monitoring methods, which had a strong and significant positive relationship with, project quality ($r = 0.893$, $p < 0.05$).

Under financial capacity, availability of finance and budgetary allocation had a significant positive relationship ($r = 0.475$, $p < 0.05$) with project quality. The overall regression model gave R2 of 0.354. This showed that about 35.4% of variations in project quality can be associated with financial capacity and monitoring. According to Barczewski (2013), the national hurried pursuit for project development in the last decade highlights the need for efficient construction and operation of new projects together with approval from relevant environmental bodies such as NEMA.

A study by Nyatwang'a (2016) focused on the determinants of effective implementation of environmental management strategies by public organizations in road construction sector in Kenya. The study was guided by one of the objective that sought to determine the relationship between environmental legislation and implementation of Environmental Management strategies during road construction. A descriptive survey design was used whereby both quantitative and qualitative data was collected and analyzed.

The population of interest was therefore twenty (20) Project Engineers, twenty (20) Resident Engineers (RE) and twenty (20) Road project Site Agents (SA) (Nyatwang'a, 2016). In this study sampling was not done since the population of sixty (60) did not warrant sampling and therefore census was preferred. Primary data was obtained using questionnaires while secondary data was be obtained from journals, periodicals, textbooks, project and academic reports. In addition, strategic management publications, reports from governmental entities, internet and developmental plans were also used to provide secondary data. In this study, information was collected using drop and pick method where questionnaires were distributed to the respondents. Content Validity Index (C.V.I) determined the relevance of every item on the instrument on the basis on study's objectives.

From the findings of Nyatwang'a (2016) study, all the respondents (100%) were all male and no woman is involved in the management of the selected ongoing road projects. Majority of the respondents (36) indicated that environmental audit has been carried on the road projects (representing 85.7%) have carried out annual environmental Audit while the remaining percentage (14.7%) have not carried out the

environmental audit. The reason for not having carried out environmental audit was because the road projects have just started and not finished one (1) year. Environmental Audit is done annually as per EMCA, 1999. The findings in the above study further revealed that road projects are not adequately staffed with trained and experienced Environmental and Social Safeguards specialist. Finally, it was concluded that Environmental Management Plans (EMPs) are not adequately implemented during road construction. The reasons why implementation of EMPs has no effect include EMP is not billed item in the contract (47.6%), and EMP is not well articulated in the contract (42.9%).

The other factors are: no permanent staff responsible for environment on site (35.7%), contractors not taking EMP implementation seriously (26.2%), lack of funds (16.7%) and insufficient environmental skills and training for supervision staff (9.5%) among others (Nyatwang'a, 2016). This study could, therefore, be linked to compliance of contractors to monitoring activities. Wanjala, Iravo, Odhiambo and Shalle (2017) observed that over the years, there has been a challenge in monitoring practices implementation which have led to many organizations crumble as a result of failing to mastering the monitoring best practices in respect to performance of their own projects. The authors studied effect of monitoring techniques on project performance in state corporations in Kenya. Selected 65 state corporation to inform the sample size. They used Pearson correlation and and t-test to determine relationships between variables. The findings of the study indicated that monitoring techniques had significant influence on the project performance (techniques ($\beta 3 = 0.674$, $p<0.05$). The study however empasises the importance of monitoring but it does not explain how monitoring particularly influences performance in road construction projects, hence the need for the current study.

2.9 Contractors' Capacity Evaluation in Tender Award, Process Monitoring and Performance of Road Construction Infrastructural Projects

Performance of engineering projects, such road infrastructure and building infrastructure, directly have a relationship with contractors' capacity in executing tasks. For instance, Mutoro, Asinza, Kanda and Malenya (2017) in their study titled, "Effect of Contractor Capacity and Monitoring and Evaluation on Completion of

Water Services Boards in Kenya," found out that contractor capacity had a relatively strong significant positive relationship with completion of projects ($r = 0.657$, $p<0.01$). Mutoro et al., assessed contractor capacity in terms of adequacy of resources and experience. The findings revealed that in all aspects, the respondents did not agree that contractors had; adequate financial resources, skilled personnel, equipment and tools, goodwill from suppliers with construction materials, adequate and relevant construction experience in tune with the similar nature of projects and complexity, site management skills, used current methods and techniques, control over sub-contractors, complied with Health, Safety and Environmental standards, understanding of labour laws. Despite the results from tender evaluation process, the need to ensure that monitoring is made part of it is vital. In view of Rigotti, Migliaccio and De Marco (2015) the process of evaluating performance via previous and personal preferences as opposed to exploiting systematic approaches can result to either misevaluation or ultimate failure. Chan and Chan (2004) argue that:

> "In nature, the construction industry is dynamic, with the 'project success'concept remaining ambiguously defined in the said industry. The ultimate aim for any project is its success. Nevertheless, it implies variegated things to different people. Whereas some authors focus on cost, time, and quality as major criteria, others propose that success is a more complex concept" (Chan and Chan, 2004)

Measuring of project success sounds and appears ambiguous to many scholars. Mwakajo and Kidombo (2017) agree that projects' success means a lot of things because it is a multi-dimensional construct. Koppinen and Lahdenpera (2004) observed that construction and maintenance levels and values of road networks ought to be maintained at the least cost possible; thus, available money should be utilized effectively to meet the expectations of different stakeholders (See Figure 1).

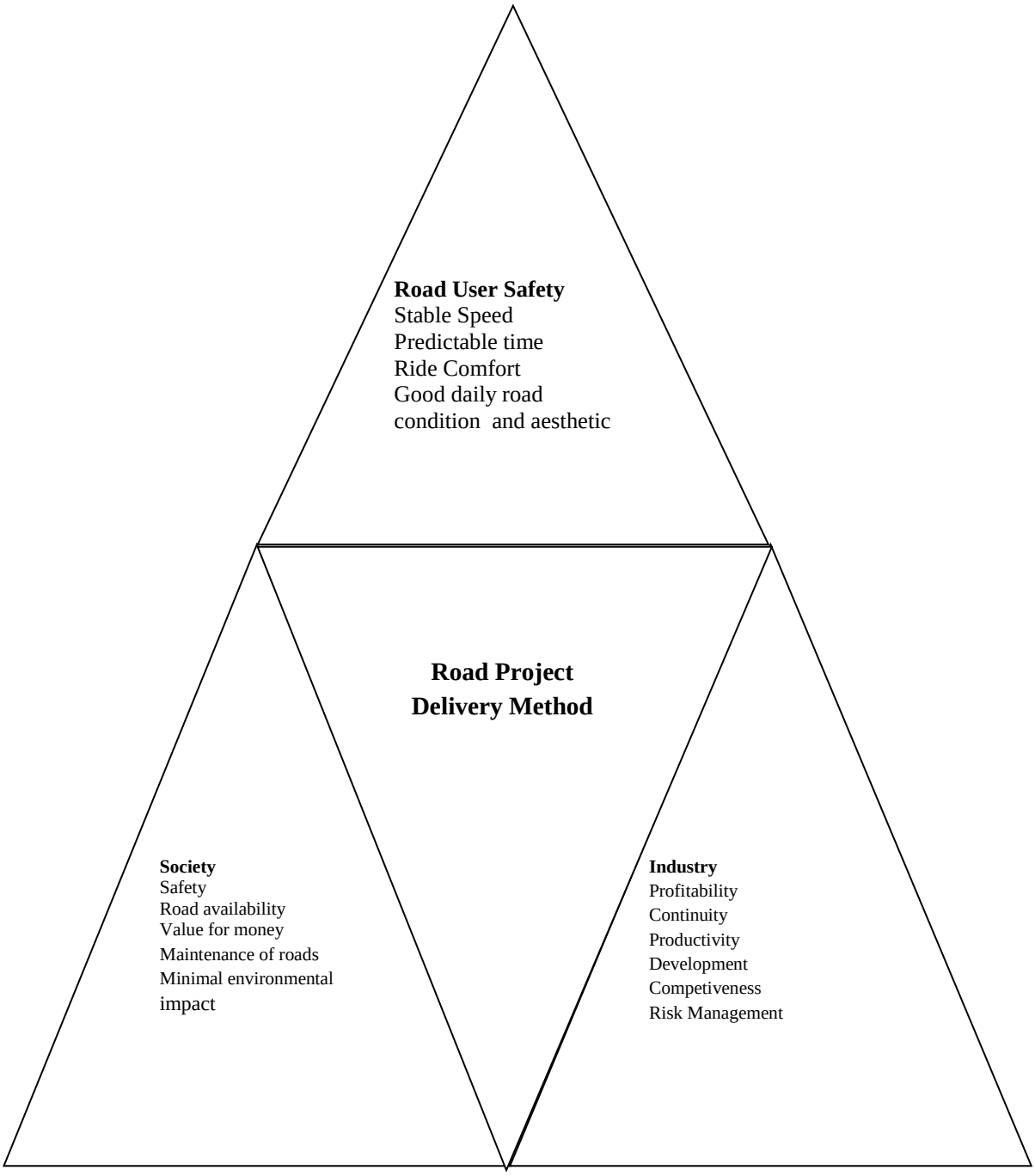

Figure 1: Goals of Various Stakeholders

Source: Adapted from Koppinen and Lahdenpera (2004)

The stakeholders' requirements are focused on performance of the road infrastructural projects. Nicholas and Holt (2003) indicated that adequacy of information, technical knowhow, control and monitoring procedures and contractors' ability to manage risks

are among the key project performance indicators in construction industry. Asinza, Kanda, Muchelule and Mbithi (2016) noted that project quality is associated with monitoring. In the case of small contractors or tasks and services that do not pose significant environmental and social (E&S) risks, a general E&S plan describing controls and monitoring mechanisms, or the adherence to a pertinent client's procedures, may be sufficient (IFC, 2017).

Besides having strong monitoring systems to oversee the specifics in the road construction and, or construction industry generally, there remains a need to understand how to measure performance. According to Wambui, Ombui and Kagiri (2015), the significance of performance identification in an organization is demonstrable globally, with key results being the attraction of investment in the future, upsurge in the share value as well as the attraction of the right and superior human expertise. Others such as Boyle (2014) revealed that performance evaluation framework for contractors escalate the sum total delivery of construction programs, current projects' performance, as well as the capacity to single out contractors of high quality. Objective scoring is typical of a good system, where numerical scores are rationale-based, and regular. Project-specific advantages exist, and learning curve is a salient attribute. A system revealing the complete performance record is fundamental. This evaluation criterion, drills into the justifications for the performance score, thereby identifying challenges on both the designer and the owner.

According to this proposition, late completion shown by the latest progress schedule may not necessarily be a justification for a low score for the particular contractor. This could also mean that the same contractor may have significantly dealt with the problems caused by others before. In fact, since problem solving of that nature by contractors remains fundamental to the project success, superior performance appraisal mechanism rests in its ability to identify such contractors.

2.10 Theoretical Framework

The current study on contractors' capacity evaluation in tender award, process monitoring and performance of road construction infrastructural projects was limited

to theory of construction management, Domino theory of accident causation, resource-based theory and human capita theory.

2.10.1 Theory of Construction Management

The construction management theory was proposed by Radosavljevic and Bennett (2012). They posit that concentration on project management only has limitions in regard to the performance of construction project. The six inherent difficulty indicators were advanced by De Valence (2012) as the basic variables in CM theory; being the main determinants of the most suitable CM strategy.

They include: derived linkages between pre-existing interacting teams way before project commencement; time differences in the course of the project with or without inter-team relationships, otherwise called relationship fluctuation; the amount of time taken by teams to work together in the past, otherwise called relationship quality; interaction patterns throughout project life, called relationship configuration; inconsistencies among team performance, called performance variability; and unavoidable factors otherwise referred to as external interference. Radosavljevic and Bennett (2012) further argue that the progress and development of the construction sector was dependent upon a hybrid of both project and corporate management understanding. The CM theory unveils the argument that construction management aims at efficient and effective completion of construction projects within the set objects. It all begins with the selection of competent project teams for the undetaking of the projects. The team here entails: managers, building team, designers, production specialists, manufacturers, as well as commissioning specialists.

The theory acknowledges the inherent and unavoidable challenges confronting construction teams. It is also founded on the perspective that the key objective of CM is to alleviate such inherent problems. Others such as Seboru *et al.* (2016) in a study on the linkage between materials' acquisition and road construction performance in Kenya utilised the theory and established that performance of such projects has a conflation to the theory in question. Hence the theory is use in the current study, more specifically to test its relevance on the predictor variable management ability of the contractor and performance of the road construction infrastructural projects. It is considered important since it explains the reason why successful projects have a direct

correlation with the contractor's management ability or capability to oversee selection of competent teams and execution of construction tasks as per the design specifications.

2.10.2 Domino Theory of Accident Causation

Advanced by H.W. Heinrich in 1931, Domino theory of accident, attempts to present a set of axioms, otherwise called "the industrial safety axioms". The first axiom deals with cause-effect of accidents, and it stipulates that 'accidents occur due to a complexity of determinants, with the accident itself being the last.' Accordingly, he developed the 'domino theory' model since the said sequence of factors was compared to chain of dominoes hitting and collapsing one another in series. According to Heinrich, Peterson and Roos (1980), the said sequence is injury, due to; accident, caused by; risky act and, or physical or mechanical hazard, as a result of the; person's fault, due to their; ancestry and social ecosystem (See Figure 2).

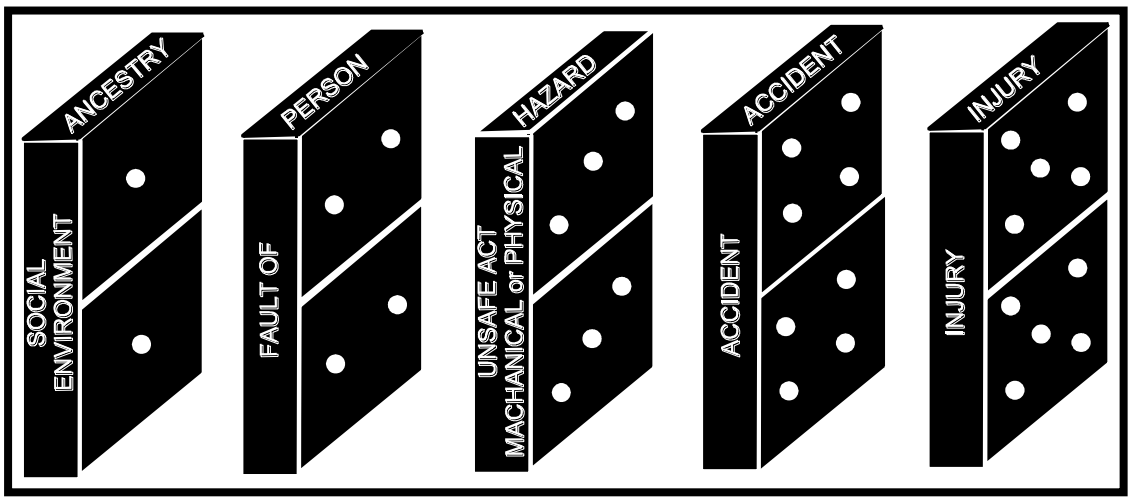

Figure 2: Domino Theory Model

Source: Adapted from Heinrich and Roos (1980)

Five sequential antecedents from the Domino theory have been identified by Hosseinian and Torghabeh (2012), namely: firstly, social ecosystem and ancestry which are among the process of knowledge acquisition at workplaces including culture, values, and attitudes; with lack of skills as well as technology for task

performance, poor ecosystem and social conditions leading to human fault. Secondly, carelessness which mainly is a description of adverse personal attributes, acquired or otherwise. Such carelessness are antecedent to poor work conditions.

Thirdly, hazardous human acts, with risky conditions encompassing the faults as well as technical failures leading to accidents. Fourthly, accidents as a result of risky acts leading to injuries. Finally, injury is the ultimate result of accidents. Domino's theory was further updated by Bird and Loftus in 1974 to put it in the context of management system in the manner proposed by the Domino model. The following explains the series of events in this model (Hosseinian & Torghabeh, 2012): absence of management control system; primary causes including personal attributes, job related attributes, spontaneous causes; contact with energy as well as substance; property, human, and process loss.

Therefore Sabet *et al.* (2013) argue that majority of the construction accidents have their origins from human faults as well as functional sources including facilities and equpments used in the work processes. As a structural map, the domino theory has attracted considerable support and acceptance among the theories that attempt to explain the occurence of accidents. James Reason endeavored to develop a remedy version of domino theory. The former was of the opinion that there always exists a conflation between human conduct and subsequent outcomes.

According to Sabet *et al.* (2013), concerns have to hedge against the risks of accidents as a result of risky activitiesby the persons involved. Others such as Mahat *et al.* (2015) concur with the complexity argument of accident causation, due to the multiplicity of factors antecedent to the on-site accident itself. Accordingly, there is need for an accident prevention strategy since it plays a role in the inter-relationship among the factors in question.

Literature on construction safety shows that many empirical investigative endeavors have been undertaken with a view to analyzing accident records for purposes of categorizing the most frequent forms of accidents and their root causes. Table 2.1 adopted from Mahat *et al.* (2015) entails a summary of literature sources highlighting

the primary causes of accidents at the construction site. Therefore Table 2.1 is a summary of the key triggers of accidents in both building and civil engineering sectors. It has been adopted to illustrate the causes of avoidable accidents in road construction infrastructural projects during the life of the project and when the road is being used by the either motorists or pedestrians.

Table 2.1: Root Cause of Accidents

Author(s)	**Root Cause of Accidents**
Hinze and Parker (1978)	Work pressures as well as rivalry among crew members
McClay (1989a) and McClay (1989b)	Dangers, personal faults, as well as operational limitations
Raymond (1995)	Line managers' inadequate supervision: industry custom as well as practices; incoordination
Kartam and Bouz (1998)	High employee turnover and miscalculated actions; weak safety framework; poor cleaning; fate; poor maintainance of the tools; poor supervision; and object misplacement.
Abdelhamid and Everett (2000)	A two-pronged typology 1) Human error elements: failure to secure and give a warning; failure to adorn protective gear; unauthorized equipment operation; speeding; person specific factors; removal of safety devices; poor service of equipment; insecure posture; defective tool; among other insecure actions. 2) Physical factors, via: vicarious liability; ignorance of set procedures; accident source defects; apparel related dangers; ecosystem related hazards; fire risks; dangerous workshop arrangement; risky methods of work; housekeeping related risks; poor distribution of work; inadequate guard; public risks; as well as other risky conditions.
Suraji, Duff and Peckitt (2001)	Project nature, construction technology, restriction

Author(s)	Root Cause of Accidents
	at the site, project length, systems of procurement, design related complications, sub-contracting related factors.
O'Toole (2002)	Improper capacity building, absence of safety equipment, weak safety enforcement system, unsafe tool and technology, hazardous work environment, bad safety attitude, as well as the failure to comply with prescriptions.
Tam, Zeng and Deng (2004)	Weak leadership in light of safety sensitization; improper capacity building; resource inadequacies; irresponsible operation; uncertified skill labor; inappropriate equipment; no measures for first aid; poor enforcement safety mechanism; non-committal organization; poor educational level; safety unconsciousness of workers; nonexistence of equipment for protection (PPE); poor operationalization of safety regulation; poor technical guidance; relaxed functional procedures; inexperienced staff; inadequate safety regulation; weak transportation safety; material storage exposure to risks; weak team work.
Hamid, Majid and Singh (2008)	Equipment related weaknesses, poor work environment, industry uniqueness, methodological weaknesses, human faults and lack of management engagement.

The Domino theory model is applicable to all accidents and is a possible remedy to the management of losses. The theory is linked to the fourth objective of this study which is the influence of contractors' safety record and performance of road construction infrastructural projects. Though the theory can be linked to accidents occurring during implementation of projects, the gap exist to further explain how accidents can occur as a result of past activities. In this case, the theory was borrowed

to show the relationship of accidents happening as result of contractors' negligence in the road construction projects. This could also be referred to what Domino theory states as 'hazardous human acts', which would mean that some accidents such as pedestrians being knocked down by running vehicles maybe as a result of the contractor's poor workmanship to install adequate footbridges and placing bumps in designated places. Just like the theory has been used to explain how accidents occur during the construction phase of the projects, it is as much as useful to explain accidents when the road is put to use after construction hence another way to measure performance of the road.

2.10.3 Pecking Order Theory

The Pecking Order Theory, also referred to as the 'Pecking Order Model' (Myers and Majluf, 198)4, is related to the company's capital structure. It was modified and popularised by Stewart Myers and his colleague Nicolas Majluf. The theory postulates that companies managers should follow a hierarchichal method when considering various sources of financing.

The pecking order theory attempts to relate to the capital structure of an organization. This theory explains why an organization would opt to first finance its investment using its own internal financing, follwed by debt and lastly equity (Myers and Majluf, 1984). However, it is argued that, from information asymmety, equity financing remains to be the costliest and can only be relied upon as the last option for obtaining financing. Youssef and and El-ghonamie (2015) term capital structure as, " the combination of a firm's liabilities and owners' equity, which means that capital structure of a firm, is a specific mix of all the claims on the firm (debt and equity) that is used to fund its operationsand expansions." A study by Jae-Kyu, Seung-Kyu, Ju-Hyung and Jae-Jun (2014) focusing on the capital structure determinants among the construction Companies in South Korea, empirically analyzed a total of 43 listed construction companies covering a period between 2000 to 2010. The study used a multiple regression analysis. The main focus of the study was on the changes in the coefficients of determinants as per the leverage ratio quantiles of the construction companies. The findings revealed that company and non-debt tax shield size positively related with leverage among comapnies dealing with construction. It was however revealed that a negative relationship existed with leverage in terms of

profitability, growth of the company, company's asset tangibility, and liquidity. The major results noted in this study included: 1) construction companies were following static tradeoff theory in relationship to size; 2) non-debt tax shields seemingly had somehow limited effects on construction companies decisions on capital-structure; 3) in respect to profitability, construction companies were following the pecking order theory; and 4) asset tangibility had the opposite sign compared to earlier studies. In general, results were attributed to characteristics of construction business.

In this current study, the theory was borrowedand linked to the second objective to explain the relationship between finance ability of the contractors and performance of road constuction infrastructural projects. More specifically, the study was out to find out indicators such as credit rating, bank's good will flexibility of the loan agreements, turnover, profits obligations, amount due and owned funds influence performance of the road.

2.10.4 Resource Based Theory

According Rugman and Verbeke (2002) the Resource based theory was founded by Penrose in 1959 and originally captured in her book entitled "The Theory of the Growth of the Firm", the theory has gained popularity as demosntrated by wide application by array of scholars in the strategy thematic area. Rugman and Verbeke note that the theory availed the intellectual underpinning for the modern, resource-based view of an organization. Others such as Theriou, Aggelidis and Theriou (2009) examined the conflation between two dominant views of the concern, namely:Resource-Based View (RBV) as well as the Knowledge-Based View (KBV), by analyzing the comparative effect of concern-specific assets as well as knowledge endowments on the competitive advantage of the organization.

An intergrated framework was suggested elaborating on the causal effect of both views on the competitve advantage of a concern. When considering project success the words of Isaac Newton that "If I have seen a little further it is by standing on the shoulders of Giants," should not erode our minds (Müller & Jugdev, 2012). Theriou, Aggelidis and Theriou (2009) assert that knowledge capacity effects, overt and covert, affecting the performance of a concern in the same manner as the unique assets of

such a concern would, as well as ‘knowledge complementarity or its dynamism’ subtle effects on a concern’s unique assets as well as abilities, leading to the betterment of prevailing or novel marketing, organizational, as well as technical abilities. Theriou and colleagues therefore coined the term ‘dynamic knowledge capabilities’, a conflation that is imperative due to its emphasis on the significance sustainable competitive advantage. Penrose’s theory is considered to have key lessons in management practice and as such, has become a canonical reference resource, capabilities, and knowledge-based theory literature (Pitelis, 2004).

The resource based view shifted attention from a market perspective to a firm perspective when trying to explain differences in firm performance. From the start, with Edith Penrose and The Growth of the Firm in 1959, an ongoing process of development lasted over 20 years until the idea of inter-firm differences in resources as a factor explaining firm success was presented (Hansson, 2015). This theory was further popularized by Barney (1991) who viewed a firm as sum of physical capital resources, human capital resources and organizations.

Resource base theory therefore beliefs that firms that can properly mix its resources and capabilities stand a better chance to gain competitive advantage over other firms. However, Hijzen, Gorg and Hine (2005) warn the negative impact of international outsourcing on the demand for unskilled labour. A similar article by Jaafar, Rashid and Aziz (2005) that focused on the same theory articulated factors antecedent to the SMCEs’ performance in the Malaysian context; it was observed that the ability of the theory to explain the usefulness of a firm’s resources in developing superior performance, is actually its key strength.

Through inferential statistics, the study proposed that SMCEs ought to place more emphasis on managerial capacity about financial, project, and marketing as well as supplier relationships to foster superior performance of a concern. Nevertheless, given the industry uniqueness, the study also established that the characteristics of the owner are insignificant in light of performance of an enterprise. The study results availed evidence to the effect that a firm’s survival is a function of its key resources, including, appropriate managerial abilities to develop strategies for sustainable

industry competitive advantage. Hence, the theory stood out to support the following predictor variables used in this study to measure performance of roads, these are; financial ability of the contractors, technical ability of the contractors and management ability of the contractors versus performance of road construction infrastructural projects in Nairobi County, Kenya.

2.10.5 Human Capital Theory

According to Fugar, Ashiboe-Mensah and Adinyira (2013), the above theory was founded by Schultz (1961) and refined by Gary S. Becker in his seminal work on "employer-provided training economics" of 1962 and 1964. The theory proposes that capacity building has the potential to instill critical knowledge assets to workers, thereby increasing the income and productivity of those workers. An attempt has been made by Becker to draw a distinction between specific and general human capital. Accordingly, specific human capital entails technology obtained via capacity building initiatives, and that which seeks to address specific skill needs.

Conversely, general human capital has been defined as is knowledge acquired through capacity building initiatives but whose value transcends contextual differences, such as literacy skills. Bohlander *et al.* (2001) have defined the concept of human capital as the skills, knowledge, as well as abilities of persons, and of which have economic worth to a concern. This definition has something in common with the definition given by the OECD, and which offers a description on human capital as bundles of knowledge, competencies, skills-sets, as well as characteristics contained in persons that enhance the development of personal, economic and social welfare (OECD, 2001).

Similarly, Dess and Pickens (1999) have defined the concept as the abilities, skills, knowledge, as well as experience, all domiciled in, and part and parcel of a person. These three definitions underline three key words, "knowledge", "Skills" and "Competencies (capabilities)". According to Becker, the concept of human capital is similar to the physical avenues for production, including machines and factories. This applies where one is capable of investing in human capital through capacity building programmes as well as medical treatment.

Hence, it is through human capital that production is tenable, and through which marginal investment is capable of yielding marginal output (Fugar, Ashiboe-Mensah & Adinyira, 2013). In a structural equation modeling based study of the determinants of mechanism of construction development transformation in China, Wang, Li and Shi (2015) asserted that the role of the basic production factors for the transformation played in the construction could not be ignored. The authors compared the influence coefficient of seven factors, physical capital and human capital and found that they were still important, which they noted that the construction was still labor and capital intensive, so that human capital, mechanical equipment, and so forth still played an important role in construction currently. Human capital is considered key in construction industry in the sense that most of the production work requires a human hand.

This theory is linked to skills and competencies required by construction contractors to enhance their effectiveness and performance while undertaking special assignments in the construction works. The theory therefore supports the third objective of this study: to assess the influence of technical ability of contractors on road construction infrastructural project performance in Nairobi County, Kenya.

2.11 Conceptual Framework

The conceptual framework in figure 3 guides the study. A conceptual framework has been defined by Svinicki (2010) as an integrated set of notions about the functionality of a phenomenon, or of its components. Accordingly, the framework is the basis upon which causal relationships across events, notions, concepts, observations, interpretations, knowledge, as well as other aspects of experience can be visualized. visualized.

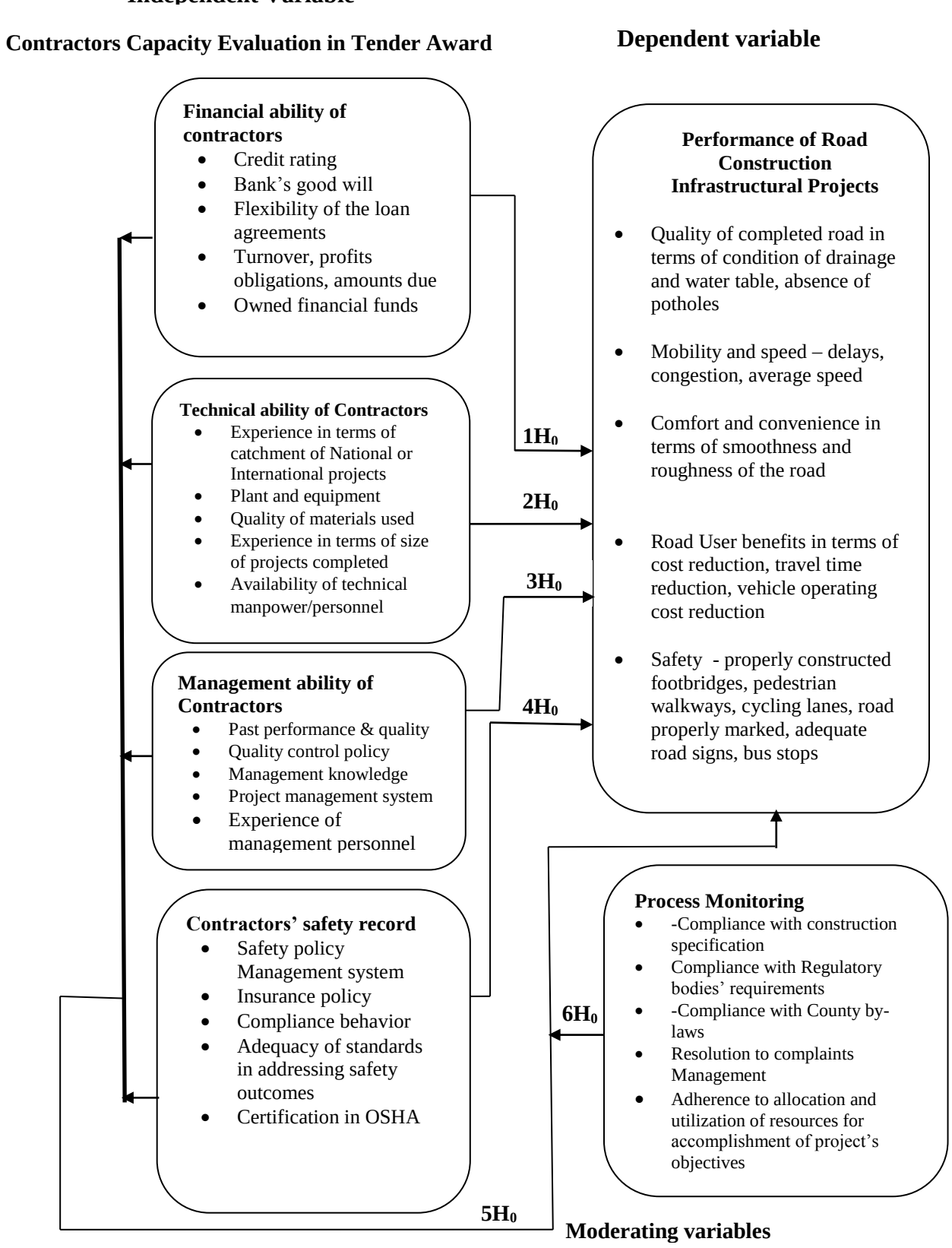

Figure 3: Conceptual Framework of Contractors' Capacity Evaluation in Tender Award, Process Monitoring and Performance of road construction infrastructural Projects.

Grant and Osanloo (2014) assert that in the absence of a conceptual framework, the vision and structure of a study would be unclear the same way a house would be if it would be constructed without a blueprint. The relationships among the variables in this study were conceptualized as shown in Figure 2.2 Contractors' capacity evaluation in tender award are the independent variables of this study and in this respect; the aim is to find out how each of these variables financial ability of contractors, contractors technical ability, contractors management ability, and finally contractors' safety record relate with road construction infrastructural project performance which is dependent variable. The influence of joint contractors' capacity evaluation in tender award and road construction infrastructural project performance was also established.

Process monitoring is purposed to improve contractors' capacity evaluation in tender award in general and for this reason, it is necessary to establish how this process monitoring moderate between contractors' capacity evaluation in tender award and road construction infrastructural project performance. Process Monitoring is in itself a variable that can be used to gauge the suitability of a contractor to assume monitoring processes but being the end result of the tender evaluation processes, it is isolated as a moderating variable and performance treated as a dependent variable.

The reviewed literature has presented adequate evidence that performance of road construction project is dependent on a number of factors or variables including those chosen for this study: financial ability of contractors, technical ability of contractors, management ability of contractors and contractors' safety record. Therefore, the interdependencies of these independent variables should not be ignored in construction of road projects for them, at a greater extent, influence project performance.

For example, while the financial ability of contractors ensures the required inputs in the project are sufficiently supplied, bearing in mind the contractors' good credit rating and bank's good will among other predictors, the technical ability and management ability of contractors forms the requisite human resources for

construction of quality projects that survive test of time and offer maximum satisfaction, in this case road-user benefits.

On the other hand, the need to consider contractors' safety record is key to ensure that accidents are not only curbed or prevented during the construction phase but also, most importantly, after post-delivery. This means that contractors are able to adhere to safety procedures that ensure that the road user is not susceptible or prone to any accidents that might be because of negligence to safety procedures. Similarly, the role of the moderating variable, specifically process monitoring is to provide oversight or the strategic guidance and control necessary between the contractors' capacity evaluation in tender award and performance of road construction infrastructural projects.

Subsequently, process monitoring is assumed to determine the interplay between the independent variables. In addition, process monitoring is assumed to speed up the achievement of high project performance designed and as intended to meet the road-user benefits or satisfaction. In general, the interrelationship between the independent variable and the moderating variable is assumed to lead to high-level performance in performance of road infrastructural projects.

2.12 Summary of Literature Reviewed

The literature review focused much of its attention on empirical literature and general theories relating to contractors' capacity evaluation in tender award, process monitoring and road construction infrastructural project performance in Nairobi County. This was with the focus on financial ability of contractors and performance of road construction infrastructural projects, technical ability of contractors and performance of road construction infrastructural projects, contractors management ability and road construction infrastructural project performance, contractors' safety record and performance of road construction infrastructural projects and finally a summary on the moderating variable, process monitoring.

From the literature reviewed, this study has picked out a number of concerns for each of the study variable. Firstly, it is revealed that project performance is a broader concept that is informed by the completion of a project (delivery) and the life of the project (post-delivery), with latter informing this study. For example, Artikinson (1999) has attempted to draw a distinction between the criteria for success into delivery as well as post-delivery phases. The framework avails a methodology for the understanding of success criteria, namely: the iron triangle; information system; firm-level and community advantages.

Cost, time as well as quality criteria relate to the 'iron triangle'. Post-delivery levels consist of: (1) information system, whose conditions are: reliability; maintainability; validity; and information quality utilization (2) the conditions for firm-level benefits are: better efficiency; superior effectiveness; better bottomline; long-term goals; institutional learning as well as waste reduction (3) the benefits to the community are: consumer satisfaction; social and ecosystem impact; personal growth and development; knowledge acqusition; better profits to the contractor and suppliers of capital, as welll as overall economic impact accruing to the general community. The model is relevant for both intra as well as the extra-project life cycle phases; hence ideal for continuous appraisal. Onatere, Nwagboso and Georgakis (2014) while studying on performance indicators for urban transport development in Nigeria listed a number of safety performance indicators, which include but not limited to damaged roads with potholes, damaged or collapsed bridges, number of road signs and traffic measures, number of people killed or seriously injured in road traffic accidents, and inadequate headways.

According to Pekuri, Haapasalo and Herrala (2011) performance is a much general concept covering both the economic as well as the functional components of an economic sector. The concept entails productivity as well as the bottom line, among key non-cost elements, such as quality, speed, delivery and flexibility. Baccarini (1999) defines project performance using two success concepts: firstly, successfully accomplishing a project on time, without cost overruns and with high quality, all of which are measurable in terms of budgetary, time, fucntional as well as technical

conformance; and secondly, the final product's effects, including satisfaction of the project purpose and key stakeholders.

Similarly, Nyangwara and Datche (2015) did a research focusing on the factors affecting construction projects' performance in the context of Coast region, Kenya. The key study objectives were: firstly, to assess the determinants of construction projects' performance for the assistance of key stakeholders to address performance challenges as well as to bolster performance of such projects; secondly, to examine the external environmental influence on the project performance.

Thirdly, to identify the most impactful project procedures on the performance of projects; and finally, to assess project management actions' impact on project performance. Nguyen (2015) indicated that the use of frameworks to evaluate contractors' bids to weigh their abilities remains important to ensure that construction projects can effectively be managed. Prequalification, therefore, is used to assess the suitability of contractors. This process is also tied to bid evaluation. According to Herbsman and Ellis (1992) there must be a clear multi-parameter bidding system that assesses the bid amount, time of execution, and quality of previous work. From the reviewed literature, it was also revealed that the financial stability of contractors had influence on performance of road construction.

The most affected by capital requirements are indigenous contractors undertaking public sector construction projects (Igochukwu and Onyekwena, 2012). In Mwakajo and Kidombo (2017) study it was established that the level of financing is a basic factor of task execution. Kithinji and Kamaara (2017) also found that project finance largely influenced infrastructure project completion. A study by Densford, James and Ngugi (2018) also demonstrated through the findings that there exists a strong relationship between financial resource mobilization and performance of road as far as quality is concerned. The study posited that financial resource mobilization as a strategy could be used to raise funds within a construction firm which in turn could contribute to road performance. Akali and Sakaja (2018) found that contractors had the capacity for accessing capital sources and loans. Rahman, Memon and Karim

(2013) established that besides cash flow, financial challenges are significant factors causing cost overruns in large construction projects in Malaysia.

The technical abilities of contractors' and performance of road construction infrastructural projects are interdependent. The reviewed literature revealed that there can never be quality workmanship without proper project's materials. The study by Seboru *et.al* (2016a) listed indicators to be used to measure technical capacity of a given contractor. The indicators include material procurement, storage, inventory control, testing the quality of raw materials, quantifying materials required, and identifying materials to be used in a project. Out of these indicators, it was concluded that quantification of materials required has greater influence on construction projects.

Moreover, the study revealed that contractor's competency and timely availability of construction of resources. A similar study by Seboru *et.al* (20016b) recommended that training diversity could improve workers' abilities to share knowledge during project execution. Various studies have highlighted issues related to management capacity of contractors. Some of the related factors are listed by Naik, Sharma and Kashiyani (2015) as follows: some of the issues related to management capacity of contractors include poor planning and scheduling, management of personnel, lack of materials and equipment to meet schedule, poor job-site supervision, inadequate management knowledge and contractor experience, lack of team work and proper guidance by the supervisors.

Aje, Odusami and Ogunsemi (2009) conducted a research on the impact of contactors' management capacity on the time and cost of performance of construction projects in Nigeria. The statistical findings revealed that contractors' management capability is a significant criterion in the appraisal of potential construction contractors' performance in the course of prequalification as well as tender assessment. Previous performance and quality thereof, experience of the contractor, management knowledge as well as programme for quality control were also identified as the major yardsticks for assessing contractors' management ability. Others such as Omran, Abdalrahman and Pakir (2012) state that project managers should work with an effective team.

The road construction infrastructural project performance is also influenced by the contractors' safety record. There are two aspects of safety performance: safety compliance that is following procedures and safety compliance meaning participating in safety related activities. Safety and health administration performance can be evaluated effectively by breaking regulatory processes into two elements: behavior compliance, and enforcement (Weil, 2001). Employer's practices and investments in safety by worker training and site management are key to overall performance. Jannadi and Bu-Khamsin (2002) agree that planning and preparation, the use of signage, signaling and barricades are useful in minimizing accidents occurrences. Others such as Diugwu, Baba and Egila (2012) concluded that constraints to safety management in construction industry are lack of adequate regulations, lack of resources (personal or financial) lack of knowledge of details and implications, lack of management commitment.

Process monitoring has been demonstrated to have a relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects. Bulle and Makori (2015) noted that to a great extent monitoring and evaluation in strategic planning influences performance of urban roads in organizations. Although Byaruhanga and Basheka (2017) argue that inadequate attention is given to project monitoring of road infrastructure. Similar study by Mango and Iravo (2015) demonstrated that contractors and project supervisors utilise monitoring instruments to some extent in the operations of their project, thereby generating satisfactory degree of success. Wanjala, *et al.* (2017) found that monitoring techniques significantly influenced project performance in state corporations.

It was also determined that majority of CDF projects in Gatanga Constituency in Kenya had minimal time and cost overruns, a characteristic that was considered key for success of those projects. Therefore, project monitoring affects positively project success. Asinza, *et al.* (2002) found that the extent at which monitoring is happening and the monitoring methods being used have a strong and significant positive relationship with project quality.

2.13 Knowledge Gaps

From the literature reviewed, this study has picked out a number of concerns for each of the study variable; the first variable that this study considered is; contractors' capacity evaluation in tender award; the second is moderating variable process monitoring on relationship between performance of road construction infrastructural projects. The literature review has demonstrated that previous studies have focused on factors influencing road construction performance, although performance is to mean project implementation instead. These factors are majorly used during prequalification and bidding of road contractors.

Contractors' capacity evaluation in tender award is, therefore, based on these factors as reviewed. Although the factors are used to measure project implementation, this study used these factors to measure performance. Only two studies (Seboru, et. al, 2016a; Seboru, *et al.*, 2016b) from the review of the literature have shown the relationship between contractors' capacity evaluation in tender award and performance of the road construction infrastructural projects as indicated in the matrix Table 2.2:

Table 2.2: Matrix Table for Literature Review: Summarizes the Knowledge Gaps Established in Review of Related Literature

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
Performance of road construction infrastructural projects	Kihoro and Waiganjo (2015)	The determinants of performance of projects in construction sector, a survey of gated community in Nairobi City County, Kenya	The study population comprised of property developers who had invested and completed projects in gated community development. A small sample population of 200 project managers in the study was calculated by normal approximation to the hyper-geometric distribution to arrive at a sample size of 130. The study adopted a semi structured open and closed questionnaire as data collection instrument. A pilot study was conducted on 20 property developers in Kiambu area which is the second largest with gated community.	Performance is a dependent variable that can be determined by several independent variables. The study concluded stakeholder management and competence of the project manager was essential in the performance of a project. The study recommended the use of multi criteria analysis during planning as well proper relationship management among all the stakeholders in the project.	The study only dealt with factors affecting performance in construction industry. It did not address the interaction of contractors' capacity evaluation in tender award, process monitoring and performance of construction projects.	Demonstrated the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in Nairobi County, Kenya.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
	Seboru, Mulwa, Kyalo and Rambo (2016a)	The acquisition of materials' influence on road construction projects' performance in Kenya, a case of Nairobi County.	Anchored on the controlling, stakeholder and construction management theories. Philosophical paradigm was pragmatism, while the research approach was mixed methods. Cross sectional descriptive surveys as well as correlational research design were used. A sample size of 74 senior engineers comprising 30 from consulting engineering firms as well as 44 senior engineers from construction companies; 74 managing directors comprising 30 managing directors from consulting engineering firms as well as 44 managing directors from construction concerns. A five point Likert type scale research questionnaire was employed to gather data of quantitative nature, with interview guides	H1 was rejected since the statistical results yielded R^2=0.246, F (6, 40) =2.173, p=0.066>0.05, leading to a conclusion that the predictor variable was statistically insignificant in regard to the influence on the criterion variable. In spite of this, the determination requisite material quantities significantly influenced the road construction project performance. A recommendation was drawn that concerns dealing in road construction ought to set up the right policies that guide requisite quantity determination.	Though the study used acquisition of materials as the independents variable, the criteria used for measuring suitability of the contractors were not clearly stated and therefore the gap exist that this new study wishes to bridge by looking at financial, technical, management and safety and health record of the contractors.	Theory of construction management was used to explain the relation of the independent and dependent variable in the study of contractors' capacity evaluation in tender award and performance of road construction infrastructural projects. The methodology used maybe replicated in this study.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
			were utilized for qualitative data collection. Descriptive data was analyzed using percentages, frequencies, arithmetic mean as well as standard deviation. Inferential statistics were undertaken using Pearson's Product Moment Correlation as well as Linear Regression.			
	Enshassi, Mohamed and Abushaban (2009)	Determinants of local construction projects' performance: a case of Gaza Strip, Palestine	120 study questionnaires were disseminated to 3 majorcategories participants in the project: 25 project owners; 35 consultants; as well as 60 contractors. Accordingly, 88 research questionnaires, representing 73% were returned: 17 were from project owners; 25 from project consultants; while 46 were from contractors.	The survey resultsdemonstrated that each of the 3 categoriesconcurred thatthe most significantdeterminants of project performance were: time-overrunsoccasionedby the closure of roads, henceinadequacy of materials; resource unavailability; poor project management skills; material price fluctuations; personnel skill gaps; and equipment quality weaknesses.	The study captured some of the indicators of contractors' capacity evaluation in tender award (leadership skills, unavailability of resources, unavailability of highly experienced and qualified personnel and quality of equipment. These indicators plus the ones not mentioned here were not tested.	The study used the indicators of contactors' capacity evaluation in tender award and showed their linkage with the outcome variable, being performance of road construction infrastructural projects.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
	Nyangwara and Datche (2015)	Factors affecting construction projects' performance in the context of Coast region, Kenya	Descriptive cross sectional survey as well as correlational designs were employed. The extent of concurrence among respondents in light of the factor-ranking was established through the use of Kendall's Coefficient of Concordance. Questionnaire survey, interviews, case studies as well as modeling were employed for data collection. 40 aspects were established using survey questionnaire, classified into 8 categories, appraised as well as ranked whether project owners, consultants or constructors. 180 study questionnaires were disseminated to project owners, consultants as well as contractors, with 132 questionnaires successfully returned	The points of convergence among the three categories of respondents were: average time-overruns occasioned by material inadequacies as well as road closures; resource availability according to plan; project management leadership skill-sets; material price fluctuations; personnel skill-sets; as well as material and equipment quality.	Failure to include road users like PSV Matatu drivers to give their opinions and experiences about their satisfaction. Satisfaction among these sampled population may not have been adequately answered or addressed hence the current study.	The current study proposed to replace Owners of construction projects with the PSV Matatu drivers and not use the Owners of Matatu.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
Financial ability of Contractors	Mwakajo and Kidombo (2017)	Factors influencing projects performance in road infrastructural projects in Manyatta constituency in Embu County in Kenya.	This research used a descriptive survey design and targeted a population 153 which include active road contractors, contracted staff, directors, engineers, technical staff and clerical and support staff. The researcher only sampled Active road contractors using simple random sampling method. The sample size was determined by using Yamane formula. The study used 126 respondents as a total sample size including active road contractors. Data was collected using semi structured questionnaire. Frequency and percentages was used for the descriptive data. Coded broad sheets thereafter were used for extracting data from the returned questionnaires. The researcher analyzed the data by SPSS having carefully completed the	The findings concluded that availability of finances enable resource acquisition.	The variable of availability of finance was only used to show relationship as far as the project implementation or completion is concerned but the performance during the life of the road projects was not clearly stated.	The study show ed the relationship of financial ability of contractors and performance of road construction infrastructural projects (post delivery phase).

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
			variable view and imputed the extracted data appropriately on the data view.			
	Denford, James and Ngugi (2018)	Effect of Project Resource Mobilization on Performance of Road Infrastructure Projects Constructed by Local Firms in Kenya.	Target population was 41 roads constructed by local construction firms. Descriptive analysis was performed whereby results were presented using frquencies, percentages, means and standard deviation. To show strenth and relationships among variables, correlation and inferential statistics were run hence the results achieved were empirical.	The study looked at financial resource mobilization as a strategy to enhance performance of the roads constructed by local construction firms.	The study was focused on the Lake Basin region and therefore results could not be generalized hence the need to conduct a study in Nairobi and demonstrate how overally finacial ability of contractors influences performance of road, specifically during post delivery stage.	The current study demonstrated there existed a strong relationship between financial ability of contractors and performance or roads in Nairobi County, Kenya.
	Kulemeka, Kululanga and Morton (2015)	Inhibiting determinants of performance of SMCs from the dimensions: “work quality,” “ estimation of tender,” “preparation of tender,” as well as “completion on time ” of Malawian	370 survey questionnaires disseminated to respondents in the construction sector,includingclientele in the public sector, consultants, contractors,as well as resource trainers so as to collect data from 118 attributesarrived atvia a well thought out review of literature.	The factors were largely economic in nature, concurrent with previous findings in the Sub-Saharan Africa. Top in the list of influencers was high lending interest rates; capital access challenges; forex fluctuations; bond obtainability challenges; as well asprohibitive tax regimes. The findings set	This study, however, left a gap to be studied in terms of the influence of contractor’s finance on post delivery performance of the road construction projects.	The study established how financial ability of contractors influences performance of road construction infrastructural projects.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
		construction projects.		the pace for continued research on the same phenomenon in such a dynamic world, accelerated by global elements and punctuated by spontaneous changes.		
	Kithinji and kamaara (2017)	Determinants of Government road infrastructure projects'completion in Meru County, Kenya.	The study employed descriptive design, with the target population being contractors and construction project managers. A census survey technique method was adopted and sample size was 80 respondents. A closed and open-ended questionnaire was used to collect primary data. Both quantitative and qualitative approaches were used for data analysis. Quantitative data was summarized and analyzed using descriptive statistics with the help of Statistical Package for Social Sciences (SPSS) version 23. Qualitative data adopted Content analysis while inferential	The finding indicated that project finance, and project technology innovation largely influenced infrastructure project completion.	There exist a gap on post-delevery project performance hence the need to test the same	The study established that financial ability of contractors influences performance of road construction infrastructural projects even during post delivery of the project or when the road is being used. That is the quality could easily be ascertained.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
			statistics was applied to identify a mathematical relationship between variables using multiple regression analysis, which was used to establish the degree of statistical relationships between the study variables. A response rate of 82.5% was established with 66 respondents reached, out of the 80 targeted			
	Akali and Sakaja (2018)	Influence of Contractors' Financial Capacity on Performance of Road Construction in Kakamega County	Desriptive survey design, Stratified random sampling. Used Yamane formula (1967). Target Population was 203 and sample size was 135 which included contractors and engineers charged with supervisory tasks. Test retest was done to ascertain reliability by use of Cronbach's Alpha coefficient which was established to 0.754.	40% (a large extent) and 30% (a moderate extent) of contractors can access capital sources/loans; 30% and 60% (to a large and moderate extents respectively) have capacity to access funds	The study did not measure how the independent variable and dependent variable correlate and also the strength of the variable through regression analysis was not carried out.	The study showed there is a strong relationship between contractors' financial ability and performance of road projects.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
	Rahman, Memon and Karim (2013)	Significant Factors Causing Cost Overruns in Large Construction Projects in Malaysia	Used questionnaire whereby 262 were returned out of 400, data analysis done by use of SPSS, to rank factors Relative Importance Index (RII) was used.	Cash flow and financial difficulties continue to face the today's contractors in construction industry.	The study did not measure the strength and relationship of the predictor variable (financial capacity). The study focused on all construction firms.	The current study showed that financial capacity of the contractors significantly influences performance of roads and not only implementation.
Technical Ability of Contractors	Atieno and Muturi (2016)	Determinants ofroad construction projects' performance in Kenyan arid and semi-arid geographical contexts and focuses on the Isiolo – Moyale (A 2) and Garissa – Modogashe (C 81) road projects.	A descriptive research design was employed. This study had a small population of 77 and thus no sampling was done, a census was carried out. Regressions and ANOVA (Analysis of Variance) test was used to assess the factors affecting performance of road construction projects.	The researchestablished a positive correlation between Contractor's Competency, Construction parties' Financial Management, Timely availability of Construction Resources, and Conflicts towards the realisation of increased performance of road construction projects in arid areas in Kenya. The study also found that the predictor variables account for 82.7% of variance of the criterion variable. The study found that the contractor's competency variable will lead to the greatest change in performance followed	Though the relationship was established that contractors' competency have a possible influence on the performance of the road construction projects, that was done only on project completion phase of the project but not during the life of the roads projects. Hence, the need to study post delivery performance.	The study established how a contractors' competency or abilities can influence performance of road project even after completion phase.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
				by the conflict variable, construction parties' financial management variable and timely availability of construction resources. attle rustling meetings by national and county governments; and fair and equitable compensation and resettlement of Project affected persons.		
Management ability of Contractors	El-Maaty, Akal and El-Harawy (2016)	Egyptian highway projects' performance via identification of quality performance determinants	13 owners of highway projects, 27 owners of regional roads, as well as 15 consultants subjected to a study questionnaire.	Using fuzzy triangle approach to undertake an analysis of datademonstrating that the most significantdeterminantsof quality, the following were identified: staff experience in such projects; inspection efficiency; clearly defined terms of reference among key stakeholders; sub-standard pavements due to physical factor dynamcs ; as well as the quality and type of asphalt utilised in the process of construction.	Though the study determined the most critical quality performance determinants, no relationship was done among these variables.	The study showed the relationship of the management ability variable and the dependent variable performance after completion of the road construction.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
	Aje, Odusami and Ogunsemi (2009)	The contractor management capacity's impact on time as well as cost performance of Nigerian construction projects.	Data collection method not clearly articulated	The study findings revealed that the management acumen of contractors is a key criterion for the appraisal of performance potential of construction contractors at the pre-qualification as well as tender assessment stages. It was also determined that past quality performance, experience of the contractor, knowledge portfolio of the management as well as a programme for quality control were the key determinants of contractors' management capacity. It was also discovered that contractors' management capacity significantly impacted time and cost performance, with p-values being 0.042 and 0.039, respectively.	Though the study presents clearly the criteria of judging contractors' management capability, this is not clearly brought out to show how performance is affected by the same throughout the project life (post-delivery).	This new study on contractors' capacity evaluation in tender award used the same indicators but now to measure performance after project completion but specifically the life of the road construction projects. A relationship was therefore established.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
	Omran, Abdalrahman and Pakir (2012)	A case study of the project performance in Sudanese construction industry.	A random distribution of 75 structured study questionnaires, out of which 52 were successfully returned. RII system was employed to rank the determinants of project performance accordingly. The Kruskal-Wallis test revealed the comparison and opinion variations in between the respondents.	The findings indicated that the five priority factors influencing project performance were: experience and skill-sets level of project leadership; planning level; design as well as specification adequacy; and progress of cost monitoring.	The indicators for contractors' capacity evaluation in tender award are well stated only that the authors have used these variables to show the relationship up to completion of the project but not after that; that is, throughout the project life.	The current study proposesd to examine the degree to which the variables listed can or does affect performance of roads construction infrastructural projects during post delivery.
	Ntuli and Allopi (2014)	The impact of experience as well as skill-set inadequacies on the construction sector in Kwazulu-Naatal, South Africa.	Focused group discussions	The challenges established included: capacity development; tendering process knowledge gaps; cash flow issues due to delayed invoice settlement; high levels of corruption; insufficient understanding of the procurement processes by the contractors; poor business planning skills; ignorance of the CIDB's role in the sector; absence of functional as well as managerial abilities among contractors; poor pricing; ignorance of the	The study revealed important factors that are likely to affect a project success or performance but a relation was not established.	The findings of this study are focused on project completion but this new study used, for instance, the personnel skills and show the relationship with the performance of road construction infrastructural projects in a post delivery stage of the same.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
				overarching conditions of the contracts; sub-contracting problems; enhanced transparency in tender opportunities circulation; as well as the establishment of a forum for experience sharing.		
Contractors' Safety Record	Jannadi and Bu-Khamsin (2002)	Safety determinants in the Saudi Arabian construction context	A survey of 28 concerns involved in large industrial construction projects in the Eastern region. The research methodology involved the following steps: (1) literature review was undertaken for the identification of variables; (2) a list of variable dimensions and their respective indicators was developed; (3) expert interviews were then undertaken to enhance construct validity; (4) a research questionnaire was developed based on the identified variable dimensions and indicators; (5) data was the collected; (6) data	Engagement of the management, protective gear, planning as well as preparation for disasters, radiations, ladders and scaffolding, prevention of fires, electrical tools, excavators, trenching as well as shoring, and mechanical tools constitute the most significant determinants of the industrial construction safety performance. The respondents concurred on the significance of three key factors, via: the involvement of management; protective gear; as well as emergency planning, as	This study was conducted in industrial set up. The variables appear to measure performance during implementation of the project.	The current study used some of the indicators to measure performance in road construction infrastructural projects during post delivery of the project.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
			analysis was undertaken; and (7) a summary of the results was developed	the highest biggest influencers in this regard.		
	Diugwu, Baba and Egila (2012)	Regulative effectiveness and the degree of sinsitization in the context of Nigerian construction sector	Random dissemination of 495 research questionnaires, out of which 312 were successfully returned and comprising 271 and 41 valid and invalid questionnaires respectively. Being 69% response rate.	Despite several construction concerns being probably aware of the safety and health impacts of their activities, they still had no safety and health policy in place. Summarily, the research concluded that health and safety management constraints, inadequate support, asset limitations, lack of knowledge of details as well as implications, and management non-commitment impacted the safety and health strategies.	The research determined that the determinants of health as well as safety of contractors in the construction sector. However, a gap still prevails since these variables' indicators are relevant only up to till project completion; and not in the course of the project's life demonstrate real performance.	The study demonstrated how contractors' safety record influences performance of the road construction infrastructural projects.

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
Process Monitoring	Mwangu and Iravo (2015	A case study on the effect of M&Eon the success of Constituency Development Fund Projects in Gatanga Constituency, Kenya.	The study was inclined to the field survey design, sampling 45 respondents selected through stratified random sampling method. Data collection was done using structured questionnaires while analysis was undertaken through Statistical Package for Social Sciences (SPSS), Version 16.0.	M&E instruments are employed by contractors as well as project supervisors to a someextentin their project functions, thereby realizing success of such projects. Majority of CDF projects in thes saidcontextexperienced neither cost nor time overruns, accounting for their success.	Instruments for monitoring are used in project operations but the gap exists whereby the extent to which monitoring happens is not clearly stated.	The study showed the extent to which the moderating variable, process monitoring, influences the relationship between the contractors' capacity evaluation in tender award (predictor) and performance of road construction infrastructural projects in Nairobi County.
	Byaruhanga and Basheka (2017)	Influence of contractor monitoring on road infrastructural projects' performance of in the Ugandan context.	Non-probability sampling design was utilized in the selection of engineers and procurement professionals. Simple random sampling was used to select members of parliament, private consultants, and civil society organizations. A mix of both closed ended questionnaire and	Key findings of the study include: award of contracts to undeserving contractors due to weak systems of procurement; incompetence of staff involved in the procurement exercise; none existent contractor apparisal system; service delivery challenges due to delayed payments; weak internal M&E systems.	The study clearly outlined there is imperative need for monitoring but did not demonstrate to what extent. The weaknesses that are dragging effective monitoring are therefore subject of this study's gap.	The study showed the extent to which the moderating variable, process monitoring, influences the relationship between the contractors' capacity evaluation in tender award (predictor) and performance of road construction

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
			interview guide was used to collect data.			infrastructural projects in Nairobi County, Kenya (criterion).
	Umugwaneza and Kule (2016)	Role of M&E on projects sustainability in Rwanda.	The study universe was 104 respondents. Slovin's formula was used to determine the sample of 83 respondents. Purposive sampling and simple random sampling methods were used. Secondary as well as primary data were bothemployedin the study. Primary data was collected using a well-structured questionnaire. Research questionnaires were utilised as an instrument for data collection. Data analysis was done through SPSS version 23. Data analysis involved statistical computations for averages, percentages, and correlation and regression analysis.	The study findings indicated that accountability ($r=0.347$, $p<0.01$), effective communication ($r=0.466$, $p<0.01$), partnership for planning ($r=0.506$, $p<0.01$) and supportive supervision ($r=0.612$, $p<0.01$) significantly correlate to the resilience of projects in Rwanda. It was suggested by the study that management engagement in overseeing the M&E exercise in the project wouldfacilitate project resilience in the Rwandan context. The study also recommended that organizations should consider monitoring and evaluation as mandatory at all levels of the projects.	The role of monitoring though pointed out, that the management needs to be engaged in process monitoring, the gap exists in terms of what need to be monitored.	The study showed the extent to which the moderating variable, process monitoring, influences the relationship between the contractors' capacity evaluation in tender award (independent) and performance of road construction infrastructural projects. in Nairobi County, Kenya Dependent).
	Ng'etich and Otieno (2017)	factors influencing monitoring and evaluation	Descriptive survey design where self-administered questionnaires and	The study findings therefore indicated that there is a great influence	The study did not demonstrate the extent to which monitoring is conducted hence the need to explore the process	The current study showed the extent to which the

Variable	*Author (Year)*	*Title of the study*	*Methodology Used*	*Findings*	*Knowledge Gap*	*Focus of the Current Study*
		processes of county road projects in Turkana county government.	secondary sources were used for data collection. 50 respondents were selected from employees who have worked in the construction and maintenance of roads since the county government came in place.. Stratified random sampling design was utilised in the study. Numerical data collected using questionnaires was coded and entered and analyzed with the help Ms Office Package: Excel.	of availability of funds, stakeholder participation and involvement of technical persons on M&E processes of county road projects. However, the study did not demonstrate the extent to which monitoring is conducted hence the need to explore the monitoring intensity of the road construction infrastructural projects.	monitoring of the road construction infrastructural projects. The compliance of contactors' to key rules and regulations and other statutes were shown.	moderating variable, process monitoring, influences the relationship between the contractors' capacity evaluation in tender award (independent) and performance of road construction infrastructural projects. in Nairobi County, Kenya Dependent).
	Wanjala, Iravo, Odhiambo and Shalle (2017)	Effect of Monitoring Techniques on Project Performance of Kenyan State Corporations.	Descriptive and correlational research designs, Pearson Product Moment, the use beta coefficient and p value to explain influence of monitoring techniques (predictor variable) on performance (dependent variable).	Monitoring techniques significantly influence project performance in state corporation ($\beta 3 = 0.674$, $p<0.05$).	The study was not specific to road projects. The study used monitoring techniques and therefore it might have missed the process involved	The current study demonstrated process monitoring significantly moderates the relationship between the predictor and outcome variables.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter gives a description of the methodology used to conduct the research, including the reseach paradigm, study design and target population, sample size and sampling procedures, data collection tool and its pre-testing mechanism for validity and reliability, procedures for data collection and analysis techniques, ethical considerations, as well as operationalization of the variables.

3.2 Research Paradigm

The study employed pragmatism as a research paradigm. The choice of pragmatism as a philosophical direction to this study was preferred as opposed to the two well-known research paradigms such as positivism and constructivism. In view of positivists a single reality exist. Therefore to carry out a study based on positivism, positivists propose the significance of applying scientific technique involving organized observation as well as description of occurencesput within contextual model or theory, including hypotheses presentation, the implementation of strictly controlled experiments, the application of inferential statistics for hypotheses testing, and the statistical interpretation of results in the light of the underpinning theory (Ponterotto, 2005).

However the constructivists are of the view that mental realities are constructed, as opposed to being an external condition (Hansen, 2004). Mertens (2005) argues that the said reality involves social aspects of nature. While studying situations, the constructivists tend to rely on the views or opinions of the participants in the study (Ponterotto, 2005). Subsequently, constructivists provide ground for qualitative research. As opposed to positivism and constructivism, pragmatism is chosen because of its appropriateness in terms of ontological, epistemological, methodological and axiological approaches. Furthermore, philosophically, pragmatism recognizes that there exists both singular and multiple realities. Hence, in this study phenomena were measured from engineers, contractos and matatu drivers' perspectives of the variables

under the study. Finally pragmatism is preferred paradigm because it does not commit to any given system of reality of philosophy but instead it focuses on important reseach problems of what and how.

The use of the term paradigm and philosophy are used interchangeably in most of the research works. Newby (2010) states that research philosophy describes the principles governing research practice. He goes further to define paradigm as, "an idea that at any one point in time all those working in a particular area, field or subject adopt common ways of working and common ways of looking at issues." Similarly, Mugenda (2008) agrees that paradigms acts as axiomatic systems that are characterized by different sets of assumptions about the phenomenon they inquire.

Axioms in this case are the untestable assumptions or statements that are made about phenomena under investigation (Frankfort-Nachmias and Nachmias, 1996). Punch (2005) opines that philosophical paradigm entails complicated dynamics occurring quite often in the research methodology literature, and it implies assumptions relating to the world's social dimensions, and relating to what comprises suitable techniques and researchable topics. In the most precise terms, it would mean how science should be done. Science therefore is derived from the Latin *scientia*, which means knowledge (Pedhazur & Schemelkin, 1991). Mugenda (2008) explains that science is a set of logical procedures and methods, which provide for the systematic understanding of phenomena or reality. Mugenda correlates between research and knowledge, that:

> "Human beings instinctively seek to understand the world around them. It is this understanding that makes them feel in control. People's knowledge of the world around them therefore gives them cognitive control that helps them interact with their social and physical environments freely and meaningfully. When people do not have knowledge of the world around them and therefore are not in control, they are unable to function or navigate through life. Human beings acquire knowledge of the world around them in different ways…."(Mugenda, 2008)

It is at this point that pragmatists hold the view that the world is not an absolute unity (Creswell, 2014; Wambugu, Kyalo, Mbii and Nyonje, 2015). According to Lincoln and Guba (2000), research is considered value laden in that the values we hold and the kind of socialization process we have undergone tend to shape our view about the world we all inhibit in and our experiences with various phenomenas. Although Creswell (2013) posits that even though many forms of this philosophical paradigm exist, many people argue that pragmatism as a worldview emanates out of what people do, their circumstances, and results as opposed to antecedent conditions, being the case in positivism.

Scholars such as Creswell (2014) add that in mixed methods, studies are concerned with many data collection as well as analysis as opposed to a one way subscription, as is normally the case with quantitative or qualitative approaches. That truth is instanteneous. It is regardless of the duality between truth free of the mind or within the mind. Mixed method is therefore a third pholosophical paradigm, albeit not as novel stand-alone methodology eliminating the classical quantitative as well as qualitative research methodologies, rather it is an extension of the two by incoporating both methods (Johnson and Onwuegbuzie, 2004).

According to Leech and Onwuegbuzie (2009) the concept of developing a hybrid of quantitative and qualitative study methods, referred to as mixed method, within the same study can be traced in early studies of 1960s. According to Tashakkori and Creswell (2007) a summary of comparative analysis of studies revealing the ‘‘mixed’’ methodology due to the fact that they employ both qualitative and quantitative methodologies in the following manner: two forms of study questions combining qualitative as well as quantitative dimensions; how the study questions are conjured, that is, either participatory or, pre-planned; bi-sampling typology, that is, for example, probability and non-probability sampling designs; two ways of data collection, such as, focus group discussions and surveys; two categories of data, that is, numerical and textual; two methods of data analysis, that is, statistical and thematic techniques; as well as, two categories of study conclusions, that is, emic and etic representations - also called ‘‘objective’’ and ‘‘subjective,’’ conclusions.

The argument held by Cameron (2011) is that mixed method researchers ought to be flexible and innovative with a portfolio of research skills exceeding those that their single-mode approach may need. In this regard, they ought to categorically mention their philosophical underpinnings as well as paradigmatic position prior to the rigorous defense of their methodological preferences, and show they have sound knowledge base of mixed method study designs as well as their methodological considerations. Hence, for instance, the current study adopted structured questionnaires, while interview schedules were used to collect both quantitative and qualitative data.

3.2.1 Research Design

The study adopted descriptive cross-sectional survey research design and correlational design. The choice of cross-sectional over longitudinal survey is that the study was out to collect data at one point in time and the findings are to to be generalized to the sampled population only at the time of the survey. Longitudinal is preferred in studies that traces trends and may need triangulation which is not the case for the current study. Also, a survey is preferred in this study because it is out to help in describing data and characteristics of the phenomena under the study.

Moreover, the use of survey is to help answer the questions of who, what, where, when and how. On the other hand, correlation design is going to help measure the extent to which two or more variables are related. In addition, since the study is looking at the causal influence of relationships as well as the degree to which an integration of predictor variables (under contractors' tender evaluation results) influence the outcome of the dependent variables (road construction infrastructural project performance), the choice of correlation design is deemed benefting.

Therefore, combining both descriptive and corrlation research designs is for the former to help in describing the phenomena and the latter to provide an opportunity to identify predictor relationship by use of correlations, multiple regression and hierachical regression models designed under this study. The research design consists of four components (Frankfort-Nachmias & Nachmias, 1996): generalization, control,

manipulation and comparison. The last three are important in identifying the causal relationship beteween dependent and independent variables.

Comparison enables us to depict covariation (two or more phenomena vary together), manipulation facilitates the establishment of the time order of events, while control enhances the determination that the observed covariation is not as a result of spurious correlation, that is, a conflation between two variables explainable bya third variable. Generalization, the fourth component, relates to the degree to which the study results are applicable to bigger universe and varied conditions. Study designs are a scientific inquiry typopogy within qualitative, quantitative, as well as mixed method approaches providing unique procedural direction in a study (Creswell, 2014). Kumar (2011) defines research design as the structure, strategy, and plan used to investigate a phenomenon with an aim of obtaining answers to research questions.

Research design may be regarded as the blueprint used to collect and analyze data (Pandey and Pandey, 2015). The use of a descriptive survey is to describe characteristics of a population to be studied. Sekaran (2006) affirms that it is undertaken to ascertain and describe variables' characteristics. Williams (2007) observes that descriptive research design examines a situation the way it is in its natural state; thus, it identifies phenomon's attributes of interest on observational basis. Dooley (2007) notes that correlational design is one which measures the independent variable rather than setting it. Normally variables are left to take their natural values rather than fixing them as would appear in experiments. The mixed method used helped in analyzing the descriptive, inferential and qualitative data. Sekaran (2006) indicated that the use of correlational analysis is "to trace the mutual influence of variables on one another." The data from this study was analyzed by showing the mutual relationship between the contractors' capacity evaluation in tender award (predictor variable) and road construction infrastructural project performance (criterion variable).

In a scientific enquiry that would include a number of research attributes, over and above the sheer knowledge of the arithmetic means as well as standard deviations of the key study variables, it is valuable to establish the manner in which the such

varaibles relate to each other. This is to enable one to understand the direction, nature as well as significance of the bivariate linkages of the key study variables or simply put, the conflation between any pair of attributes among all the study variables. In this case the use of pearson correlation matrix provided the information required (Sekaran, 2006).

In multivariate statistics whereby the study is concerned with association of more than 1 predictor variable with an outcome variable, the regression analysis would be useful (Dooley, 2007). Dooley states that multivariate analyses can apply to data of any measurement level. For example, we can study nominal or ordinal variables in multiway contingency tables with as many dimenstions as there are variables.

3.3 Target Population

The study's target population comprises: 48 consulting senior engineers and a similar number of 48 managing directors in consulting engineering firms;68 senior engineers and 68 managing directors in construction companies (as per NCA records); 95 matatu drivers on Outer-Ring Road and 133 matatu drivers on Eastern bypass. This gives a total target population of 460. The figure for the total number of matatus operating on Outer-Ring Road and Eastern Bypass are obtained from officials of the matatu owners association. Matatus refers to public vehicles service vehicles used in Kenya. The target population is therefore presented in Table 3.1.

Table 3.1: Target population

No.	Category of respondents	Number of Population to be Sampled (N)
1	Consulting Senior Engineers	48
2	Consulting Managing Directors	48
3	Senior Engineers Construction Companies	68
4	Managing Directors Construction Companies	68
5	Eastern By-Pass Road Matatu Drivers	133
6	Outer-Ring Road Matatu Drivers	95
	Total	**460**

Singh (2006) notes that the term 'population', also called "universe" imputes a digression from its classical conceptualization. In a census survey, for instance, the exclusive enumeration of all individuals, that is, men, women and children, entails a universe. However, in study methodology, population implies the elements of a given group. In choosing a sample of study subjects, it is quite important that a researcher clearly defines his universe and highlights its attributes (Singh, 2006).

When a study comprises of all the target elements of a real or hypothetical set of persons, objects or events for which an investigation is to draw generalizations from the results of the study that is referred to as target population (Borg & Gall, 1989). It is that population to be studied in a survey and for which the basic inferences from the survey were made (Levy & Lameshow, 2008).

3.4 Sample Size and Sampling Procedures

This section describes the sample size as well as the sampling procedure employed in the current study. These are further discussed in the following subsequent sub-themes:

3.4.1 Sample Size

The sample size for this scientific enquiry was 210 individuals drawn from a target population of 460 using Krejcie and Morgan (1970) table of sampling theory. Most of the social science related researches employ a sampling theory. "Sampling theory requires that all possible elements or units in the target population be identified so that the probability for selecting a random combination of units, which constituted the sample, was calculated in advance," (Mugenda, 2008). Krejcie and Morgan (1970) developed a framework for sampling by postulating that for population sizes of 60, 65, 100, and 250, the corresponding sample sizes ought to be 52, 56, 80 and 152 respectively, all calculated at 5% level of significance. The formula provided below is used in calculating the sample size:

$$n = \frac{X^2 * N * P * (1 - P)}{(ME^2 \ * (N - 1) + (X^2 * P * (1 - P))}$$

For:

n refers to the "Size of the sample"

X^2 refers to the "Chi-Square for the specified confidence level at 1 degree of freedom"
N refers to the "Size of the universe"
P refers to the "Proportion of the universe"
And ME refers to the "expected Margin of Error (expressed as a proportion)"

According to Berg (2009), the rationale for utilising a sample from the universe is to facilitate the drawal of inferences regarding the entire universe. Bernard (2000) acknowledges that, "the sheer ease and economic convenience of sampling would defeat its very purpose. A study based on probability sampling design, nevertheless, is normally better than that which includes the entire universe." Pedhazur and Schmelkin (1991) argue that evaluation of samples is far much better than evaluation of populations beause sample offer greater accuracy, economy and feasibility.

However Singh and Masuku (2014) emphasize that the choice of sampling techniques as well as the determination of sample size are very valuable in applied statistics research problem so as draw conclusions that are free of errors. The authors state that a too small sample size may lead to failure to detect significant effects or associations even if the study is really organized, or may lead to imprecise measurement of such associations and effects. Equally, a too large sample size would lead to complexities with a potential to yield inaccurate study findings.

They warn that large samples have the potential of escalating study's cost; therefore, small samples are essential factors in scientific research. Bartlett, Kotrlik and Higgins (2001) noted that researchers ought to take note of both the right sample sizes and match it with those used in the actual study, the justification for applying insufficient sample sizes may have in the results of the study, and they further state that "despite the tendency by researchers to hold diverse opinions about the determination of the right sample size, such procedures ought to always be clearly reported alongside the findings to allow the reader to make informed judgments as to the plausibility of those results, underpinning assumptions and procedures." In this study, for example, the selection of construction companies is based on the official data by NCA in Kenya.

3.4.2 Sampling Procedure

The study adopted a stratified sampling and proportionate sampling to ensure that all categories of the population were represented according to their sizes (Bryman, 2008). These techniques were used on consulting engineering involved in civil works, and those that belong to the Consulting Engineers' Association, road contractors or construction companies categorized or classified as NCA1, with National Construction Authority. The same sampling techniques were aslo adopted for all matatu drivers plying theEastern By-Pass road in Nairobi and Outer-Ring road. Structured questionnaires were distributed to the senior engineers and managing directors working in the consulting engineering firms and construction companies.

Interviews were conducted with the mattatu drivers plying the Outer-Ring Road and Eastern Bypass. Stratified sampling was used in the study whereby the sampling frame or unit of analysis is divided into homogenous groups also referred to as strata. In this case, the strata include the consulting engineers, consulting managing directors, senior engineers of construction companies, managing directors of construction companies, Eastern By-Pass matatu drivers and Outer-Ring matatu drivers. The proportionate sampling technique or method was used to calculate a sample from the six strata whereas a simple random sampling was used to draw samples within same strata.

The choice of simple random sampling was also to ensure that each element in each stratum had an equal chance to be selected. For consulting senior engineers and managing directors a list of members registered with Association of Consulting Engineers of Kenya (ACEK) was provided by ACEK secretariat. On the other hand, a list of construction companies was obtained from the NCA where managing directors as well as senior engineers of concerns in the construction sector are drawn.

To be able to reach out to these respondents, either physical or telephone contacts or both were provided for ease of access. The list of contractors or construction companies was long and included all categories or classes of contractors by NCA. Therefore, this was narrowed down to NCA1 specifically those dealing with road works and were allowed to undertake any amount of work, with the intention to

bolster validity of the findings. The ACEK secretariat had the members officially informed about the study. The NCA contractors were contacted first and an appointment booked to ensure their cooperation.

There may be need for a census survey whenever the study universe is small and heterogeneuos (Cooper & Schindler, 2006). Hence, Sekaran (2003) suggests that having a sample greater than thirty would be most suitable for a study. Surveying all cases in a population is called undertaking a census which was not the case in this current study (Burton, 2000a). The simple random sampling technique is chosen because the numbers of senior engineers, managing directors and matatu drivers on the Outer-Ring and Eastern Bypass routes are above 30 for census as stipulated by Sekaran (2003). According to Fowler (1993), Kothari (2004) and Bell (2005), when census is conducted every individual in the study population is expected to form part of the study (Bell, 2005; Fowler, 1993; Kothari, 2004). However in this study census did not apply.

In this study, a sample size was obtained by employing a proportionate sampling procedure or method. In this case, after obtaining a sample size of 210, based on Morgan and Krejcie table (Appendix VII), drawn from the entire target population of 460, the totals for each category was multiplied by 210 and divided by 460, hence the sample size in the Table 3.2.

Table 3.2: Sampling of Procedures

Category of Respondents	Target Population (N)	Sample Size (n)
Consulting Senior Engineers	48	22
Consulting Managing Directors	48	22
Senior Engineers Construction Companies	68	31
Managing Directors Construction Companies	68	31
Eastern By-pass Road Matatu Drivers	133	61
Outer-Ring Road Matatu Drivers	95	43
Total	**460**	**210**

3.5 Research Instruments

The study used questionnaires and structured interview schedules as the primary data collection instruments. These instruments are further explained in the following subsections:

3.5.1 Questionnaires

The said research questionnaire comprised both open and closed ended questions. The questionnaire for each of the categories of respondents was divided into seven sections. The initial segment collected data on demographic information or general information of the respondent (Section A). The second section (Section B) data was collected on performance of road construction infrastructural projects and the third section (Section C) data was enumerated on financial ability of contractors and performance of road construction infrastructural projects.

In the fourth section (Section D), data was collected on technical ability of contractors and performance of road construction infrastructural projects and whereas the fifth section (Section E) data collected focused on managment ability of the contractors and performance of road construction infrastructural projects. The sixth section (Section F), data was collected on contractors' safety record and the key criterion

variable. Lastly, the seventh section (Section G) data was collected on process monitoring and performance of road construction infrastructural projects.

Research questionnaires are suitable for the collection of data about the universe (Mugenda & Mugenda, 2003; Bhattacherjee, 2012; Kothari, 2004; Kombo & Tromp, 2006). The structured questionnaires also referred to as standardized questionnaires by Berg (2009) had the following features: no item order variation, properly structured, proper wording of the questionnaire items, level language none adjustment, no clarification/answering of questions relating to the interview, no extra questions are permissible and finally highly stnadardized in the flow. Berg notes that this type of interview is intentionally meant to bring out the thoughts of the respondents, their attitudes, and opinions about matters relating to the research.

When using self-adminstered questionnaires, a researcher usually mails them to the respondents, although the researcher may choose to drop-and-pick or even administer to a group (Bernard, 2000). This study therefore employed both techniques and use one at a time where necessary to speed up the data collection process. Bernard (2000) shares advantage and disadvantage of using self-adminstered questionnaires which the researcher need to be aware about. The advantage is, self-adminstered questionnaire allows for the investigation of complex issues as opposed to a personal interview.

In addition, items involving a highly categorized set of responses, or those that need rigorous background data may experience hiccups in an oral investigation, but are often challenging to respondents if worded right. The main undoing of a research questionnaire is that it leaves the researcher with no control as to the interpretation of the questions by the repondents. Despite attempts to develop culturally correct items in the questionnaire, there is an impending risk that respondents could be forced into choosing culturally unsuitable options in a closed-ended questionnaire. To avoid this anomaly, the study therefore ensured validity and reliability is well done. However, Boynton and Greenhalgh (2004) observed that questionnaires offer an objective means of data collection whereby people's knowledge, beliefs, attitude and behaviour are captured. This study therefore used likert scales developed by Rensis Likert.

The Likert scale is the widely used variation of the summated rating scale, which means it contains statements that express the degree to which a person agrees or disagrees with a statement expressed in either favor or opposition of a view of object of interest (Cooper & Schindler, 2006). The questionnaires in this study were designed in statement using a Likert scale of 1 to 5, where 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree. Bell (2005) states that Likert scales are used in questionnaires to discover strength of feeling or attitudes towards series of statements.

3.5.2 Structured Interview Schedules

The interview schedule for this study was used to all the matatu drivers plying on Eastern By-Pass and Outer-Ring roads. The choice of interview schedule for the study is assumed that not all matatu drivers may have the proficiency to read, understand and answer the items in the questionnaire on their own. Interviews schedules are regarded as part of the major quantitative and qualitative data collection tools.

According to Punch (2005), interviews avail a avenue for the access of respondents' feelings, conceptualization of issues, definitions of conditions,as well as interpretation of reality. The technique also remains a powerful tool for understanding other persons. The interview schedule for the matatu drivers was designed based on the first section (Section A) which collected data on demographic information or general information of the matatu drivers in both routes. The second section (Section B) data was collected on performance of road construction infrastructural project and the third section (Section C) data was collected on financial ability of contractors.

In the fourth section (Section D), data was collected on technical ability of contractors and performance of road construction infrastructural projects and whereas the fifth section (Section E) data focused on management ability of the contractors and performance of road construction infrastructural projects. The sixth section (Section F), data was collected on contractors' safety record and performance of road construction infrastructural projects. Lastly, the seventh section (Section G) data was collected on process monitoring and performance of road construction infrastructural projects.

3.5.3 Pilot Testing of Instruments

Before the real study took place, the completed questionnaires and interview schedules were tried out in the field. The aim was to be sure that all the study participants comprehended the items in the instruments; and whether or not the very items maintained the same meaning across all the participants (Kelly, Clark, Brown, & Sitzia, 2003). The pilot study was conducted in Kiambu County. A pilot study is a mock-version of the actual full scale study, or trial conducted to prepare for the actual research later (Galitz, 2005; Mugenda, 1999; Connelly, 2008). Mugenda and Mugenda (2009) maintains that a sample between a range of one percent and 10 percent is sufficient for piloting. While Sekaran (2006) supports this view by stating that one percent of sample size is enough for piloting study. Hill (1998) proposed that for a pilot study 10 to 30 respondents are allowed in the survey research. Based on these three views, the current study sampled 17 respondents equivalent to eight percent. Kiambu County in Kenya was considered ideal for piloting since the respondents had homogeneous characteristics as of those in Nairobi County. Questionnaire was adminstered to nine contractors from consulting engineers firms and construction companies. Whereas eight interview schedules was used on PSV matatu drivers.

In small scale trials, a few examinees comment on the test instructions and point out any unclear questions or statements in the tools used (MacMillan and Schumacher, 2010). From the pilot study done, it was apparent that the research tools used lacked some clarity to the respondents who took part in the mock survey. It was established that most of the staements or items in sections B,C,D,E, F and G of both the questionnaires and interview schedules were not clearly stated to bring out desired information from the respondents. In consultation with the two experts who in this case were the University of Nairobi supervisors who guided in the study, the research tools were relooked at again after the pre-test to ensure they capture the required data. The initial instruments had a total of 109 items or statements as shown in appendix XV and after reviewing, 89 items or statements were retained as displayed in appendix III and appendix IV. A retest was was therefore carried out to check if any ambiguities could still existed. Through this pilot study, it was easy to determine reliability. A method of pre-test retest requires a sample of ten respondents and above

(Mulusa, 1988). A consistent number of 17 respondents was maintained during a retest.

3.5.4 Validity of Instruments

This study considered content validity to ensure that questions in the questionnaire accurately achieved the research objectives or measured the validity of the complex concepts or constructs. Bernard (2000) defines validity as the capability of the instrument to measure that which it is intended to measure. In research, we have three ways of testing validity: construct validity, content validity and criterion validity. The research instruments were presented to research experts, the researcher's academic supervisors, and engineers in the road construction to evaluate the clarity, relevance and interpretation of the items in the instruments as outlined for each objective of the study. The following scale was used: A scale of '4' for very relevant, '3' quite relevant, '2' somewhat relevant, and '1' to represent not relevant. The Content Validity Index (C.V.I) was used whereby C.V.I = items rated 3 or by both judges and divided by the sum of items in the questionnaire to be used in the study. This formula was given as follows:

$$\mathbf{n_{¾} / N}$$

A measure of the extent to which the collected data by an instrument represents a particular domain of indicators or content of a specific construct is called content validity (Oso & Onen, 2005). The study also used construct validity whereby the focus was on establishing the way questions in the questionnaire are constructed in terms of simplicity in language that can be easily understood by the respondents. In addition, the use of construct validity was to check on vagueness to instructions given to the respondents when answering questions. Construct validity as defined by Frankfort-Nachmias and Nachmias (1996) as the process involving the linkage of an instrument to an overall theoretical framework so as to establish if the said tool is anchored on the construct as well as the underpinning conjectural assumptions.

3.5.5 Reliability of Instruments

This refers to instrument's ability to deliver consistent results in a study (Bernard, 2000). A pilot testing was conducted in Kiambu County involving eight public service vehicle (matatu) drivers, as well as 9 road contractors and engineers. Questionnaire of

likert were the main instrument of data collection and hence, it was important to test the internal consistency. This helped to know how well the items on a tool fit together conceptually. The Cronbach alpha test was used to assess the research items to ascertain whether they are within 0-1 acceptable range. Founded by Cronbach (1951), the Cronbach alpha coefficient of internal consistency is capable of measuring the internal consistency of a scale or test. A reliability that gives a value of 0.6 (Kothari, 2004) and 0.80 (Oluwatayo, 2012) is considered good for descriptive type of research. However, it is argued by Drost (2012) and Orodho (2009) that values ranging between 0.7 and 1.00 are still appropriate to deduce that a reliability exists.

The study therefore used the range between 0.7 and 0.8 to determine reliability. As Cooper and Schindler (2006) put it, a reliability is "an element of measurement that relate to the precision, accuracy, as well as consistency; a requisite yet inadequate condition for validity; that is, unreliable measure cannot be valid. Zinbarg, Revelle, Yovel and Li (2005) conclude by saying that Cronbach alpha is a coefficient of reliability that provided an objective estimate as to the generalizability of data. For this study, these tests are presented in Table 3.3.

Table 3.3: Reliability Test Summary

Section of Questionnaire	Variable	No. of Items Retained in the scale	Cronbach's Alpha
Section B	Performance of Road Construction Infrastructural Projects	21	0.778
Section C	Financial Ability	11	0.753
Section D	Technical Ability	15	0.716
Section E	Management Ability	12	0.763
Section F	Safety Record	14	0.788
Section G	Process Monitoring	13	0.705
Composite Cronbach's Alpha Reliability Coefficient			**0.7505**

Table 3.3 shows that all the variables met the reliability criteria measured by the internal consistency coefficients. This is because all the variables had Chronbalch's Alpha coefficients above 0.7. Hence, this was considered acceptable level to measure internal reliability (Bryman, 2012).

3.6 Data Collection Procedure

The process of acquiring subjects and collecting the data for one's study is called data collection (Burns & Grove, 2010). Prior to collection of data from the respondents, the researcher sought permission from the relevant Kenyan government authority, the National Commission for Science, Technology and Innovation (NACOSTI). The self-adminstered structured questionnaire as well as interview schedules were utilised to facilitate collection of primary data. The research assistants adminstered the interview schedule. Interview schedule was used to collect data from matatu drivers plying Outer-Ring Road and Eastern Bypass in Nairobi. The self-adminstered structured questionnaires were used on managing directors as well as consulting engineering and senior engineers in construction companies concerns.

There was a meeting planned prior with the various contractors and their teams or staff to help schedule for data collection; in some instances, appointments were booked via a phone call. Some participants were reached through emails. This played key role in ensuring that the data collection process does not interfere or distract the respondents' own schedules. The off-peak hours identified for PSV drivers were mostly between 11.00am to 12noon and 2.00 pm and 3.30 during weekdays. Weekends it was abit flexible and data collection would commence at 9.00am to 5.00pm. It should be noted that most of PSVs they line up in their respective drop and pick areas and therefore this offered humble time for data collection. The four research assistants were also pre-trained before embarking on data collection to enhance understanding of the main objective of the scientific enquiry and ethical issues for consideration.

3.7 Data Analysis Techniques

The use of mixed methods calls for data analysis techniques that promote the same. In this study the data analysis techniques was descriptive and inferential statistics in

conformomity with pragmatism paradigm since qualitative as well as quantitative data were both collected. The process of editing was conducted to ascertain any irregularities in the data, then coded followed by entry into the SPSS system. According to Kothari (2004) coding refers to the process of allocating numbers or other signs to responses in order to aid in the classification of the data into limited groups. It is important for the efficiency of data analysis as well as the reduction of several responses to a reasonable number of classes containing the key information needed to helpwith the analysis. The qualitative data collected as per the six objectives of the study was analyzed by use of thematic approach as suggested by Burton (2000b). According to Leech and Onwuegbuzie (2007) the use of constant comparison analysis helps in identifying the underlying themes as presented through the qualitative data collected.

Descriptive data was analyzed by using frequencies and percentages. Both the arithmetic mean and standard deviation were used as statistical tools to measure central tendency and dispersion respectively. These statistical tools are, according to Gakuu, Kidombo and Keiyoro (2018) ideal for the interval data. The position about where items tend to cluster is indicated by the measures of central tendency (or statistical averages), and it was considered the most representative statistic for the whole set of data. The measure of central tendency is also called statistical average and it entails the mode, median, and mean, being the most popular averages. The chief use of mean in this study comprised a summary of the key characteristics of a series and to facilitate comparision.

Similarly, the mean is determined by the algebraic treatment thereby considered useful in this study to help in carrying further statistical calculations. An average can reveal a series the same way a single figure can, however, it no doubt is incapable of revealing the whole characteristics of a phenomenon under investigation (Kothari, 2004). Spefically, it is not capable of revealing how the values about a variable are scattered around the mean. Statistical devices referred to as measures of dispersion are normally worked out so as to reveal the scatter.

Some of the key dispersion statistics are (a) mean deviation, (b) range, and (c) standard deviation (Kothari, 2004). Along with many related statistics such as coefficient of variation and variance, the standard deviation is applied predominantly

in empirical studies and it is normally considered as a very effective dispersion statistic in a series. In the current study, standard deviation was used due to its amenability to mathematical manipulation since the algebraic signs are considered in its calculation, as is never the case in mean deviation. Moreover, it is never vulnerable to sampling dynamics. The merits therefore make standard deviation as well as its coefficient an important statistic of the scatteredness of a series in the current study.

Standard deviation was also used in the current study owing to its popular use in inferential statistics. Finally, data was subjected to further analysis to measure relationship between variables. The analysis was therefore based on linear regression, multiple regression, hierarchical Regression and pearson's product moment correlation. Multivariate and hierachical regression analyses were used for hypotheses testing at 95 percent level of confidence, with linear regression applied to determine the effect of each predictor variable on the criterion variable.

According to Bernard (2000) multiple regression also qualifies as a PRE measure. That is, it also reveals the extent to which you could predict characteristics of an outcome variable than you could if you with an arbitrary mean – but incorporating all the information available in a series of criterion variables. Regression analysis, according to Faraway (2002), is applicable for purposes of explaining or modeling the association between one or more *input, predictor, explanatory*, or *independent* or variables, $X_1...X_p$ and a single variable Y, referred to as the *output, response*, or *dependent* variable. The method is referred to as simple regression when p=1, but when p>1 it is referred to as multiple regression and at other times as multivariate regression. It is called multivariate multiple regressions whenever there is more than one Y.

According to O'Brien and Scott (2012), the criterion variable Y is explained by only one predictor variable in a simple regression model. In this regard, *Karl Pearson*'*s coefficient of correlation* (or simple correlation) is the most predominantly applied technique for measuring the extent of association between a pair of variables. The following assumptions underpin the coefficient: (i) linear correlation between the two

variables; (ii) causal relationship between the two variables; and (iii) normal distribution of data.

The conflation between key study variables can be analysed using various methods, even though no technique can certianly demosntrate existence of a causal linkage between such variables. Therefore, the preoccupation of any multivariate analysis is to attempt to answer the questions:what is the association between the variables in question?Then to what extent are the variables correlated? I sthere any causal linkage between the variables? If yes, of what degree and in which direction, and what is the direction of that causal relationship?

The foregoing questions are answerable using correlational and regressional analyses, respectively. The key among several methods to undertake correlational and regression analyses are: *In case of bivariate population:* Correlation analysis can be done by(a) Karl Pearson's coefficient of correlation; (b) Charles Spearman's coefficient of correlation; and (c) cross tabulation; while inferential analyses can be doneby simple regression equations. *In case of multivariate population:* Correlation analyses are doable by (a) computing coefficient of multiple correlation; (b) computation of coefficient of partial correlation; whileinferential analysesare doneby the use of multiple regression equations (Kothari, 2004).

According to Kothari (2004), Karl Pearson's coefficient of correlation, otherwise called the product moment correlation coefficient is denoted by 'r', where the value of '*r*' lies between ± 1. '+*r* 'denotes positive correlation between the concerned variables, while '-*r*' denotes negative correlation. '*r=0*' denotes none existence of association between the concerned variables. A unit variation in predictor variable, under a constant variation in the criterion variable in the same direction, implies a perfect positive. Otherwise, the correlation is perfectly negative.

Values of '*r*' tending to +1 or –1 imputes a high level of correlation between the concerned variables. The measuring scale in this study was interval scales. According to Cooper and Schindler (2006), interval scales have one additional strength over and above the capability of both ordinal and nominal scales. In this regard, the interval scale incoporates the notion of interval equality, that is, the distance between 1 and 2,

equals the distance between 3and 4, which also equals the distance between 4 and 5. Under conditions of interval scale, unimodal and relatively symmetric data, it is possible to measure central tendency using arithmetric mean. The indicators of the variables for contractors' capacity in tender award, process monitoring as well as performance of road construction infrastructural projects are as shown in Table 3.4. The analytical models have been adapated from Seboru (2017) and Kinyanjui (2014).

Table 3.4: Correlation and Regression Models

Variables		Indicators	Sub-Indicators
Dependent Variable	Performance of Road Construction Infrastructural Projects.	• Quality of completed road in terms of condition of drainage and water table, absence of potholes • Mobility and speed – delays, congestion, average speed • Comfort and convenience in terms of smoothness and roughness of the road • Road User benefits in terms of cost reduction, travel time reduction, vehicle operating cost reduction • Safety - properly constructed footbridges, pedestrian walkways, cycling lanes, road properly marked, adequate road signs, bus stops	
Independent Variable	Contractors' Capacity Evaluation in Tender Award (X_1, X_2,X_3, X_4)	• Financial ability of Contractors (X_1)	• Credit rating (X_{1a}); Bank's good will (X_{1b}) • Flexibility of the loan agreements (X_{1c}) • Turnover, profits obligations, amounts due (X_{1d}) • Owned financial funds (X_{1e}).
		• Technical ability of contractors (X_2)	• Experience in terms of catchment of National or Local projects (X_{2a}) • Plant and equipment (X_{2b}) • Quality of materials used (X_{2c}) • Experience in terms of size of projects completed(X_{2d}) • Availability of tactical manpower/personnel (X_{2e}). •

		• Management ability of contractors (X_3)	• Past performance & quality (X_{3a}) • Quality control policy (X_{3b}) • Management knowledge (X_{3c}) • Project management system (X_{3d}) • Experience of management personnel (X_{3e}).
		• Contractors' Safety Record (X_4)	• Safety policy Management system(X_{4a}) • Insurance policy (X_{4b}) • Compliance behavior(X_{4c}) • Adequacy of standard in addressing safety outcomes (X_{4d}) • Certification in OSHA (X_{4e}).
Moderating Variable	Process Monitoring (X_{10})	• Compliance with construction specification (X_5) • Compliance with Regulatory bodies' requirements (X_6) • Compliance with County by-laws (X_7) • Resolution to complaints Management (X_8) • Adherence to allocation and utilization of resources for accomplishment of project's objectives (X_9).	

Data analysis was guided by following correlation and regression models:

Where

y-Dependent Variable

a-Constant Term

B_1, B_2, B_3, B_n – Regression Coefficients (Note: the symbols B is for unstandardized beta values in simple linear regressions for model 1, 2, 3 & 4; and symbol β is used for standardized beta values in multivariate and hierarchical regressions for model 5 and model 6 respectively).

X_1, X_2, $X_3 \ldots _n$ – Predictor Variables

e – Error Term.

For the first study objective, the following hypothesis is developed and the corresponding analytical model is set up.

Model 1

H_0: Financial ability of contractors does not significantly influence performance of road construction infrastructural projects.

Performance of road construction infrastructural projects = f (Financial ability of contractors)

$y = a + B_1X_1 + e$

Where:

y - Performance of road construction infrastructural projects

X_1 - Financial ability of contractors

B_1 – Regression coefficient

a – Regression constant

e – Error term

For the second study objective, the following hypothesis is developed and the corresponding analytical model is set up.

Model 2

H_0: Technical ability of contractors does not have significantly influence performance of road construction infrastructural projects.

Performance of road construction infrastructural projects = f (Technical ability of contractors)

$y=a+B_2X_2+e$

Where:

y - Performance of road construction infrastructural projects

X_2 - Technical ability of contractors

B_2 – Regression coefficient

a – Regression constant

e – Error term

For the third study objective, the following hypothesis was developed and thecorresponding analytical model set up.

Model 3

H_0: Management ability of contractors does not significantly influence performance of road construction infrastructural projects.

Performance of road construction infrastructural projects = f (Management ability of contractors)

$y=a+B_3X_3+e$

Where:

y - Performance of road construction infrastructural projects

X_3- Management ability of contractors

B_3 – Regression coefficient

a – Regression constant

e – Error term

For the fourth study objective, the following hypothesis is developed and the corresponding analytical model is set up.

Model 4

H_0: Contractors' safety record does not significantly influence performance of road construction infrastructural projects.

Performance of road construction infrastructural projects = f (Contractors' safety record)

$y=a+B_4X_4+e$

Where:

y - Performance of road construction infrastructural projects

X_4- Contractors' safety record

B_4 – Regression coefficient

a – Regression constant

e – Error term

For the fifth study objective, the following hypothesis is developed and the corresponding analytical model is set up.

Model 5

H_0: The combined contractors' capacity evaluation in tender award does not significantly influence performance of road construction infrastructural projects.

Performance of road construction infrastructural projects = f (Combined contractors capacity evaluation in tender award)

$y= a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + e$

Where:

y - Performance of road construction infrastructural projects

X_1 – Financial ability of Contractors

X_2– Technical ability of Contractors

X_3 – Management ability Contractors

X_4– Contractors' safety record

$\beta_1, \beta_2, \beta_3, \beta_4$ - Regression coefficients

a – Regression constant

e – Error term

For the sixth study objective, the following hypothesis was developed and the corresponding analytical model was set up.

Model 6

H_0: Process Monitoring does not significantly moderate the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects.

Performance of road construction infrastructural projects = f (Process Monitoring)

$y= a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_{10} + \beta_6X_1X_{10} + \beta_7X_2X_{10} + \beta_8X_3X_{10} + \beta_9X_4X_{10} + e$

Where:

y=Performance of road construction infrastructural projects

a= Regression constant

X_1= Financial ability of Contractors

X_2= Technical Ability of Contractors

X_3= Management Ability of Contractors

X_4= Contractors' Safety Record

X_{14}= Process Monitoring

β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8, and β_9 = Regression coefficients

e=Error term

The study used various types of analysis to test hypotheses so that empirical conclusions are arrived at. Table 3.5 indicates all the study objectives, study hypotheses and the respective type of analysis.

Table 3.5: Statistical Tests of Hypotheses

Research Objective	Hypothesis	Type of Analysis	Level of Acceptance/Rejection
i. To determine the extent to which financial ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya.	1. H_0: Financial ability of contractors does not significantly influence performance of road construction infrastructural projects.	• Pearson's Correlation • Linear Regression	• P > 0.05 Fail to reject • P < 0.05 Reject
ii. To assess how technical ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya.	2. H_0: Technical ability of contractors does not significantly influence performance of road construction infrastructural projects.	• Pearson's Correlation • Linear Regression	• P > 0.05 Fail to reject • P < 0.05 Reject
iii. To establish how management ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya.	3. H_0: Management ability of contractors does not significantly influence performance of road construction infrastructural project.	• Pearson's Correlation • Linear Regression	• P > 0.05 Fail to reject • P < 0.05 Reject
iv. To examine how contractors' safety record influence performance of road construction infrastructural projects in Nairobi County, Kenya.	4. H_0: Contractors' safety record does not significantly influence performance of road construction infrastructural projects.	• Pearson's Correlation • Linear Regression	• P > 0.05 Fail to reject • P < 0.05 Reject
v. To determine how the combined contractors' capacity evaluation in tender award influence performance of road construction infrastructural projects in Nairobi County, Kenya.	5. H_0: The combined contractors' capacity evaluation in tender award does not significantly influence performance of road construction infrastructural projects.	• Multiple Regression	• P > 0.05 Fail to reject • P < 0.05 Reject
vi. To assess the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in Nairobi County, Kenya.	6. H_0: Process monitoring does not significantly moderate the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects.	• Multiple Regression • Hierarchical Regression	• P > 0.05 Fail to reject • P < 0.05 Reject

3.8 Ethical Considerations

The study is going to use permit from NACOSTI, university clearance letter, transmittal letters prior to undertaking field research. The challenge of many researchers lies mainly in the manner in which they relate to their external environment, and as Berg puts it:

> "PERHAPS TO a greater degree compared to the average citizen, SOCIAL SCIENTISTS do have an ethical obligation to their study universe, their colleagues, as well as the larger society. This isbecause social scientists delve into the social lives of other human beings. From such delving into private social lives, policies, practices, and laws may emanate. Accordingly, social researchers ought toassure the protection ofprivacy, rights, as well as welfare of the communities and persons forming the focus of their research." (Berg, 2009)

Various strategies have been put in place to ensure ethical standards in the current study. For example, transmittal letters were written to the respondents seeking authority to collect data, in which case they (respondents) non-disclosure and confidentiality commitments were made. In light of this, annonimity was encouraged in the filling of questionnaires by the respondents. The respondents were informed that that the findings of the research would be available to them on request. The respondents were also informed of the following: the direct benefits of the study to their situation so as to avoid mid-stream withdrwal from the process as well as non-response to some aspects of the questionnaire; the guarantee of no harm as a result of participation in the study; as well as the guarantee of non-traceability, confidentiality and anonymity in the study.

According to Mugenda (2008) the need for protection of the welfare and rights of the participants,being the overriding ethical obligation of all personsinvolved in a study. Ethics refer to the standards or norms of conductconsidered important by the society and that guide moral judgement about study behavior (Cooper & Schindler, 2006). Mugenda (2008) notes that ethical standards also entail virtues of compassion, empathy and honesty when handling subjects or other living beings in a study. Just like Mugenda empasises on honesty, this studies ensures that all in-text citations are

acknowledged by including them in the reference list. The Turnitin software was used in order to check for plagiarism and hence corrections were done accordingly and any detected anomalies rectified.

3.9 Operationalization of the Variables

Operationalization refers to the process of denoting numbers or numerals and any other symbols to the study. It explicitly specifies variables in a manner that facilitates measurement of variables (Sekaran, 2006). Table 3.6 shows a summary of the operationalization of the variables.

Table 3.6: Operationalization of the Variables

Objective	Variables	Indicators	Measurement	Measuring Scale	Research Approach	Type of Statistical Data Analysis	Tool of Analysis
	Dependent Variable: Performance of Road Construction Infrastructural Projects	• Quality of completed road in terms of condition of drainage and water table, absence of potholes • Speed and mobility – average speed, congestion, and delays. • Comfort and convenience in terms of smoothness and roughness of the road • Road User benefits in light of cost reduction, travel time reduction, vehicle operational cost reduction • Safety - properly constructed footbridges, pedestrian walkways, cycling lanes, road properly marked, adequate road signs, bus stops	Calculation of an average of the sum of the responses of each respondent over the twelve scales in the third column for each variable, leading to a composite index.	Interval	Quantitative	Parametric	Descriptive Analysis tools (Standard deviation, Means, frequencies and percentages)
		• Performance of Rroad construction infrastructural projects.	Open-ended questions		Qualitative	Non-Parametric	Descriptive Analysis(thematic)

Objective	Variables	Indicators	Measurement	Measuring Scale	Research Approach	Type of Statistical Data Analysis	Tool of Analysis
i. To determine the extent to which financial ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya.	**Independent Variable:**Financial ability of Contractors	• Credit rating • Bank's good will • Flexibility of the loan agreements • Turnover, profits obligations, amounts due • Owned financial funds	Calculation of an average of the sum of the responses of each respondent over the twelve scales in the third column for each variable, leading to a composite index.	Interval	Quantitative	Parametric	Descriptive Analysis tools (Standard deviation, Means, frequencies, percentages, Pearson's Correlation and Linear Regression)
		Financial ability of Contractors and performance of road construction infrastructural projects.	Open-ended questions		Qualitative	Non-Parametric	Descriptive Analysis tools (thematic)
ii. To assess how technical ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya.	**Independent Variable:** Technical Ability of Contractors	• Experience indicated by catchment of national or international projects • Plant and equipment • Quality of materials used • Experience demonstrated by size of projects completed • Availability of tactical manpower/personnel	Calculation of an average of the sum of the responses of each respondent over the twelve scales in the third column for each variable, leading to a composite index.	Interval	Quantitative	Parametric	Descriptive Analysis tools (Standard deviation, Means, frequencies, percentages, Pearson's Correlation and Linear Regression)
		Technical Ability of Contractors and performance of road construction infrastructural projects.	Open-ended questions		Qualitative	Non-Parametric	Descriptive Analysis tools (thematic)
iii. To establish how management ability of contractors influence performance of road construction infrastructural projects in Nairobi County,	**Independent Variable:** Management ability of Contractors	• Past performance & quality • Quality control policy • Management knowledge • Project management system • Experience of managemet personnel	Calculation of an average of the sum of the responses of each respondent over the twelve scales in the third column for each variable, leading to a composite index.	Interval	Quantitative	Parametric	Descriptive Analysis tools (Standard deviation, Means, frequencies, percentages, Pearson's Correlation and Linear

Objective	Variables	Indicators	Measurement	Measuring Scale	Research Approach	Type of Statistical Data Analysis	Tool of Analysis
Kenya.							Regression)
		Management ability of Contractors and performance of road construction infrastructural projects.	Open-ended questions		Qualitative	Non-Parametric	Descriptive Analysis tools (thematic)
iv. To examine how contractors' safety record influence performance of road construction infrastructural projects in Nairobi County, Kenya.	**Independent Variable:** Contractors' Safety Record	• Safety policy Management system • Insurance policy • Compliance behavior • Adequacy of standard in addressing safety outcome like proper use of road signage • Certification in OSHA	Calculation of an average of the sum of the responses of each respondent over the twelve scales in the third column for each variable, leading to a composite index.	Interval	Quantitative	Parametric	Descriptive Analysis tools (Standard deviation, Means, frequencies, percentages, Pearson's Correlation and Linear Regression)
		Contractors' Safety Record and performance of road construction infrastructural projects.	Open-ended questions		Qualitative	Non-Parametric	Descriptive Analysis tools (thematic)
v. To determine how the combined contractors' capacity evaluation in tender award influence performance of road construction infrastructural	**Independent Variable:** Combined Contractors' Capacity Evaluation in Tender Award.	• Financial ability of Contractors • Technical ability of Contractors • Management ability of Contractors • Contractors' \Safety record	Calculation of an average of the sum of the responses of each respondent over the twelve scales in the third column for each variable, leading to a composite index.	Interval	Quantitative	Parametric	Descriptive Analysis tools (Standard deviation, Means, frequencies, percentages, Pearson's Correlation and Multiple Regression)

Objective	Variables	Indicators	Measurement	Measuring Scale	Research Approach	Type of Statistical Data Analysis	Tool of Analysis
projects in Nairobi County, Kenya.							
		Combined contractors' capacity evaluation in tender award influence performance of road construction infrastructural projects	Open-ended questions		Qualitative	Non-parametric	Descriptive Analysis tools (thematic)
vi. To assess the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in Nairobi County, Kenya.	**Moderating Variable:** Process Monitoring	• Compliance with construction specification • Compliance with Regulatory bodies' requirements • Compliance with County by-laws • Resolution to complaints Management • Adherence to allocation and utilization of resources for accomplishment of project's objectives	Calculation of an average of the sum of the responses of each respondent over the twelve scales in the third column for each variable, leading to a composite index.	Interval	Quantitative	Parametric	Descriptive Analysis tools (Standard deviation, Means, frequencies, percentages, Pearson's Correlation, Multiple Regression and Hierarchical Regression)
		Process Monitoring and Performance of road construction infrastructural projects.	Open-ended questions		Qualitative	Non-Parametric	Descriptive Analysis tools (thematic)

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents the study results, which have been analyzed based on themes drawn from the study objectives. The thematic areas include: Questionnaires return rate, Background information of the respondents, Basic statistical assumptions, Performance of road construction infrastructural projects, Financial ability of contractors and performance of road construction infrastructural projects, Technical ability of contractors and performance of road construction infrastructural projects, Management ability of contractors and performance of road construction infrastructural projects, Contractors' safety record and performance of road construction infrastructural projects, Combined contractors capacity evaluation in tender award and performance of road construction infrastructural projects, Moderating influence of process monitoring on the relationship between contractors capacity evaluation in tender award and performance of road construction infrastructural projects.

4.2 Questionnaire Return Rate

Questionnaires were administered to 210 respondents, comprising 106 contractors and 104 PSV matatu drivers. Out of these, 153 were filled and returned, representing questionnaire return rate of 72.8%. It was established that 57 questionnaires, as shown in table 4.1, were not returned despite elaborate effort by the researcher to have them completed and returned. Saunders, Lewis, and Thornhill (2009) argue that 50% questionnaire return rate is reasonable to facilitate meaningful inferential analysis. According to Mugenda and Mugenda (2003), response rate of 70% and above is considered excellent for purposes of inferential analysis. In respect to the reviewed literature on construction projects for this study, Enshassi, Mohamed and Abushaban (2009) recorded a response rate of 73% whereas Nyangwara and Datche (2015) recorded 73.3%. The response rate of 72.8% in the current study, therefore, met the

criteria set by both Saunders, Lewis and Thornhill (2009) and Mugenda and Mugenda (2003). The researcher, thus, proceeded to data analysis, including inferential analyses.

Table 4.1: Questionnaire Return Rate

Category of Respondents	Sample Size	Returned	Average Return Rate (%)
Contractors	106	82	77.36
PSVs Drivers	104	71	68.27
Total	**210**	**153**	**72.815**

4.3 Background Information of Respondents

Background information about the respondents are an important part in social research since it informs the nature of responses obtained. Age of the respondents, for instance, is deemed important in attempt to understand their views about a phenomenon. Gender is also a major consideration in understanding the dynamics about the respondents since construction of reality about a phenomenon would also take cue from the gender biases. The level of education of the respondents also plays a critical role in determining the nature of responses obtained from a study since it determines the manner in which the educationally diverse respondents express opinions about a research problem. Level of experience is equally deemed important since it determines the quality of responses, in terms of the validity of the responses obtained. The background information about the respondents was as shown in the sub-sequent sub-themes:

4.3.1 Contractors' Demographic Information

This section presents demographic information of the respondents, specifically consulting engineers and contractors in road construction projects; both are referred to here as contractors. The results are presented in Table 4.2.

Table 4.2: Contractors' Demographic Profile

Categories of Demographics	Values	Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	62	75.6	75.6	75.6
	Female	20	24.4	24.4	100.0
	Total	**82**	**100**	**100**	
Age	21-30 years	6	7.3	7.3	7.3
	31-40 years	19	23.2	23.2	30.5
	41-50 years	25	30.5	30.5	61.0
	51-60 years	22	26.8	26.8	87.8
	61 and above years	10	12.2	12.2	100
	Total	**82**	**100**	**100**	
Highest Level of Education	College Diploma	9	11.0	11.0	11.0
	Bachelor's Degree	46	56.1	56.1	67.1
	Master's Degree	27	32.9	32.9	100
	Total	**82**	**100**	**100**	
Status in Organization	Managing Director	15	18.3	18.3	18.3
	Director	22	26.8	26.8	45.1
	Manager	13	15.9	15.9	61.0
	Senior Staff	20	24.4	24.4	85.4
	Supervisor	12	14.6	14.6	100.0
	Total	**82**	**100**	**100**	
Work Experience of Contractors	6-10 years	20	24.4	24.4	24.4
	11-15 years	17	20.7	20.7	45.1
	16-20 years	11	13.4	13.4	58.5
	21 and above Years	34	41.5	41.5	100
	Total	**82**	**100**	**100**	
Years of Operation in Road Construction	6-10 years	2	2.4	2.4	2.4
	11-15 years	18	22.0	22.0	24.4
	16-20 years	15	18.3	18.3	42.7
	21 and above Years	47	57.3	57.3	100
	Total	**82**	**100**	**100**	
Category of Road Involved in Construction	National	60	73.2	73.2	73.2
	International	22	26.8	26.8	100.0
	Total	**82**	**100**	**100**	

From Table 4.2, the study was interested in understanding the gender dynamics given that the Kenyan constitution of 2010 requires that there should be at least a third (1/3) of either gender in every aspects of work situation. The results revealed that 62 (75.6%) of the respondents were male contractors and 20(24.4%) represented the female counterparts. This still shows that road construction industry is male-dominant. Similarly, the African traditional patriarchal system gives support to male children in education especially when it comes to science and engineering subjects.

In terms of age, Table 4.2 shows that 6(7.3%) of contractors ranged between 21-30 years, 19(23.2%) fell under a bracket of 31-40 years, 25(30.5%) were between 41-50 years, 22(26.8%) had senior age who ranged between 51-60 years, and the most senior were 10(12.2%) at 61 years and above. The results demonstrates that road construction is mainly run by mature citizens. The fewer number of youth in the industry could be due to lack of capacity, for example, financial and machinery aspects, to undertake large scale projects. However in this study, it implies that majority of contractors are largely aware of issues in road construction and performance. It also implies that contractors were mature and could responsibly respond to the questions on the research problem.

Results in Table 4.2 further reveal that only a few of the contractors nine(11.0%) held college diploma, those with Bachelor's degree were 46(56.1%) and finally those who have gone a step further to attain a Master's degree were 27(32.9%). This implies that majority of the contractors who participated in the study 73(89.0%) were well educated and therefore their level of education is high and are capable providing good road infrastructure and put it in proper use. This also means that if road is poorly performing then something else is influencing that and not education levels of the contractors.

The study was also interested in knowing the status of the contractors in construction firms. This was viewed as important in validating the responses. Therefore, Table 4.2 shows that 15(18.3%) were managing directors of their organizations, 22(26.8%) were directors, 13(15.9%) were managers, 20(24.4%) were senior staff, 12(14.6%) were

serving as supervisors. This implies that in road construction industry, duties and responsibilities are shared or delegated according to one's ability hence professionalism. It also suggests that roles played by individual contractors could be pursued to understand who fails or failed in his or her mandate during construction and even upon completion of road construction for enhanced performance.

Work experience of contractors was deemed important because it could help the respondents (contractors) state their personal opinion and experiences about the phenomenon. The results in table 4.2 demonstrates that 20(24.4%) had been in the construction for between 6-10 years, 17(20.7%) had been in the industry for between 11-15 years, 11(13.4%) had been in the industry for between 16-20 years, while the rest 34(41.5%) had served for over 21 years. This implies that they could all provide quality responses to the questionnaire due to vast experience in road construction.

The study also sought from the respondents about their firms' years of operation in construction industry. The number of years a construction a firm has existed in the industry is equated with quality of output it is likely to give in the event a tender is awarded to construct the road. In this regard, table 4.2 shows that 2(2.4%) of firms had been operated for between 6-10 years, 18(22.0%) had operated for between 11-15 years, 15(18.3%) had operated for between 16-20 years, while majority 47(57.3%) had operated for the longest duration for 21 years and above. This implies that majority of construction firms had amassed the required capacity over time and would stand a better chance to provide good road performance based on experience. It also means that respondents would adequately respond to a question on road performance and give valid and quality data.

Roads in Kenya are classified differently depending either with the type of the road or the geographical location of the road. On this note, respondents were asked to share their opinions on particular road they have taken part in its construction. In table 4.2, the findings shows that majority of contractors 60(73.2%) had participated in construction of

national roads (as classified by NCA), while the remaining 22(26.8%) had experience with construction of international roads. This implies that a good number of contractors have a better idea of what is ailing performance of roads locally and therefore their responses on road performance were well put. However, their inability to take part in construction of international roads could be associated with the stringent requirements for engineers to deal in international roads, hence, majority have focused mainly on the national roads.

4.3.2 PSVs Divers' Demographic Information

This section presents demographic information of the respondents, specifically drivers plying Outer ring road and Eastern Bypass. The results are presented in Table 4.3.

Table 4.3: PSV Drivers' Demographic Profile

Categories of Demographics	Values	Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	69	97.2	97.2	97.2
	Female	2	2.8	2.8	100.0
	Total	**71**	**100**	**100**	
Age	21-30 years	21	29.6	29.6	29.6
	31-40 years	20	28.2	28.2	57.7
	41-50 years	19	26.8	26.8	84.5
	51-60 years	5	7.0	7.0	91.5
	61 and above years	6	8.5	8.5	100
	Total	**71**	**100**	**100**	
Highest Level of Education	KCSE	9	12.7	12.7	12.7
	College Certificate	34	47.9	47.9	60.6
	College Diploma	25	35.2	35.2	95.8
	Bachelor's Degree	3	4.2	4.2	100
	Total	**71**	**100**	**100**	
Status in Organization	Driver	49	69.0	69.0	69.0
	Driver/Conductor	22	31.0	31.0	100.0
	Total	**71**	**100**	**100**	

Categories of Demographics	Values	Frequency	Percent	Valid Percent	Cumulative Percent
Work Experience of Drivers	6-10 years	20	24.4	24.4	24.4
	11-15 years	17	20.7	20.7	45.1
					58.5
	16-20 years	11	13.4	13.4	100
	21 and above Years	34	41.5	41.5	
	Total	**71**	**100**	**100**	
PSV Years of Opetration in Transport Industry	5 and below years	5	7.0	7.0	7.0
	6-10 years	28	39.4	39.4	46.5
	11-15 years	8	11.3	11.3	57.7
					73.2
	16-20 years	11	15.5	15.5	100
	21 and above Years	34	26.8	26.8	
	Total	**71**	**100**	**100**	
Name of the Road PSV Plying	Outer Ring	40	56.3	56.3	56.3
	Eastern Bypass	31	43.7	43.7	100.0
	Total	**71**	**100**	**100**	

From Table 4.3, the study was interested in understanding the gender dynamics in road transport given that the majority of youth are in informal sector, for self employment or informal employment; and therefore, it was necessary knowing how many of those are female working within transport industry. The results indicated that 69(97.2%) of the respondents were male and 2(2.8%) represented the female counterparts. This still shows that PSV transport system is dominated by male. This could be due to harsh working condition that are experienced in this form of road transport. Women are unlikely to survive such conditions hence less interest in joining this sector.

Age-wise, the results in Table 4.3 demonstrates that 21(29.6%) ranged between 21-30 years, 20(28.2%) fell under a bracket of 31-40 years, 19(26.8%) were between 41-50 years, 5(7.0%) had senior age who ranged between 51-60 years, and the most senior were 6(8.5%) at 61 years and above. The results demonstrates that road transport is mainly operated by qualified mature citizens. A large number of youth in road transport sector

could be due to lack formal jobs because most of them start work early after high school and a lot of experience is not required to get employment in this kind of employment. Matatu industry does not favour the senior citizens very much because matatu owners tend to associate efficiency with the younger generation. However, this implies that matatu drivers were mature and could more responsibly answer the questions on the research problem.

Basic education is made mandatory by the government of Kenya, although most the current drivers did not get the chance to get free primary and secondary education. Similarly, road performance has been blamed on rogue drivers who perhaps would be lacking some training. In this study, it was important to establish the level of education of all drivers to deduce something on road performance. Results in table 4.3 revealed that only a few of the drivers nine(12.7%) had sat for KCSE, quite a significant number had college certificates and college diplomas at 34(47.9%) and 25(35.2%) respectively, while only those with a Bachelor's degree were 3(4.2%). This implies that majority of the drivers who participated in the study had acquired some form of tertiary education hence capable of providing good responses regarding performance roads they ply on everyday.

The study was interested in establishing the status of respondents in transport sector, or simply their organizations. It was considered as important to assist in validation of the responses. In Table 4.3 it can be observed that 49(69.0%) were drivers , while those who assumed the role of the driver and at the sometimes conductor were 22(31.%). The higher number of drivers over the conductors explains the reason why most of the time conductors operating are not certified hence frequent arrests of the same. It could also mean some of the factors or reasons to poor performance of the road, such as road accidents whereby vehicles rum into each other or pedestrians are knocked down, could be because of this group of drivers acting as conductors as well.

Work experience of PSV matatu drivers was deemed important because it could easily assist the drivers state their opinions and experiences about the phenomenon. The

foregoing results in table 4.3 demonstrates that 20(24.4%) had been in the transport sector for between 6-10 years, 17(20.7%) had been in the sector for between 11-15 years, 11(13.4%) had been in the transport sector for between 16-20 years, while the rest 34(41.5%) had served for over 21 years. This implies that they could all provide quality responses to the questionnaire due to vast experience on how they perceive road performance considering the two roads under the study were constructed in the recent years within which these years of experience brackets are drawn.

The government of Kenya (GOK) regulates importation of used vehicle not only to promote user satisfaction but also minimize old vehicle that might be a reason for road accidents hence poor road performance. In this respect, the study was interested to seek from the respondents how long their vehicles have operated on the roads. from the respondents about their firms' years of operation in construction industry. The number of years a construction a firm has existed in the industry is equated with quality of output it is likely to give in the event a tender is awarded to construct the road. In this regard, table 4.3 shows that 5(7.0%) of firms PSV had operated for five years and below, a great number 28(39.4%) had operated for between 6-10 years, 8(11.3%) had operated for between 11-15 years, 11(15.5%) had operated for between 16-20 years, while 19(26.8%) had operated for quite sometime for 21 years and above. This implies that many of PSVs have been driven for sometimes and could firmly attest to the performance.

The PSVs in Nairobi County are registered in SACCOs which ply on specific routes or roads. For example, Outer ring road and Eastern Bypass road have PSVs registered under Citi Hopa, Eastern Bypass SACCOs among others. In respect to this, respondents were asked to state their opinions on particular road they ply. In table 4.2, the findings reveals that 40(56.3%) ply along Outer ring road, while the rest 31(43.7%) ply Eastern Bypass road. This implies that a good number of matatu drivers would share their opinion on the performance of these two roads that were recently constructed after independence and during devolved government system.

4.4 Basic Tests for Statistical Assumptions

The study carried out several statistical tests to ascertain normal distribution of data before analysis is undertaken, These include: Test for normality of research data (Kolmogrov and Shapiro Wilk tests), Test for Multicollinearity for the variables and linearity tests. These are further discussed in the sub-sequent sub-themes:

4.4.1 Test for Normality of Research Data

The study used Shapiro-Wilk test (SW-test) as opposed to Kolmogorov-Smirnov (KS-test) to ascertain that data was normally distributed since this is one of the assumptions of linear regression analysis. This test for normality was introduced and used by Shapiro and Wilk (1965) for a complete sample. Razali and Wah (2011) posit that normaldistrib ution of datais a key assumption ofmany st atistical procedures including t-tests, andlinear regression analysis, discriminantanalysis, as well as the analysisof variance. Theyfurther argue thatvalidity and reliabilityof statisticalinferences are greatly compromised when normality assumption is violated.

The most commonly used tests fornorm ality includegra phical methods (histograms, box plots, quartile quartile); numericalmethods (skewnessan dkurtosisindices); andthe formal normality tests. There are four formal tests for normality, namely: Shapiro-Wilk test, KolmogorovSmir nov test, Lillier forstest, andAnderson Darling test. TheShapiro-Wilk test is the most powerful, followed by Anderson-Darling test, Lillierfors test, and Kolmogorov-Smirnovtest (Razali & Wah, 2011). Nevertheless, all the fourformal tests for normal distributionof data are not the best choice for small samples. For example, Tabachnick and Fidell (1996) opines that Skewness and Kurtosis are not appropriate for establishing normality when the samplesize is above 150 because no much difference would be expected or revealed. The concept of normality has been arguedto be important when applying most statistical techniques. In this regard, many statistical operations suchas corre lation, reg ression, analysis of varia nce, and other parametric tests assume that the population from which the sample was drawndisplays normal distribution ofcharacteristics.

The normality assumption should be taken seriously; otherwise, it would be difficult to draw an accurate and reliable conclusion about reality. Shapiro –Wilk test gives values referred to as W statistic. It is recommended that Shapiro Wilks to be used for small sample where n= 3 but not above 2000, whereas KolmogorovSmirnov should only be deemed appropriate when n > 2000. This current study qualified for Shapiro Wilks since n=153. According to Bonini, Hausman and Bierman (1997), this is to mean that when W statistic is near to or is equal to one (1) then it is assumed that data presented is perfectly normal. Therefore, the values of W statistics for the variables in this study ranged between 0.923 and 0.985. As a result, thisimplies that the data used in thisstudy was closer to normal as thevalues were not farfrom one (1). At thispoint, it could be noted in normalcircumstances and real lifesituations data maynot be perfectlynormally distributed. The results of Kolmogorov-Smir novand Shapiro-Wilktests are shown in Table 4.4.

Table 4.4: Results of Kolmogorov Smirnov and Shapiro Wilk Tests

	Kol mogorov-Smirnov[a]			Sha piro Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Performance of Road Construction Infrastructural Projects	0.134	153	0.000	0.964	153	0.001
Financial Ability of Contractors	0.113	153	0.000	0.960	153	0.000
Technical Ability of Contractors	0.146	153	0.000	0.923	153	0.000
Management Ability of Contractors	0.186	153	0.000	0.924	153	0.000
Contractors' Safety Record	0.087	153	0.006	0.985	153	0.104
Process Monitoring	0.171	153	0.000	0.957	153	0.000

a. Lilliefors Significance Correction

The results in Table 4.4 show that performance of road construction infrastructural projects, financial ability, technical ability, management knowledge, contractor's safety record, and process monitoring were normally distributed. This is because all the W Statistics values were closer to 1.

4.4.2 Test forMultico llinearityfor the Variables

Thevaria blesin thisstudy weresubjec ted to the multicollineraity tests. According to Asteriou and Hall (2007), multicollinearity is caused by inter-correlation among the explanatory variables. They also argue that the most logical way to test for mutlicollinearity problem is to obtain correlation coefficients between pairs of explanatory variables. Alin (2010) states that multicolllinearity exists when two or more predictors are linearly related in a statistical model whereby R (correlation coefficient) is greater or sometimes less than zero. He further states that "Multi collinearitycre ates diffi cultieswhen one builds a regressionmodel between response variabley and explanatory vari ableX." In this study, both correlation coefficients (through correlation matrix), and Variance Inflation Factors (VIFs) were examined for significant multicollinearity problem. Any VIF values exceeding 10 are usually indicator of significant multicollinearity (Field, 2013; Somekh & Lewin, 2015). Otherwise, multicollinearity problem is insignificant. Theres ults we reas shownin Ta ble 4.5.

Table 4.5: Collinearity Statistics

Model	Un standardi zed Coeffici ents		Standardized Coe fficients	T	Sig.	Collinearit y Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	3.007	0.185		16.270	0.000		
Financial Abilityof Contractors	0.212	0.033	0.380	6.482	0.000	0.595	1.680
Technical Ability of Contractors	-0.218	0.065	-0.277	-3.376	0.001	0.304	3.287
Management Ability of Contractors	-0.209	0.062	-0.243	-3.339	0.001	0.385	2.597
Contractors' Safety Record	0.579	0.075	1.060	7.681	0.000	0.107	9.320
Process Monitoring	-0.210	0.071	-0.357	-2.977	0.003	0.142	7.053

Dependent Variable: Perf ormanceof Road ConstructioInfrastructuralPro jects

From Table 4.5, all the varianceinflation fac tor (VIF) val ueswere below 10. This implies thatthere was nosignificant multicolli bearityproblem among thevariables in the study. The results werechecked against the resultsfrom correlation matrix in Table 4.6.

Table 4.6: CorrelationMatrix forIndepe ndentVariables

Variable		Financial Ability of Contractors	Technical Ability of Contractors	Management Ability of Contractors	Contractors' Safety Record	Process Monitoring
Financial Ability of Contractors	Pea rson Correlation	1	0.376	0.322	0.617	0.510
	Sig. (2-tailed)		0.000	0.000	0.000	0.000
	n	153	153	153	153	153
Technical Ability of Contractors	Pearson Co rrelation	0.376	1	0.779	0.656	0.600
	Sig. (2-tailed)	0.000		0.000	0.000	0.000
	n	153	153	153	153	153
Management Ability of Contractors	Pearson Corre lation	0.322	0.779	1	0.520	0.440
	Sig. (2-tailed)	0.000	0.000		0.000	0.000
	n	153	153	153	153	152
Contractors' Safety Record	Pearson Correl ation	0.617	0.656	0.520	1	0.922
	Sig. (2-tailed)	0.000	0.000	0.000		0.000
	n	153	153	153	153	153
Process Monitoring	Pearson Correlation	0.510	0.600	0.440	0.922	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	
	n	153	153	153	153	153

**. Correlation issignificant at the 0.05 level (2-tailed).

If the value of correlation coefficient is large, then multicollinearity is a significant problem, with 0.9 usually considered the threshold of significant inter-correlation. Table 4.10 demonstrates that most of the correlation coefficient values werebelow 0.9, which implies thatthere was no signify cant multicollinea rity among thevariabl es; however, correlation coefficieint value of contractors safety record (predictor variable) and process moinitoring (moderating variable) was 0.922 which is not far from the the threshold. Although 0.9 is acceptable, it is not uncommon to encounter such a scenario as in this case hence, 0.922 was still acceptable in this study since to begin with, the value is not extreme. Secondly, the model is used for prediction only and thirdly, the variables being querried are not of particular interest to study question.

4.4.3 Linearity Tests

To ascertain the linear relationship of variables under the study, scatter plots were used. A linearrelation ship must existbetween twoor more variablesbefore linear regression is carriedout (Tabachnick & Fidell, 2013). The depen dentvariable, perfor manceof road construction infrastructural projects, wasused to test the relationship ithas with indepe ndentvariables and moderating variable; financial ability of contractors, technical ability of contractors, management ability of contractors, contractors safety record and process monitoring. It was revealed that the variables had linear relationship hence it was possible to conduct inferential analysis.The output of these tests are presented in appendice section (appendix IV to appendix XIV).

4.4.4 Likert Scale as an Interval Measure

The Likert scale types of questions were adopted in this study. Brown (2011) states that in the Likert scale, either an item or a group of items, also referred to in this study as statements or questions, are arranged in group with intention of measuring a single variable. Boone and Boone (2012) argue that data in Likert scale can also be analyzed as interval measurement scales. Normally, acompo site score, eithersum or mean, is calcu latedfrom four or so Likert-typeitems. This study chosemean (tomeasure central ten dency) and standarddeviation (to measure variability) asthe ma in escriptive statistics for use as interval scale items.

However, Wambugu *et al.* (2015) note that data in the Likert-scale is categorized as ordinal data. In view of Field (2013), even though this data happens to have a ranking as a property, it is still deficient since it lacks the exact distance between two adjacent data-points. Hence, to be able to perform parametric tests using Pearson Product Moment Coefficient, Likert data was converted to interval measurement level. This was made possible by taking composite mean score pertaining to each variable (Boone & Boone, 2012), which assisted in further statistical tests (correlation and regression).

4.5 Perfor manceo fRoad ConstructionInfrastruc turalProjects

Data collected onthe dependentvariable about road performance was descriptively analyzed in both quantitative and qualitative forms.

4.5.1 Quantitative analysisof Performanceof Road ConstructionInfrastruc tural Projects

The study found it necessary to ascertain repondents' opinions on performance of roads. Perceptions of respondents on each of the following dimensions of performance of road construction infrastructural projects: quality of completed road in terms of condition of drainage and water table; mobilityand speed – delays, congestion, averagetravel speed; comfort/convenience in terms of smoothness and roughness of the road; road user benefits in terms of cost reduction, travelti me reduction, vehicleop erating costreduction; and road safety were each measured within the scale. The Likert scale ranged from 5-Strongly Agree (SA), 4-Agree(A), 3-Neut ral (N), 2-Dis agree (D), and 1-Strongly Disagree (SD). The res ultsare inTable 4.7.

Table 4.7: Performance of Road Construction Infrastructural Projects

No.	Statements	5(SA) F (%)	4(A) F (%)	3(N) F (%)	2(D) F (%)	1(SD) F (%)	Mean	SDV
	(a) Quality of Completed Road in terms of condition of drainage and water table							
1.	The road is built with a functional drainage systems to provide long-term road performance	23 (15.0%)	32 (20.9%)	44 (28.8%)	24 (15.7%)	30 (19.6%)	2.96	1.327
2.	The road is well constructed with water table that does not permit flooding	0 (0.0%)	16 (10.5%)	47 (30.7%)	61 (39.9%)	29 (18.9%)	2.33	0.902
3.	Road constructed with adequate drainage systems depends entirely on contractor capacity to do the job	35 (22.9%)	44 (28.8%)	43 (28.1%)	30 (19.6%)	1 (0.6%)	3.54	0.070
4.	Drainage system is operative and allows passage of residual	5 (3.2%)	28 (18.3%)	27 (17.7%)	60 (39.2%)	33 (21.6%)	2.42	1.116

No.	Statements	5(SA) F (%)	4(A) F (%)	3(N) F (%)	2(D) F (%)	1(SD) F (%)	Mean	SDV
5.	Properworkmanship is evidenced by lack of potholes	42 (27.5%)	75 (49.0%)	33 (21.6%)	3 (1.9%)	0 (0.0%)	4.02	0.756
	(b) Mobility and Speed – delays, congestion, average travel speed							
7.	Congestion has significantly reduced	30 (19.6%)	117 (76.5%)	6 (3.9%)	0 (0.0%)	0 (0.0%)	4.16	0.460
8.	Delays are reduced	25 (16.3%)	115 (75.2%)	13 (8.5%)	0 (0.0%)	0 (0.0%)	4.08	0.494
9.	Average travel speed has generally improved	58 (37.9%)	74 (48.4%)	21 (13.7%)	0 (0.0%)	0 (0.0%)	4.24	0.679
	(c) Comfort/Convenience in terms of smoothness and roughness of the road							
10.	The texture of the road is good	67 (43.8%)	55 (35.9%)	30 (19.6%)	0 (.0%)	1 (0.7%)	4.22	0.805
11.	The skid resistance of the road surface is good	45 (29.4%)	64 (41.8%)	33 (21.6%)	10 (6.5%)	1 (0.7%)	3.93	0.911
	Flooding of the road is not experienced during heavy downpours (rainy season)	6 (3.9%)	3 (2.0%)	36 (23.5%)	51 (33.3%)	57 (37.3%)	2.09	1.023
	(d) Road User benefits in terms of cost reduction, travel time reduction, vehicle operationg cost reduction							
12.	The vehicles take longer to depreciate	12 (7.8%)	84 (54.9%)	34 (22.2%)	3 (2.0%)	20 (13.1%)	3.42	1.110
13.	The vehicle breakdowns on the roads has reduced due to good road constructed	24 (15.7%)	85 (55.6%)	44 (28.7%)	0 (.0%)	0 (.0%)	3.87	0.656
14.	Due to properly constructed road the road user costs has tremendously reduced	18 (11.8%)	83 (54.2%)	16 (10.5%)	15 (9.8%)	21 (13.7%)	3.41	1.227
	(e) Road Safety							
15.	Reported cases of accidents have reduced	38 (24.8%)	72 (47.1%)	28 (18.3%)	2 (1.3%)	13 (8.5%)	3.78	1.100
16.	Roads are having enough signage	9 (5.9%)	81 (52.9%)	45 (29.4%)	15 (9.8%)	3 (2.0%)	3.51	0.828
17.	Bumps are provided in the designated places	14 (9.1%)	55 (35.9%)	24 (15.7%)	57 (37.3%)	3 (2.0%)	3.13	1.080
18.	Road users do know the meaning of most of the signage language	54 (35.3%)	70 (45.8%)	28 (18.3%)	0 (.0%)	1 (0.6%)	4.15	0.759
19.	Pedestrians' walkways adequately provided	16 (10.5%)	43 (28.0%)	34 (22.2%)	44 (28.8%)	16 (10.5%)	2.99	1.189

No.	Statements	5(SA) F (%)	4(A) F (%)	3(N) F (%)	2(D) F (%)	1(SD) F (%)	Mean	SDV
20.	Footbridges are sufficiently provided	8 (5.2%)	0 (0.0%)	32 (20.9%)	54 (35.3%)	59 (38.6%)	2.05	1.035
21.	Bus stops are well and placed in the right designated areas	8 (5.2%)	18 (11.7%)	15 (9.8%)	70 (45.8%)	42 (27.5%)	2.22	1.129
	Compositemean and standarddevi ation						**3.36**	**0.297**

InTable 4.7, the means of 21 items used to generate dataonperformance of road constructioninfrastructural proj ectswere summed up and used to compute the com posite meanand stan darddeviation that resulted to 3.36 and 0.297 respectively.

Statement one, road is built with a functional drainage systems to provide long-term road performance, out of 153 respondents, 23(15.0%) strongly agreed, 32(20.9%) agreed, 30(19.6%) strong disagreed, 24(15.7%) and 44(28.8%) stated a neutral opinion. Arising from this line item was a mean of 2.96 against a composite mean of 3.36. This implies the drainage system is not properly functioning. A highersta ndard devia tion of 1.327 against a com posite stan dard deviation of 0.297 indicatedthat this item elicited inconsistency in terms of responses received. Therefore, factors inhibiting functional draianage systems, besides technical aspects, need thourogh checkup and a solution provided to enhance road performance.

Statement two, the road is constructed with water table that does not permit flooding, out of 153 respondents, 16(10.5%) were in agreement with the statement, 29(18.9%) strongly disagreed, 61(39.9%) disagreed, followed by those with neutral opinions 47(30.7%). Amean of 2.33 obtai nedwas below the composite mean of 3.36 which refuted the claim that water table is well contructed. With a stan darddeviati on 0.902 against 0.297 the composite standarddevia tion, the opinions received were divergent among the respondents. It is thereof re Important for the roa dconstru ction engineersto pay keen attentionto water table in terms of design specifications to avoid flooding during heavy downpours.

Statement three, road constructed with adequate drainage systems would depend entirely on contractors' capacity to do the contruction job. Out of 153 respondents, 35(22.9%) strongly agreed, 31(20.3%), 44(28.8%) agreed, 1(0.6%) stongly disagreed, 30(19.6%) disagreed and 43(28.1%) shared a neutral opinion. The statement had a mean of 3.54, slightlyhigher than thecom positemean of 3.36 indicating that contractors with capacity are capable of constructing adequate drainage systems. There was consistency in responses based on the lowerstandarddevia tion of 0.070 compared to the composite standard deviation of 0.297. This line I tem was influencing performance of road construction infrastructural projects positively.

Statement four, drainage systems is operative and allows passage of residual. Out of 153 respondents, 5(3.2%) strongly agreed, 28(18.3%) agreed, 33(21.6%) strongly disagreed, 60(39.2%) disagreed. This demon stratesthat majority ofresponde ntswere in disagreement with the statement. The rest of respondnets 27(17.7%) chose to remain neutral. With a mean of 2.42 below the composite mean of 3.36, this suggested that the drainage systems does not allow passage of residual hence influencing performance negatively. Emerging from this statement was also as tandard deviat ionof 1.116 higher than the compo sitestandardde viationof 0.297 which proved that opinions were inconsistent. This could be because of lack regular maintenance or contractors not being able to adhere to design specifications during construction. Moreso, monitoring of human activities such as excessive littering is necessary to avoid blockage of the drainage systems.

Statement five, proper workmanship is evidenced by lack of potholes. Out of 153 respondents, 42(27.5%) stongly agreed, 75(49.0%) agreed, 3(1.9%) disagreed and 33 (21.6%) remained neutral. A highest mean of 4.02 recorded compared to the composite mean of 3.36 implied that good workmanship by the contractors would definitely result to quality outputs or roads that are well performing. The line item therefore influenced performance positively. A high erstandard de via tionof 0.756 on this statem entcompared

to theco mpositestandard devi atio nof 0.297 indicated divergence in respondents' opinions due high score in neutral opinions.

Statement six, congestion has significantly reduced. Out of 153 respondents, 30(19.6%) strongly agreed, 117(76.5%) agreed. There were zero responses in terms of those who disagreed with the statement and only 6(3.9%) remained neutal. A line item mean of 4.16 reco rdedwas hig herthan the compo sitemeanof 3.36 hence supporting the views that indeed congestion had ceased. This implies that road performance had so far been enhanced and this could be as a result of expansion and upgrading of the status of the road. The line item influenced performance of road positively. A higher standard deviationof 0.460 compared to thecomposite of 0.297 indicated diver gence in opinions due to those who were neutral in opinion.

Statement seven, delays are reduced. Out of 153 respondents, 25(16.3%) strongly agreed with the statement, while 115(75.2%) agreed. None disagreed and 13(8.5%) remained neutral. Derived from this statement was a higher mean of 4.08 com pared tothe com posit emeanof 3.36 and a higherstan dard deviation nof 0.494 compared to 0.297 the composite standard deviation due to neutral position of some respondents due to neutral position of some respondents. This implied that road performance in terms of reduced delays had positively improved.

Statement eight, average travel speed has generally improved. Out of 153 respondents, 58(37.9%) strongly agreed, 74(48.4%) agreed. Meanwhile, none of the respondent disagreed although only a few 21(13.7%) gave a neutral opinion. With ameanof 4.24 higher thatthe composit eme an of 3.36, and a stan darddevi ation of 0.679 higher than the compositestandarddeviation oof 0.297, the results suggests that the opinions were convergent and that average speed had significantly improved and this influences performance of road construction infrastructural positively. This could be due to construction of a dual carriage for a road like Outer-Ring. The line item therefore positively influenced performance of road.

Statement nine, texture of the road is good. Out of 153 respondents, 67(43.8%) strongly agreed, 55(35.9%) agreed, 1(0.7%) strongly disagreed and 30(19.6%) expressed a contrary neutral opinion. A mean of 4.22 higher than the composite mean of 3.36 suggested that road texture had been improved. The line item had a positive influence on performance of the road. The standard deviation of 0.805 obtainedwas high erth an the comp ositestandard deviation of 0.297 indicating respondents' opinions were divergent due to the high score in neutral opinions.

Statement 10, the skid resistance of the road surface is good. Out of 153 respondents, 45(29.4%) strongly agreed, 64(41.8%) agreed, 1(0.7%) stronglydisagreed, 10(6.5%) disagreed and 33(21.6%) neutral. Based on these responses a corresponding line item mean of 3.93 higherth an theco mposite me an o f 3.36 indicated that's kid resist ance wasgood. The statement therefore had aposit iveinf luence on perfo rmanceo f road. Emerging from this statement was a standard of 0.911 higherthan comp osite stan da rd deviation of 0.297 that showedopinions were divergent due high score in the neutral opinions.

Statement 11, flooding of the road is not experienced during heavy downpours (rainy season). Out of 153 respondents, 6(3.9%) strongly agreed, 3(2.0%) agreed, 57(37.3%) strongly disagreed, 51(33.3%) disagreed whilest 36(23.5%) chose to remain neutral on this statement. A line mean of 2.09 recorded was lower than 3.36 which indicated that motorists experienced flooding during heavy rainy seasons on the roads. This could be due to some reasons already highlighted such as littering by the public or citizens, narrow or fewer drainage systems and improper water table. These issues need to be sorted out at the beginning of road construction to avoid affecting the overall performance of the roads. This statement attract eda standarddevi ation of 0.911 higherthan 0.297 the compositestandard deviationhence this implied a lot of inconsistenciesor neutrality in responses.

Statement 12, vehicles take longer time to depreciate. Out of 153 respondents, 12(7.8%) strongly agreed, 84(54.9%) agreed with the statement, 20(13.1%) strongly disagreed, 3(2.0%) disagreed and 34(22.2%) remained neutral. The me anwas 3.42 higher than 3.36 thecom positeme an. This therefore implied that the matatu drivers were deriving maximum benefits because their vehicles were taking longer time to depreciate, a sign of road performance. The line item influenced performance of road positively. The respondents' views were diverse given thesta ndarddevia tionwas 1.110 above the compo sites tandarddeviation of 0.297 implyingneutrality in opini ons.

Statement 13, thevehicle breakdowns on the roads has reduced due to good road constructed. Out of 153 respondents, 24(15.7%) strongly agreed, 85(55.6%) agreed, none disagreed and the rest 44(28.7%) remained neutral. A higher mean of 3.87 compare dtocompo site meanof 3.36 was obtained. This therefore implies thatroad performa ncehas significantly improved due to reduced vehicle breakdowns as this was not the case in the past. The statement showed a positive influence on performance of road. The standard deviation of 0.656 above composite standard deviation of 0.297 indicatedopinions lied in one direction or remained consistent. This was due to higher neutralopinions.

Statement 14, due to properly constructed road user costs has tremendously reduced. Out of 153 respondents, 18(11.8%) strongly agreed, 83(54.2%) agreed, 21(13.7%) strongly disagreed, 15(9.8%) disagreed, while the rest 36(23.5%) had a neutral opinion. A mean of 3.41 wasob tained high erthan thecomposite meanof 3.36 which suggested that indeed a road user costs have reduced. A standarddeviation of 1.227 on the statement was higher thanthe compositestandard deviateon of 0.297 which clearly indicated that the respondents openly gave diverseviews. This was due to high score in neutral opinions.

Statement 15, reported cases of accidents have reduced. Out of 153 respondents, 38(24.8%) strongly agreed, 72(47.1%) agreed, 13(8.5%) strongly disagreed, 2(1.3%) disagreed and 34(22.2%) were neutral. A corresponding higher mean of 3.78 derived

from this statement against a composite mean of 3.36 explains that cases of road accidents on both roads, Eastern ByPass and Outerring have significantly reduced. Inconsistency inopi nions wasevident byahigher standar ddeviation f 1.100 compared to a composite standarddeviationof 0.297. This was due to high score in neutral opinions. Although accidents have reduced, there could still be a few cases that need public awareness and campaigns to ensure road safety is observed by both the motorists and the contractors during construction.

Statement 16, roads are having enough signage. Out of 153 respondents, 9(5.9%) strongly agreed, 81(52.9%) agreed, 3(2.0%) strongly disagreed, 15(9.8%) disagreed and 45(29.4%) gave a neutral opinion. Analysis revealed a higher mean of 3.51 on this line item compared to a composite mean of of 3.36 implied that the roads had enough signage. The opinionsshared by the respondents alsoshowed that there wasinconsistency in reportinggiven a higher standar deviation of0.828 andcompoisite stan dardd eviation of 0.297. This was due to high score on neutral opinions. Indeed, provision of road safety signage is vital to eradicate some of the road carnages we witness on some of the roads. Subsequently, there should be no road commissioned prior to ensuring it is well marked and sufficient signages are provided for both the motorists and pedestrians.

Statement 17, bumbs are provided in the designated places. Out of 153 respondents, 14(9.1%) stron glyagreed withthestatement, 55(35.9%) agreed, 3(2.0%) strongly disagreed, 57(37.3%) disagreedand 24(15.7%) wereneutral. This statement yielded a slightlylower mean of 3.13 comparedto the composite mean of 3.36. This implies that the line item influences the performance of road construct ioninfrastructural project nega tively. With a standard deviation of 1.080 compared to thecomposite stan darddevi ationof 0.297, the viewsof the respondents were inconsistent. Generally, based on this opinions, the study discovered that bumps are not constructed in the right areas on the roads.

Statement 18, road users do know the meaning of most signage language. Out of 153 respondents, 54(35.3%) strongly agreed, 70(45.8%) agreed, 1(0.6%) strongly disagreed and 28(18.3%) remained neural. Arising from this statement was a corresponding mean 4.15 higher than the composite mean 3.36. This influences performance of road construction infrastructural positively. A higher standard deviation 0.759 compared to the composite of 0.297 indicated opinions were divergent due to high score of neutral opinions. This implied despite most the road users knowing the meaning of road signs, there could still be ignorance and breaking of traffic rules or laws and lack of commitment to enforce the laws that would see improvement in road performance either by Nairobi county or NCA or KeNHA.

Statement 19, pedestrians' walkways are adequately provided. Out of 153 respondents, 16(10.5%) strongly agreed, 43(28.0%) agreed, 16(10.5%) strongly disagreed, 44(28.8%) disagreed and 34(22.2%) were neutral. The line item mean of 2.99 lower than the 3.36 the composite meanindica ting it had anegative influenceon the performan ceof roadco nstruction infrastr ucturalprojects. Also obtained was a standard deviation of 1.189 higher than 0.297 the compositestanda rd de viationindicatingdivergence. This wasdue to high score in the neutral opinions. Based on this analysis, it was clear that pedestrians' walkaways were insufficient and impacted negatively on road performance. Therefore, it is highly advisable for the contractors to ensure pedestrians walkways are constructed to promote safety, hence road performance.

Statement 20, footbridges are sufficiently provided. Out of 153 respondents, 8(5.2%) strongly agreed that the foot bridges were adequate, 59(38.6%) strongly disagreed, 54(35.3%) disagreed and 32(20.9%) were of neutral opinion. A lower mean of 2.05 compared to composite mean of 3.36 obtained. This influences the performance of the roadconstructi oninfrastructuralnegatively. This implied that pedestrians were not provided with adequate footbrid gesa factor thatwould be attributedto the accidents occurringon both Eastern ByPass and Outerring roads. To improve this aspect of road safety, it is imperative that the government agencies in charge of road construction sector

put in place measures that would oversee that footbridges are mandatory where highways pass. A standard deviation of 1.035 on this statement was higher compared to composite standard deviation of 0.297 signa lingdivergence of opinions. This was to the fact that there was a highscore on thene utralopinions.

Statement 21, bus stops are well placed in the right designated areas. Out of 153 respondents, 8(5.2%) strongly agreed, 18(11.7%) agreed, 42(27.5%) strongly disagreed, 70(45.8%) disagreed and 15(9.8%) remained neutral. With a much lower line mean of 2.22 compared to a composite of mean of 3.36, implying that bus stops were not placed in the right areas. This means the lineitem has a negativinfluence on perfo rmanceofroad construction infrastructuralprojects. This is to mean that when bus stops are not in designated ares, this puts pressure on other motorists hence compromised road performance. Construction of roads in future should consider this aspect seriously if performance road had to be improved. A high erstandarddeviationof 1.129 comparto composite stan darddeviation of 0.297 was due to highscore in neutral opinions.

4.5.2 Qualitative Analysis of Performance of Road Construction Infrastructural Projects

Results of interviews with road construction engineers indicated that there was concurrence among them about the state of performance of road construction infrastructural projects. The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the road construction engineers:

> *"Rain is the main concern; we tend to do our best in terms of constructing better roads for our citizens but excessive rains sweep away the tarmac; a contractor is also limited by the variation of project design; one of the reasons why we experience poor performing roads it is because road projects are faced by public interference; inadequate drainage for storm water; disposal of wastewater overburdens drains and un-hygienically recommended; poor Social life of road users mainly causing traffic congestion; there is need therefore to encourage public systems of transport than private vehicles (poor social lifestyle); encroachment by road hawkers, limit performance around road reserves;*

ignorance on the part of public service vehicle to fully observe road marks; large volumes of personal vehicles; a trend on over relying on personal vehicles exceeding traffic designed stream density resulting to snarl-ups or congestion hence poor road performance." Road Construction Engineers' Opinions (2019)

Results of interviews with public service vehicles (PSVs) drivers indicated that there was concurrence among them about the state ofperformance of roadco nstruction in frastructuralpro jects. The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the PSVs drivers:

"A day never ends without at least one accident happening; in some instances, when it rains heavily flooding occurs and this really stress us as drivers because we cannot move our vehicles although this has quite improved compared to when the road was dilapidated; this outer ring road some good work was done however the road safety signs are lacking and hence some accidents happen; when it there's heavy downpour of rain our vehicles get stuck and we count it as a loss to our businesses; the bus stops are not adequate and therefore we are forced to pick and drop passengers in the middle of the road which is not only dangerous to our clients but also to us; it is criminal offence to pick and drop passengers along the road but what do we do when the bus stops are not provided? We are sometimes forced to bribe police to allow us to pick passengers where clearly it is not designated for us to do so, especially around Allsops stage; there are no footbridges in common areas that would enable pedestrians or public cross the road. For example, at Mutindwa market, pedestrians are a cause of traffic congestion; corruption is eating our country because when a contractor is awarded tender is forced to share with the one who awards thenthe contractoris leftwith no other optionother than constructaroad that does not minimum quality requirements; I am just being assertive that our government systems have condoned corruption hence poor services including construction of quality roads; around Taj Mall coming down towards the quarry there is a drainage problem. Sometimes when it rains there is an overflow to the main road making it impassible for PSVs and even private vehicles; some parts along outer ring road have no service lanes and this imply that all vehicles must use the main road which cannot happen with us drivers of PSVs,"

The drivers opinions were further stated as follows:

"bus stops are the main problem we are experiencing on our roads especially this Eastern by pass. The government should do something

*about this; we have witnessed recently the government coming in late to erect footbridges after the loss of innocent lives due to speeding vehicles; if I am asked, I would allow bumps constructed along the main road or the highway. It is not only dangerous but it encourages pedestrians to cross anywhere carelessly and this works against the mobility of vehicles; the challenge we keep on experiencing on daily basis is where to pick and drop our passengers, for there are no sufficient bus stops; you find that areas with bus stops are not even properly done; this is totally annoying; the road is good yes but it is sometimes a nightmare when you have to stop the vehicle to allow the pedestrians to cross the road in areas not even permitted; during rush hours we tend to experience heavy traffic jams; the congestions and delays experienced contribute high fuel costs because the vehicles take longer to reach their destinations like town."*PSVs Drivers' Opinions (2019)

4.6 Financial Ability of Contractors and Performance of Road Construction Infrastructural Project

This section presents both the descriptive and the correlational analyses of financial ability of contractors.

4.6.1 Quantitative Analysis of Financial Ability of Contractors

The study determined the extent to which financial ability of contractors would influence performance of roads. The views of respondents on dimensions of financial ability under which the indicators were drawn were: credit rating; bank goodwill; flexibility of loan agreements; turnover, profits, obligations, and amounts due; as well as the level of owned funds used by the contractor. The respondents we reasked to givethe iropinions, in a scale of1-5, using various statements relating to specific indicators of financial ability of contractors. The Likertsc ale rangedfrom 5-Strong lyAgree (SA), 4-Ag ree (A), 3-Ne utral (N), 2-Disagr ee (D), and 1-St rongly Disagree (SD). The resultsare sho wnin Table 4.8.

Table 4.8: Financial Ability of Contractors and Performance ofRoad ConstructionInfrast ructuralProjects

No.	Statements	5(SA) F (%)	4(A) F (%)	3(N) F (%)	2(D) F (%)	1(SD) F (%)	Mean	SDV
	(a) Credit Rating							
22.	All construction firms undertaking road construction have a good credit record	39 (25.5%)	30 (19.6%)	40 (26.1%)	41 (26.8%)	3 (2.0%)	3.40	1.188
23.	Credit rating does affect contractors' accessibility to bank's facility/loan	31 (20.3%)	88 (57.5%)	18 (11.7%)	2 (1.3%)	14 (9.2%)	3.78	1.076
24.	Credit rating does affect contractors' accessing other sources of finance for construction work	43 (28.1%)	63 (41.2%)	26 (17.0%)	3 (2.0%)	18 (11.7%)	3.72	1.233
	(b) Bank's Good Will							
25.	Contractors with bank's good will tend get their construction financial requests fully funded by the bank	47 (30.7%)	58 (37.9%)	20 (13.1%)	20 (13.1%)	8 (5.2%)	3.76	1.176
26.	Contractors' need bank's good will to access loan facility to complete their construction work	68 (44.4%)	49 (32.0%)	31 (20.3%)	5 (3.3%)	0 (0.0%)	4.18	0.867
	(c) Flexibility of aloan agreements							
27.	Contractors get flexible loan agreements with their respective banks for construction works	50 (32.7%)	51 (33.3%)	33 (21.6%)	19 (12.4%)	0 (0.0%)	3.86	1.013
28.	Contractors can operate with even stringent loan agreements and deliver quality projects	5 (3.3%)	37 (24.2%)	36 (23.5%)	44 (28.8%)	31 (20.2%)	2.61	1.154
	(d) Turnover, Profits obligations, amounts due							
29.	Firms with good turnover have good financial health	32 (20.9%)	82 (53.6%)	29 (19.0%)	2 (1.3%)	8 (5.2%)	3.84	0.949
30.	Level of cash flow affects a construction firms operations	32 (20.9%)	95 (62.1%)	26 (17.0%)	0 (0.0%)	0 (0.0%)	4.04	0.616
	(e) Owned Funds							
31.	Firms with their own funds tend to contribute positive road performance	57 (37.3%)	57 (37.3%)	39 (25.4%)	0 (0.0%)	0 (0.0%)	4.12	0.786
32.	Owned funds plus other sources of capital contribute to constructing a road that leads to good performance	76 (49.7%)	64 (41.8%)	13 (8.5%)	0 (0.0%)	0 (0.0%)	4.41	0.644
	Composite mean and standard deviation						**3.79**	**0.533**

In Table 4.8, the means of 11 items or statements used togenerate data on financial ability of contractors were summed up and used to compute thecomposite me anand standard devi ationthat resultedto 3.79 and 0.533 respectively.

Statement 22, all construction firms undertaking road construction have a good credit record. Out of 153 respondents, 39(25.5%) strongly agreed, 39(25.5%) agreed, 3(2.0%) strongly disagreed and 41(26.8%) disagreed and 40(26.1%) expressed neutral opinions. A line item mean of 3.40 recorded was below the composite mean of 3.79. This line item influences performance of road construction infrastructural projects negatively. Based on this analysis, not all construction firms have a good credit rating. This implies that the failing reputations of most contractors for not being awarded tenders in national road construction could be due to their credit rating that adversely affects their activities. A higherstandard dev iationof 1.888 compa redto composite standarddeviation of 0.533 indicatedthat the opinions fromt herespondents wer edivergent. This is also evidence in neutralscoreopinions.

Statement 23, credit rating does affect contractors; accessibility to bank's facility/loans. Out of 153 respondents, 31(20.3%) strongly agreed, 88(57.5%) agreed, 14(9.2%) strongly disagreed, 2(1.3%) disagreed, whereas the rest 18(11.7%) held a neutral position. A mean of 3.78 wasgenerated close bytoa compositemean of 3.79. This impliedthat credit rating does not affect contractors accessing loans from the banks. Although this might be true, a closeby line mean of 3.78 against the composite mean of 3.79 still shows credit rating can affect to some degree accessing bank loans. However, this would also mean that contractors might still be financed by their banks as long as they are servicing their loans. A standardde viat ionof 1.076 obtained w asabove the compositestandard deviation of 0.533 of 0.533 implyingdivergence of opinions.

Statement 24, credit rate does affect contractors accessing other sources of finance for work. Out of 153 respondents, 43(28.1%) strongly agreed, 63(41.2%) agreed, 18(11.7%) strongly disagreed, 3(2.0%) disagreed and 26(17.0%) remained neutral. A lower mean of

3.72 obtainedon thisstate mentcompared to a com positemean of 3.79 implied that credit rating does not hinder the contractors from accessing other sources of finance. According to respondents' views, given a higher standard deviation of 1.233 compared to a composite standard deviation of 0.533, it was evident there were inconsistences. This could be as a result of high score in neutral opinions.

Statement 25, contractors with banks' good will tend to get their construction financial requests fully funded by the bank. Out of 153 respondents, 47(30.7%) strongly agreed, 58(37.9%) agreed, 8(5.2%) strongly disagreed, 20(13.1%) disagreed, whereas 20(13.1%) were neutral. A lowe mean of 3.76 compared to a composite mean of 3.79 was obtained. This implied that bank's good will is not the main factor that would influence the bank to fully fund contractors. Comparing aline it emstandard deviation of 1.176 and acomposite stan dardde viation of 0.533, it can be concludedthat the respondents had divergen top inions. This line item influencesthe performan ceof road constructioninfrastructure projectsnegatively.

Statement 26, contractors need banks good will to access loan facility to complete their construction work. Out of 153 respondents, 68(44.4%) strongly agreed, 49(32.0%) agreed, 5(3.3%) disagreed and 31(20.3%) remained neutral. A line item mean of 4.18 obtained on this statement compared to 3.79 affirmed that indeed contractors need bank's good will to access loan facilities. Contractors may not be lucky for fully funding by their banks due to the bank's good will standing, however, they still need that good will to access loan facility to complete their construction work. This influences performance of road construction infrastructural projects positively. A highersta ndarddevi ationof 0.867 and a comp os itestandard deviationof 0.533 implied thatthe re spondents' opinions tended to beinfluenced by highneutral opinions.

Statement 27, contractors get flexible loan agreements with their respective banks for construction works. Out of 153 respondents, 50(32.7%) strongly agreed, (33.3%) agreed, 19(12.4%) disagreed, whereas 33(21.6%) gave a neutral view. A means core of 3.86

abovethe com positeme an of 3.79 was obtained from the analysis, which implied that contractors get flexible loan agreements awarded by their banks. This influences performance of road construction infrastructural positively because contractors are able to complete work in good time. This statement elicited divergent views represented bystandard deviate onof 1.013 compared to the composit estandarddeviationof 0.533. This was due to high score of neutral opinions. To grow local and regioanal capacity in road construction, banks should be willing to support local contractors.

Statement 28, contractors can operate with stringent loan agreements and still deliver quality roads. Out of 153 respondents, 5(3.3%) strongly agreed, 37(24.2%) agreed, 31(20.2%) strongly disagreed and the rest 36(23.5%) neutral. A mean of 2.61 compared to composite mean of 3.79 implied that stringent loan agreements are a detterent for contractors accessing bank loans and that majority of contractors would never survive with that, hence poorly done infrastructural projects. The opinions werediver gingas revealed byastan darddeviation of 1.154 higher th anthe composite standardddeviation of 0.533. This is evidenced by high neutral opinion score. This may make it difficult for contractors to access funding from banks hence delay in delivering of quality road infrastructure on the agreed time frame and eventually compromising future performance of the road.

Statement 29, firms with good turnover have good financial health. Out of 153 respondents, 32(20.9%) strongly agreed, 82(53.6%) agreed, 8(5.2%) strongly disagreed, 2(1.3%) disagreed while the rest 29(19.0%) remained neutral. A meanof 3.84 greaterthan theco mpositeme an of 3.79 was obtained. This findings implied that contractors financial health is determined with a good turnover hence good road performance. A standard deviation of 0.949 higher than the composite standard deviation of 0.533 was derived indicating that the opinions as per the results were inconsistent due to high score of neutral opinion which basically increases the standard deviation.

Statement 30, level of cash flow affects a construction firms's operations. Out of 153, 32(20.9%) strongly agreed, 95(62.1%) agreed and none of the respondents disagreed with the statement. Only 26(17.0%) had a neutral opinion. On this statement, analysis revealed a higher mean of 4.04 thanthecompositemeanof 3.79 which impliedthat indeedlevel of cashflow is important to ease contruction firms' operations. This influencesperformance of road constructioninfra structure proj ectspositively. A derived standard deviation of 0.616 comparedtoacompo sitestandarddeviationof 0.533 indicated that respondents held inconsistent opinion due to high neutral opinions.

Statement 31, firms with their own funds tend to contribute to positive road performance. Outof 153 respond ents, 57(37.3%) strong lyagreed, 57(37.3%) agreed, 39(25.4%) had a neutral opinion and yet none disagreed. This lineitemwas supported by a me an o f 4.12 compared toaco mposite me anof 3.79 andastan darddeviationof 0.786 against 0.533. This implied that owned funds can positively contribute towards constructing quality roads that would lead to good road performance. The standard deviation showed divergence in respondents' views. This was due to high score on neutral opinions. Therefore, contractors and construction firms must aim to increase level of owned funds to be able to actively participate in road construction infrastructural projects and also improve on performance.

Statement 32, owned funds plus other sources of capital contribute to constructing a road that leads to good road performance. Out of 153 respondents, 76(49.7%) strongly agreed and 64(41.8%) agreed, demonstrating thatmajoritya greed withthe state ment. Onth otherhand, only 13(8.5%) held neutral view and zero disagreed. A hig hermeanof 4.41 compared toth eco mpositemeanof 3.79 implied that a contractor working with owned funds and other sources of capital is highly likely to construct a road with good performance. The opinions shared by the respondents were divergent giventhat a stan dard deviate on 0.644 was higher than the compositestandarddiationof 0.533. This was due to slightly high score in neutral opinion.

Results of interviews with road construction engineers indicated that financial ability influenced to a great extent theperfomance roadconstruction infras tructuralproje cts. The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the road construction engineers:

> *"Insufficient financial capacity can lead to substandard work thus lead to poor performance; diversion of projects funds to other entities of business affects smooth flow of project construction and even affect the quality upon completion; overreliance on projects' certificates (IPCs); the financial ability will enable a contractor hire not only the right personnel but skilled personnel; contractors with adequate funds will tend to produce the maximum satisfaction as far as good road is concerned; if a contractor wishes to get quality equipment, quality materials for the best outcome in road construction then it is important for that contractor to have sufficient funds."* Road Construction Engineers' Opinions (2019)

Results of interviews with public service vehicles (PSVs) drivers indicated that financial ability influ encedto a greatex tent theper form ance of road construct on infrastructural projc ts. The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the PSVs drivers:

> *"Some contractors we have heard on TVs, radios and even daily newspaper that their work is affected due to lack of funds; this is serious because we end up with low quality job done; Materials can never be bought if there are inadequate funds; it is true without funds a contractor will end up doing a substandard work; sometimes finance is not the only thing that acts as a barrier to quality performance of a contractor and hence poor road performance but also corruption which is eating our country; it is obvious that we have witnessed that poorly performing roads are constructed by those contractors with a weaker pool of financial resources; I believe with proper financial capacity then and only then a contractor can hire the right skilled personnel; poor financial status means hiring technical expertise of less skilled personnel or workforce; it is likely impossible to produce a road with good quality if for sure you do not have funds of your own or you can easily access loans from the banks."*PSVs Drivers' Opinions (2019)

4.6.2 Inferential Analysis of Financial Ability of Contractors

The inferential analysis was performed by use of correlation and regression to show the relationship, direction and strength of the independent and dependent variables. This was based on the first objective of the study which was to determine the extent to which financial ability of contractors influe nce perform of road construction infrastructprojects inNairobiCounty. The dimensions of financial ability modeled in the study were: credit rating; bank good will; flexibility of loan agreements; turnover; and owned funds. Perform anceof roadconstruct infrastructuralprojectswas the dependent variable and was operationalized usingthefollowin indicators: road quality; mobility and speed; comfort and convenience; road user benefits; and road safety.

4.6.2.1 Correlation Analysis of Financial Ability of Contractors andPerfor mance ofRoadConstruction Infra structuralProject

Correlation analysisusing Pearson'sProductMoment techniquwas done toestablish the relationship betweenthe various dimensions of financialability of contractors and performance road construct infrastruc turalprojects. The values obtained from the correlational analysis ranged between +1 and -1. In this regard, +1 impliedperfect positi correlation, while -1 implied per fectnegativecorrelation. 0.000 implied no correlation; the modular values 0.001 to 0.250 implied weak correlation; 0.251 to 0.500 implied semi-strong correlation; 0.501 to 0.750 implied strong correlation; and 0.751 to 1.000 implied verystrongcorrelation. The findings were asshowninTable 4.9.

Table 4.9: CorrelationMa trix forFinancial Ability of Contractors and Performance ofRoad ConstuctionInfrastructural Projects

Variables		Financial Ability of Contractors	Performance of Road Construction Infrastructural Project
Financial Ability of Contractors	Pearson Correlation	1	0.669**
	Sig. (2-tailed)		0.000
	n	153	153
Performance of Road Construction Infrastructural Project	Pearson Correlation	0.669**	1
	Sig. (2-tailed)	0.000	
	n	153	153

**. Correl ation issignificant atthe 0.05 level (2-tailed).

Table 4.9 showsth at at 0.05 levelof signify cance, therewas significantcorrelation between financial abilityand performanceof ro ad construction infrastructural project (P-value<0.01). The correlation between the two variables was 0.669, which according to the continuum earlier unveiled, implied a strong correlation.

4.6.2.2 Regression Analysis of Financial Ability ofContractors andPerformance of Road ConstructionInfrastrctural Projects

The following hypothesis was tested using linear regression model to satisfy the requirements of the first objective of the study:

Test of Hypothesis 1

1.H_0: Financial ability of contractors does not signify cantly influence perform anceof road construction infrstructuralprojects.

H_1: Financial ability of contractors significantlyinfluece performance of road contruction infrastrtural projects.

The null hypo thesis ($1H_0$) wastested using the followinglinear regressionmodel:

$y = a + B_1X_1 + e$

Where:
y - Performanceof roadconstruction infrastructualprojects
X_1 - Financial ability of contractors
B_1 – Regression coefficient
a – Regression constant
e – Errorterm

The resultswere as shownin Table 4.10, 4.11 and 4.12

Table 4.10: ANOVA for Financial Ability of Contractors andPerformancof Road Construction IfrastructuralProjects

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.006	1	6.006	122.235	0.000[b]
	Residual	7.419	151	0.049		
	Total	13.424	152			

a. DependentVarible: PerformanceoRoad

b. Predictors: (Constant), Fiancial Ability of Contractors

From Table 4.10, ANOVA wasusedto establish the goodness fit of the regressionmodel. Established from the model was the f-significance value of p=0.000 was less than 0.05 (p= 0.00 <0.05). The calculated F (122.235) was signifcantlylarger than the criticalvalue of F= 3.905 This impliedthat the mo delwas significant.

Table 4.11: ModelSumary forFinancil Ability ofContrators and Performance ofRoad ConstrutionInfrastrctural Projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.669[a]	0.447	0.444	0.22166

a. Predictors: (Constant), FinancialAblity of Contractors

Table 4.11 shows that R=0.669, and R^2 =0.447. The correlation between financial ability of a contractors and performance of road construction infrastructural project was indicated by "R". This implies that financial ability of contractors has a strong influence inperformance roadcons truction infrastructural project. The R-square=0.447 explains 44.7% of performance of road construction infrastructural projects. This means that the other 55.3% of variation in perfmanceof road constction infrastrucralprojects maybe explained by other factors not covered under this model.

ModelCoefcients of FinncialAblity of Contctorsand Perforanceof Road ConstructinInfrastructurl Projects

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.945	0.129		15.062	0.000
Financial Ability of Contractors	0.373	0.034	0.669	11.056	0.000

Model: {B=0.373, t=11.056, F(1,151)=122.235, p=0.000<0.05}
a. Predictor Variable: Financial Ability of Contractors
b. Dependent Variable: Performance of Road Construction Infrastructural Projects

The results inthe Table showthat financial ability of contractors has statistical signicant influence performance roadconstructin infrasructuralpojects {B=0.373, t=11.056, F(1,151)=122.235, p=0.000<0.05}. The unstandardized beta (B) coefficient for financial ability of contractors is 0.373. The beta value imply that a unit increase in performance of road construction infrastructural projects corresponds to 37.3% increase in financial ability of contractors.

Using thestatistcal findings, the regresionmodel can be substitutedas follows:

$y = 1.945 + 0.373X_1$

Where

y - Performance ofroad constrution infrastructral projects

X_1 - Financial ability of contractors

As shownintable 4.12, for the predictor variablfinancial ability of the contractor, the probality of the t statistic (11.056) for the b coefficient is 0.000<0.001 which is less than the level of significance 0.05. From these findings the null hypothesis was rejected that the slope associated with financial ability is equal to zero (b=0) and hence in this connection, it was concluded that financial ability of contractors had significantinflence on perfoanceof road construtioninfrastrtural projects. Moreover, the b coefficient associated with financial ability of the contractor (0.373) is positive, indicating a direct relationship.

The study findings indicate a statistical significance correlation between financial ability of a contractors and performance of road construction infrastructural project. This findings areline with a studyby Kithinji and kamaara (2017) who established that project finance, and project technology had statiscallysignificant influnceon perform anceof road construction infrastructural projects. Similarly, the current study also support a study by Mwakajo and Kidombo (2017) that financial ability of a contractor has statistical significant positive relationship with performance of road construction infrastructural projects. Further, the current study found that the level of cash flow can affect the operations of the construction firm. In addition, findings show thatfirms with good turnover are likely to experience good financial health given a line item mean of 3.84 against a composite mean of 3.79. This is in line with Mwakajo and Kidombo noted that availability of finance would enable a contractor acquire other resources. The current study has also established that the level of cash flow affects a construction firms. This findings supports Nwanyanwu (2015) who found that financial ability, indicated by outright cash payment for assets, has statistically significant moderate positive relationship with net profit of an entity. This implies that financial ability of contractors is a backborne not only for the survival construction firms but also for delivering quality roads that meet beneficiary satisfaction.

A study by Kulemeka, Kululanga and Morton (2015) found that economic factors significantly influenced performance of road cosntruction infrastructural projects. The economic factors included prohibitive conditions attached to accessing capital, highly charged lending interest rates, high rates of tax. The current study has confirmed that contractors do get flexible loan agreements from their respective banks (a line item mean of 3.86 and composite mean of 3.79). The findings supports Akali and Sakaja (2018) who found that contractors had the capacity for accessing capital sources and loans. In addition, the current study has found that contractors may not be able to operate with stringent loan agreements and expected to deliver quality roads. The findings therefore agrees with the recommendation of Akali and Sakaja that contractors should be able to

establish banks that are willing to facilitate credit access. This implies that banks should be flexible in drafting loan agreements to support local contractors to enhance road performance.

The findingsindicate that constructions firms or contractors with owned funds in addition to to other sources of capital can build roads with good road of performance (a higher mean of 4.41 againsta compositemeanof 3.79). Densford, James and Ngugi (2018) revealed that, locally, construction firms' ability in resource mobilization was a challenge, however, financial resource mobilization influenced performance of roads in terms quality. The finfings also support Rahman, Memon and Karim (2013) study that contractors are highly challenged financiallly something that affects construction performance.

It istherefore importantto note that thesignificant relationship bet ween financial ability of contractsand performance construction infrastructural is because such projects are normally finance-intensive. This study has therefore shown that there is need to establish strong financial base by the contractors for effective completion of projects which can lead to excellent performance.

4.7 Technical Ability of Contractors and Performance of Road Construction Infrastructural Projects

This sectionpresents descriptivecorrelational analyses ofthe technical ability of contractors.

4.7.1 Quantitative Analysis of Technical Ability of Contractors

The study found it critical to assess technical ability of contractors and how it influences performance of roads. Respondentswe re askedto, in a scale of 1-5, score various statements relating to specific indicators of technical ability of a contractor. The dimensions of technical ability under which the indicators were drawn were experience of catchment nationalnternational projects; plantndequipment; quality of materials used; experience insize of projectompleted; and availability of technical manpower or

personnel. The respondents were asked to, in a scale of 1-5; score various statements relating to specific indicators of technical ability of a contractor. The Likert scale ranged from 5-Strongly Agree (SA), 4-Agree (A), 3-Neutral (N), 2-Disagree (D), and 1-Strongly Disagree (SD). The resultsre showninTable 4.13.

Table 4.13: Technical Ability of Contractors andPerformance ofRoad ConstrctionInfratructuralProjects

No.	Statements	5(SA) F (%)	4(A) F (%)	3(N) F (%)	2(D) F (%)	1(SD) F (%)	Mean	SDV
	(a) Experience in terms of catchment of national or international projects							
33.	Contractors project catchment experience (/national/international) are factored in during contractor evaluation	86 (56.2%)	51 (33.3%)	0 (0.0%)	11 (7.2%)	5 (3.3%)	4.32	1.024
34.	Project performance does depend on the previous catchment experience	9 (5.9%)	83 (54.2%)	61 (39.9%)	0 (.0%)	0 (0.0%)	3.66	0.587
	(b) Plant and Equipment							
35.	The quality ofplant and equipmentused determines the quality of the project	78 (51.0%)	58 (37.9%)	10 (6.5%)	7 (4.6%)	0 (0.0%)	4.35	0.799
36.	Adequate supplyof plant equipment road construction has a significant effect on project performance during the life of the project	51 (33.3%)	77 (50.3%)	20 (13.1%)	0 (0.0%)	5 (3.3%)	4.10	0.867
37.	The use of current technology determines the final product and its performance in road construction	56 (36.6%)	85 (55.6%)	12 (7.8%)	0 (0.0%)	0 (.0%)	4.29	0.603
38.	The use of own plant and equipment influences project performance	62 (40.5%)	74 (48.4%)	17 (11.1%)	0 (0.0%)	0 (0.0%)	4.29	0.658
	(c) Quality of materials used							
39.	The right use of materials during construction has significant effect on project performance	78 (51.0%)	72 (47.0%)	3 (2.0%)	0 (0.0%)	0 (0.0%)	4.49	0.539
40.	Correct mixing of materials does contribute to quality roads that meet road user satisfaction i.e. road free from potholes	88 (57.5%)	62 (40.5%)	3 (2.0%)	0 (0.0%)	0 (0.0%)	4.56	0.537
	(d) Experience in terms of size of projects							

No.	Statements	5(SA) F (%)	4(A) F (%)	3(N) F (%)	2(D) F (%)	1(SD) F (%)	Mean	SDV
41.	The size of the road(s) completed in the past can determine the contractors' ability to deliver on project performance	60 (39.2%)	81 (53.0%)	12 (7.8%)	0 (0.0%)	0 (0.0%)	4.31	0.612
42.	All contactors have experience in undertaking large scale road construction to assure project performance	8 (5.2%)	24 (15.7%)	48 (31.4%)	54 (35.3%)	19 (12.4%)	2.66	1.052
43.	Only contractors with experience in undertaking big size of road construction works can assure project performance	41 (26.8%)	25 (16.3%)	33 (21.6%)	40 (26.1%)	14 (9.2%)	3.25	1.345
	(e) Availability of technical manpower/personnel							
44.	Majority of the road construction personnel are professional and skilled	0 (0.0%)	24 (15.7%)	49 (32.0%)	55 (36.0%)	25 (16.3%)	2.47	0.946
45.	Engagement of professional project leader contributes to a successful project performance	80 (52.3%)	73 (47.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	4.52	0.501
46.	The type of personnel working on road construction cannot influence project performance as long the project leader is trained	17 (11.1%)	6 (3.9%)	32 (20.9%)	78 (51.0%)	20 (13.1%)	2.49	1.125
47.	All casual laborers in road construction are trained hence project performance	0 (0.0%)	0 (0.0%)	13 (8.5%)	56 (36.6%)	84 (54.9%)	1.54	0.649
	Composite mean and stand rd deviation						**3.69**	**0.377**

In Table 4.13, the means of 15 items used to generate data on technical ability of contractors were summed up and used to compute the composite means tandard deviation that resultedto 3.69 and 0.377 respectively

Statement 33, contractors project catchment experience, locally or internationally, are factored in during the contractor evaluation process. Out of 153 respondents, 86(56.2%) strongly agreed, 51(33.3%) agreed, 5(3.3.%) strongly disagreed, 11(7.2%) disagreed. Respondents were not neutral in answering this line item. A meanf 4.32 compareto compositmeanof 3.69 was generated. This showed that project catchment experience is considered when a contractor is being evaluated. This influences the performance of road construction infrastructural projects positively. A stdarddeviation of 1.024 a composite standard devinof 0.377 indicated opinions sharedthe respondents had inconsistencies.

Statement 34, project performance does depend on the previous catchment experience, Out of 153 respondents, 9(5.9%) strongly agreed, 83(54.2%) agreed, and 61(39.9%) expressed neutral opinion. Arising from the line item was a lower mean 3.66 to the mean of 3.69 which indicated that contractors' technical ability would not be influenced by the previous catchment experience, whether national or international. The opinions from the respondents, however, were divergent given a standard deviation of 0.377 against line itemstandard deviationof 0.587 which was due to high neutral opinions.

Statement 35, the quality of plant and equipment used determines the quality of project. Out of 153 respondents, 78(51.0%) strongly agreed, 58(37.9%) agreed, 7(4.6%) disagreed and 10(6.5%) were neutral. A generated mean line item of 4.35 against a composite mean of 3.69 suggested that to determine the technical ability of a contractor for good road performance, quality of plant and equipments is vital. Witha high er standarddevi ationof 0.799 above a compositestand ardde viation o f 0.377, it could be deduced that the views of the respondents were diverse.

Statement 36, adequate supply of plant and equipment in road constructionhas asignificant effe cton project pe rformanceduring the life of the project. Out of 153 respondents, 51(33.3%) strongly agreed, 77(50.3%) agreed to this statement, while 5(3.3%) decided to disagree and 20(13.1%) chose to remain neutral. A mean of 4.10 generatedwas highercompa red to thecom posite mean of 3.69 indicating that besides quality, the need to have adequate plant and equipments on the construction is fundamentally important. This line item influences performance of road construction infrastructural projects positively. It could also mean that less equipment would derail either the work of the contractor or work maybe done in a hurry compromising quality of project. A lowerst andarddevia tionof 0.867 compared to 0.377 compositestandard deviationshowed thatopinionsshared by the respondents were inconsistent.

Statement 37, the use of the current technology to determine the final product and its performance in road construction. Out of 153 respondents, 56(36.6%) strongly agreed, 85(55.6%) agreed, none disagreed and 12(7.8%) held neutral opinion. With a higher mean of 4.29 compared to 3.69 composite mean, it implies that the use of current technology could lead to a quality final product in terms of long lasting roads. In this regard, assessing the contractors on their level of technology adapatability is vital to enhance road performance. Given a standard deviation of 0.603 compared to the compppositestadarddeviaion of 0.377, the line item had inconsistent of opinions.

Statement 38, the use of own plant and equipment influence project performance. Out of 153 respondents, 62(40.5%) strongly agreed, 74(48.4%) agreed, none disagreed and 17(11.1%) maintained on neutral opinion. A mean of 4.29 obtainedonth is state mentwas higher thanthecompositemean of 3.69. This implies that the use of own equipment is not only a factor to gauge the ability of the contractor but also it has a high correlation with project performance. Own equipments gives the contractor ample time to commit to doing quality job. A higher standard deviation of 0.658 on this statement compared to the composite standard deviation of 0.377 is an indication that opinions tended to be divergent.

Statement 39, the right use of materials during construction has significant effect on project performance. Out of 153 respondents, 78(51.0%) strongly agreed, 72(47.0%) agreed, and 3(2.0%) expressed neutral opinion indicating that none of the respondents disagreed. A mean of 4.49 higher than a composite mean 3.69 proved the importance of and the need for utilizing quality materials during construction for enhancement of quality roads which can lead to long term performance of road construction projects. A stanarddeviati onof 0.539 compared to a lower composite mean of 0.377 is an indication that the views were divergent. This explains the reason why we have some roads that develop potholes after short period from the time of completion, hence poor road performance.

Statement 40, correct mixing of matetials does contribute to quality roads that meet road user satisfaction such as roads free from potholes. Out of 153 respondents, 88(57.5%) strongly agreed, 62(40.5%) agreed that correct mixing of materials contribute quality roads, 3(2.0%) had a neutral opinion whereas none disagreed. With a higher meanof 4.56 and copositemean of 3.69, this implied that the ability of a contractor to do proper mixing of materials has a significant influence of quality road output. Astandard devi ationof 0.537 and a compositestand arddeviationof 0.377 showed that respondents' opinions werediverging.

Statement 41, the size of he road(s) completed in the past can determine the contractors' ability to deliver on project performance. Out of 153 respondents, 60(39.2%) strongly agreed, 81(53.0%) agreed, none of the respondents disagreed and 12(7.8%) remained neutral. A meaof 4.31 higherthan the composiemeanof 3.69 was generated which implied that the size of a road(s) completed in the past could demonstrate the contractors' ability to undertake any amount of work. This fact insinuates that giving a highway job to a contractor who is used to constructing feeder-roads may fail to meet the demands that come with huge construction assignment, hence poorly constructed road. According to a standard deviation obtained of 0.612 higher thathe compositestandd deviationof 0.377, the responseswere divergent.

Statement 42, all contractors have experience in undertaking large scale road construction to assure project performance. Out of 153 respondents, 8(5.2%) strongly agreed, 24(15.7%) agreed, 19(12.4%) strongly disagreed, 54(35.3%) of respondents disagreed. On the other hand, 48(31.4%) were neutral in giving opinions. The views of the majority respondents who disagreed were supported by a mean of 2.66, which was below the composite mean 3.69. With this findings, it implies that the construction regulatory agencies should be able to streamline the road construction industry by uprooting those contractors masquerading as professional while hurting the reputation of those commited to quality work. However, thelearners should beprovided with the opportunityto work along withthe experienedcontractors so that a pool of talented young professionals is

created. In respectto a highsta ndard deviatonof 1.052 on this line itemcompa redto a composite standrddeviationof 0.377, the views of the respondents greatly took a divergent direction. This line item influences performance of road construction infrastructural projects negatively.

Statement 43, only contractors with experience in undertaking big size of road construction works can assure project performance. Out of 153 respondents, 41(26.8%) strongly agreed, 25(16.3%) agreed, 14(9.2%) strongly disagreed and 33(21.6%) of the respondents held neutral opinion. Arising from this statement was a mean alwer mean of 3.25 comparedtohe compositemeanf 3.69 which implied that not only contractors who have had experience in undertaking big size of projects can assure project performance. Other factors like use of current technology, adequate resources among others must be factored in or could play a major role. Meanhile standard deviatinof 1.345 was higher compared tohe composites tandarddeviatinof 0.377 which suggestthat therespondents' views onthis statement werediverse.

Statement 44, majority of road construction personnel are professional and skilled. Out of 153 respondents, 24(15.7%) agreed. On the other hand 25(16.3%) strongly disagreed, 55(36.0%) disagreed with this statement, followed by the neutral views at 49(32.0%). A corresponding line item mean of 2.47 lower thanacompositemean of 3.69 wasgenerated which indicatedhat majority of roadconstruction workers are not professional and skilled. A standadeviationof 0.946 high thanhe compsitestandardviationof 0.377 signified divergent opinions. It therefore implies that working with none qualified staff in road construction has been partly a reason why most roads cannot last longer before they deteriorate. Proper management and close supervision is therefore required where personell with fewer skills need support. Lately, middle level colleges are there to offer equally affordable quality trainings like any other advanced colleges and universities, whereby those with desire in road construction can take advantage of enrolling in them.

Statement 45, engagement of professional project leader contributes to a successful project performance. Out of 153 respondents, 80(52.3%) strongly agreed and 73(47.7%) agreed. On this line item none disagreed or had neutral opinion. A meanf 4.52 compared toomposite standdeviationof 3.69 implied that working with a professional project leader would greatly contribute to positive project performance. A higher standard deviation of 0.501 compared to the composite standard deviation of 0.377 showedthat opinions were divergent. Itis therefore important for every road construction project to hire a professionally trained project manager on the site if project performance isto berealized uponcompletion ofconstruction. Thimeans that roaprojects that aremostly completed with designs errors or defects, like no footbridges or pedestrians' walkways, no bus stops are likely to have not engaged a project project manager.

Statement 46, the type of personnel working on road construction cannot influence project performance as long as the project leader is trained. Out of 153 respondents, 17(11.1%) strongly agreed, 6(3.9%) agreed, 20(13.1%) strongly disagreed, 78(51.0%) disagreed and 32(20.9%) were of neutral view. The analysis further refuted the claim by a lower mean of 2.49 compared to composite mean of 3.69 that showed that there was no way a road construction project would work with just anybody as long as the project has a trained leader. Hence, more emphasis to hire properly trained team of personell to contribute to project performance. Ahighers tandarddevia tionof 1.125 to that of a compositstandarddviationof 0.377 showed that opinions wereinconsistent. This was evidenced by higher neutral opinions.

Statement 47, all casual labourers in road construction are trained. Out of 153 respondents, 84(54.9%) strongly disagreed, 56(36.6%) disagreed and only 13(8.5%) were not sure or neutral. A mean of 1.54 forth is lineitemwas belowthe composite mean of 3.69. A stadardeviationof 0.649 and compositeandarddeviationof 0.377 showed that the opinions from the respondents did not converget.Therefore, the findings implies that majority of casual labourers are not trained because their work does not require training and therefore they are picked by contractors without providing academic background.

However, it is important for freshly graduated engineering starters to embrace casual labour to enhance their skills as they anticipate growing in the road construction industry.

4.7.2 Qualitative Analysis of Technical Ability of Contractors

Results of interviews with road construction engineers indicated that technical ability influenced to a great extent the performance of the rroad constructionnal infrastrucral projeeects. The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the road construction engineers:

> *"Highly trained or qualified personnel can lead to high performance of project for example efficient work program and plan; ground's on hands ability of technical, technicians; great determiners, of project performance; trained and field experience boosts end product; untrained, semi-skilled manpower are hard to manage and also are poor decision makers hence poor performance; if working by a technical team that is competent is a must then that is what is required in the road construction; this will not only contribute to effective implementation of the road but most importantly good roads in the future; road construction must work with competent team."*Road Construction Engineers' Opinions (2019)

Results of interviews with public service vehicles (PSVs) drivers indicated technical ability influenced to a great extentth e perfor mance of of roadof construction infrastructurall proojects. The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the PSVs drivers:

> *"When a contract is being awarded to the contractor it is important and crucial for the government or whoever it awarding that tended to consider technical ability aspect since poor workmanship can result due to lack of or insufficient technical expertise or ability; hiring persons who have hands on experience in road construction will contribute to good road performance; if you get people who not or less skilled then it means your work output is going to be compromised; shoddy work will be done and you have no one to blame; although we all know that technical ability can highly influence performance of a road, the challenge that remains is of a contractor committing to hiring skilled labour; in most cases the people we have seen doing the road construction work are some old mothers and some are even breastfeeding; Imagine giving a job to such a person as much as you are trying to offer a helping hand; this is unacceptable and should not be encouraged at all; a good road is definitely a sign of a*

*competent team that a contractor used to do the job; if you employ people with skills then the outcome will match the same."*PSVs Drivers' Opinions (2019)

4.7.3 Inferential Analysis of Technical Ability of Contractors

The inferential analysis was performed by use of correlationnally andregressional to showing there relationships, direction and strength of the independent and dependent variables. The analysis was basedon the second objective of the study which aimed to assess how technical ability of contractors of the influence of pperformance off road constructions infrastrutre projecctin NairobiCounty, Kenya. The independent variable was technical ability, and it was operationalized using the indicators: catchment experience; plant equipment; material quality; project size experience; and manpower availability. Performance offthe road inconstruction infrastructural the projects swas the dependent variable and was operationalized using the following indicators: road quality; mobility and speed; comfort and convenience; road user benefits; and road safety.

4.7.3.1 Correlation Analysisisof Technical Abiliity of Contracctors andPerfomance of RoadConstruuction Infrastruccturall Projects

Correlation analysisusing Pearson's ProductProduct Momenttechique was done to establish therelatioship between the various dimensions of technical ability of contractors and performance of road construction infrastructural projects. The values obtained from the correlational analysis ranged between +1 and also is -1. In this regard, +1 implied perfectlypositive correlationa, while -1 implied perfecegative correlaation. 0.000 implied no ccorrelation; the modular values 0.001 to 0.250 implied weak correlation; 0.251 to 0.500 implied semi-strong correlation; 0.501 to 0.750 implied strong correlation; and 0.751 to 1.000 implied very strong correlation. The findings were as shown 4.14.

Table 4.14: Correlation Matrix of Technical Ability of Contractors and Performancee of RoadConstructiion InfrastruccturalProjects

Variables		Technical Ability of Contractors	Performa nce of Road Constructi on Projects
Technical Ability of Contractors	Pearson Correlation	1	0.157
	Sig. (2-tailed)		0.052
	n	153	153
Performance of Road Construction Project	Pearson Correlation	0.157	1
	Sig. (2-tailed)	0.052	
	n	153	153

Table 4.14 shows that at the leve of 0.05 level of signifffficance, there was statistically insignificance correllaation between technicalabillity of contractors and performance road construction infrastructural projects since the p valueof 0.052 was greater thealpha 0.05 (p-value>0.05). According to the foregoing continuum of correlation strength, there was a weak correlation between technical ability of contractors and performance road construction infrastructural projects since the correlation coefficient was 0.157.

4.7.3.2 Regression Analysis of Technnical Abilityy of Cotractors and Performanceof Road Construction InfrrastructuralProjects

The following 2 hypothesis was testeed using linear regggression model to satisffy the requirements of the second objectivesv of the study:

Test of Hypothesis 2

2. H_0: Technical ability of contractors does not significantly influenceon the performanceof road constructioninfratructural projects.

H_1: Technical ability of contractors signnificantly influeence the performerance of road construction infrastruccturaal projects.

The null hypothesis was tested using the following linear regression model:

$y = a + B_2X_2 + e$

Where:

y - Performance of roadconstrucion in frastructuralprojects

X_2 - Technical ability of contractors

B_2 – Regression coefficient

a – Regression constant

e – Erorterm

The resultts we re asshown inTabble 4.15, 4.16 and 4.17.

Table 4.15: ANOVA for Technic Ability ofContrract0rs and Performanceof Road Construction Infrastructural Projects

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.332	1	0.332	3.827	0.052[b]
	Residual	13.093	151	0.087		
	Total	13.424	152			

a. Dependent Variable: Perfo rmance of Road

b. Predictors: (Constant), Te chnical Ability of Contractors

From Table 4.15, theANOVA established the goodness offit of the regressionss model. Established from the model was the f-significance value of p=0.052 was greter than 0.05 (p= 0.052>0.05). Thecalclated F (3.827) was less thaan thecritical value ofF= 3.904. Therefore, the model was deemed insignificant.

Table 4.16: Model Summary for Technical Ability of Contractors and Performance of Road Construction Infrastructural Projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.157[a]	0.025	0.018	0.29446

a. Predictors: (Constant), Technical Ability of Contractors

From Table 4.16, R=0.157, and R^2 = 0.025. The degrees of and nature ofrelationship betweenth two variables, technical ability of contractors and performance of road constrrcuction infrastructural projjects, wasmeasured using “R”. The correlation between the two variables was 0.157. This implies that technical ability of the contractors got a

semi strong positive influence on the performa nceof road constructiioninfrastructural projects. The R-square 0.025 in this respect stand to explain 2.5% variations iin the performanceopof road construction infrastructuraall projects. The remaining 97.5% explains otherfactors causing variation butnot addressed under the technical ability model.

Table 4.17: Model Coefficients for Technical Ability of Contractors and Performance of Road Construction Infrastructural Projects

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.902	0.235		12.364	0.000
Technical Ability of Contractors	0.124	0.063	0.157	1.956	0.052

Model: {B=0.124, t=1.956, F(1,151)=3.827, p=0.052>0.05}
a. Predictor Variable: Technical Ability of Contractors
b. DependentVariable: Performanceof Road Construction Infrastructural Projects

The results inTable 4.17 reveal that technical ability of contractors hadno statistically significantinfluence with performance ofoad constructioninfrastructural projects {B=0.124, t=1.956, F(1,151)=3.827, p=0.052>0.05}. The unstandardized beta (B) coefficient for technical ability of contractors is 0.124. The beta value imply that a unit increase in performance of road construction infrastructural projects corresponds to 12.4% increase in technical ability of contractors.

Using the stattistical findings, the regresioon model can be subbstituted as folows:

$y = 2.902 + 0.124X_2$

Where:

y - Performance of road construction infrastructural projects

X_2- Technical ability of contractors

From table 4.17 for the predictor variable technical ability of contractors, the probality of thet statistic (1.956) for the bcoefficient is0.052>0.001 indicating that it isgreater thanthe levelo f significance 0.05. These findings demonstrate that the null hypothesis failed to be rejected that the slope associated with technical ability is equal to zero (b=0). This concludes that technical ability of contractors has no significantinflue nce on performan ceof road construction infra structural projects, even though the the b coefficient associated with technical ability of contractors (0.124) is positive, which suggests there exits a directrelationship.

The findings of the current study shows that technical ability (R squared=0.025) explains only 2.5% variation in the performance of road construction infrastructural projects. The model is also deemed insignificant. The findings contradicts a study by Atieno and Muturi (2016) whose model accounted for 87.7% variation in the performance of road. It should be noted that Atieno and Muturi were studying performance of road up to the implementation stage whereas the current stage focused on the post delivery stage; how the road is performing upon its completion.

The current study also, through a line item mean of 4.35 versus a compositeemean of 3.69, established that quality project is determined by quality of plant and equipment which agrees with Seboru et.al (2016) who established that requisite amount of materials had significant influence on project performance. This implies the texture of the road, as measured under performance of road (dependent variable) in the current study, requires proper machinery to provide quality ouput of a road which is smooth and long lasting without potholes. The current findings further support Abiodum, Segbenu and Oluseye (2017) who determined that the factors related to quality, and those that relate to project management and procurement had the highest impact on contractor performance. It is worth to note that these indicators shared by Abiodum and colleagues are bound to explain successful implementation of the road project but not for project performance during post delivery.

Further, the current study from the descriptive analysis has demonstrated that majority of the contruction personnel are not professional and skilled (line item mean of 2.47 against a composite mean of 3.69) and that engagement of professional project leader would contribute to project performance (a line item mean of 4.52 against a composite mean of 3.69). This findings speak otherwise when compared with a study by Obare, Kyalo, Mulwa and Mbugua (2016) found that execution process and performance ofrural roaadscoonstruction projects were correlated andthat suchcorrelation had no reliance on the diversity of the projectteam training, whichis contrary to the findings ofthe currentstudy.

The current findings revealed that theuse of current technology would determine the final product and its performance (line item mean of 4.29 against a composite mean of 3.69). Thus the findings support Wambui, Ombui and Kagiri (2015) whose study determined thatcompletion ofaroad constructioproject is significantly impacted by equipment used; competency of the project manager; availability of project funds; as well as technology used in the project.

The second hypothesis was, thus, supported by data since technical ability of contractors was found to insignificantlyin fluence performanceof road constructionfrastructural projects. In relation to the foregoing comparable studies, the current study has adduced empiricalevidence to refute some of the earlier findings hence concluding that technical ability does not, under current model, explain much about performance of roads in post delivery stages; that is when the project beneficiaries begin to use the roads. This implies that there could be other variables that need to be studied to explain road performance after completion.

4.8 Management Ability of Contractors a ndPerformance of Road Construction InfrastructuralPr ojects

This sectionpresents the resultsof des criptive and corre lational analyses of technicalability of contractors.

4.8.1 Quantitative Analysis of Management Ability of Contractors

Management of road construction is key to ensure deviations are minimized. Inthis respect, the studysought toestablish how management ability of contractors would influence or enhance road performance. The respondents were therefore asked to, in a scale of 1-5, score various statements relating to specific indicators of management ability of a contractor. The dimensions of management ability under which the indicators were drawn were pastperformance andqua lity; qualitycontrol policy; managementkno wledge; project management system; andexperience of management personnel. The Likert scaleranged from 5-Stro nglyAgree (SA), 4-Agre e (A), 3-Neu trall (N), 2-Disagreee (D), and 1-StronglyDisagree (SD). The re sultswere as sh ownin Table 4.18.

Table 4.18: Management Ability of Contractors and Performance of Road Construction Infrastructural Projects

No.	Statements	5(SA) F (%)	4(A) F (%)	3(N) F (%)	2(D) F (%)	1(SD) F (%)	Mean	SDV
	(a) Past performance and Quality							
48.	Contractors current performance is influenced by past performance significantly	68 (44.4%)	58 (37.9%)	6 (3.9%)	16 (10.5%)	5 (3.3%)	4.10	1.093
49.	Previous management commitment can easily be repeated in the current road performance	56 (36.6%)	92 (60.1%)	5 (3.3%)	0 (0.0%)	0 (0.0%)	4.33	0.538
50.	Road performance depends on the leadership guidance	71 (46.4%)	74 (48.4%)	8 (5.2%)	0 (0.0%)	0 (0.0%)	4.41	0.591
	(b) Quality control policy							
51.	A firm's quality control policy has significance on road performance	87 (56.9%)	63 (41.1%)	3 (2.0%)	0 (0.0%)	0 (0.0%)	4.55	0.537
52.	Construction contractors are obligated to have a quality control policy to ensure road performance	59 (38.6%)	86 (56.2%)	8 (5.2%)	0 (0.0%)	0 (0.0%)	4.33	0.574
	(c) Management Knowledge							
53.	Contractors have management knowledge hence road performance	75 (49.0%)	40 (26.2%)	16 (10.5%)	12 (7.8%)	10 (6.5%)	4.03	1.227
54.	Management knowledge in construction is necessary to ensure road performance	113 (73.9%)	37 (24.1%)	3 (2.0%)	0 (0.0%)	0 (0.0%)	4.72	0.493
	(d) Project Management system							

No.	Statements	5(SA) F (%)	4(A) F (%)	3(N) F (%)	2(D) F (%)	1(SD) F (%)	Mean	SDV
55.	A proper management system will provide proper oversight in construction	97 (63.4%)	53 (34.6%)	3 (2.0%)	0 (.0%)	0 (0.0%)	4.61	0.527
56.	Most contractors have the necessary project management system	70 (45.8%)	80 (52.2%)	3 (2.0%)	0 (0.0%)	0 (0.0%)	4.44	0.536
	(e) Experience of management personnel							
57.	The number of years of the management personnel in road construction guarantee road performance	34 (22.2%)	76 (49.7%)	20 (13.1%)	13 (8.5%)	10 (6.5%)	3.73	1.102
58.	Most of the construction contractors operate with magement teams that meet minimum requirement in terms of experience	24 (15.7%)	52 (34.0%)	47 (30.7%)	29 (19.0%)	1 (0.6%)	3.45	0.993
59.	Experience of management personnel in construction does guarantee highly well done road	5 (3.3%)	19 (12.4%)	17 (11.1%)	48 (31.4%)	64 (41.8 %)	2.04	1.152
	Composite standard mean and standard deviation						**4.06**	**0.346**

In Table 4.17, the means of 12 items used to generate data on management ability of contractors were summed up and used to compute thecom posite meanan d standarddevia tionthat resulted to 4.06 and 0.346 respectively.

Statement 48, contractors current performance is influenced by past performance significantly. Out of 153 respondents, 68(44.4%) strongly agreed, 58(37.9%) agreed, 5(3.3%) strongly disagreed, 16(10.5%) disagreed and 6(3.9%) were neutral. A rising from this line item wasahighestmean of 4.10 against the composite meanof4.06, which supported the notion that current performance of a contractor(s) is influenced by past performance. With a standard deviation of 1.093 and a composite sta ndarddeviati onof 0.346, the respondents' views were divergent. This line item influences performance of road construction infrastructural projects positively.

Statement 49, previous management commitment could easily be reapeated in the current road performance. Out of 153 respondents, 56(36.6%) strongly agreed and 92(60.1%) agreed. Whereas none disagreed, only 5(3.3%) held neutral views. Am eanof 4.33 compa

redto compositem eanof 4.06 indicated that current road project performance could be due to contractor's previous management commitment. The respondents' opinions were inconsistent, given a higher standard deviation of 0.538 compared to the composite standard deviation of 0.346. The highstandarddeviati on is due to neutral opinions.

Statement 50, road performance depends on the leadership guidance. Out of 153 respondents, 71(46.4%) strongly agreed, 74(48.4%) agreed demonstrating that respondents were in absolute agreement that good road performance depends on leadership guidance by the project manager. Although a few 8(5.2%) remained neutral, none of the respondents disagreed. A higher mean of 4.41 generatedonth is linei tem compared tothe composite mean of 4.06 implied that project performance depends or is associated with leadership guidance. Respondents' views were divergent conside ringthestandard devia tion f 0.591 washigherth an the composite standarddeviationof 0.346. The high line item standard deviation is due to neutral opinions.

Statement 51, a firm's quality control policy has significance on road performance. Out of 153 respondents, 87(56.9%) strongly agreed, 63(41.1%) agreed, none of the respondents disagreed and only 3(2.0%) remained neutral. A higher mean of 4.55 compared to the composite mean of 4.06 which implied that quality control policy significantly influences road performance and hence the need to use it during contractors' evaluation process to get rid of incompetent contractors. A higher standarddeviation of 0.537 comparedto 0.346 the composite standarddeviationisan indicator that opinionsdiverged. The line item mean score shows that it influences the performance of road construction infrastructural projects positively.

Statement 52, construction contractors are obligated to have a quality control policy to ensure road performance. In this respect, the line item had 59(38.6%) ofrespondentswho stronglyagre ed, 86(56.2%) agreed, none disagreed and 8(5.2%) neutral. A mean of 4.33 compared to the composite mean of 4.06 implying that contractors have an obligation to obtain a quality control policy to ensure project performance. A standard deviation of

0.574 compared tothecomposite standard deviation of0.346indica tingthat the expressed opinionswere collectivelyinconsistent.

Statement 53, Contractors have management knowledge hence road performance. Out of 153 respondents, 75(49.0%) st ronglyagreed witht hestatement, 40(26.2%) agreed, 10(6.5%) strongly disagreed, 12(7.8%) disagreed and 16(10.5%) were neutral. A mean of 4.03, closer to the composite mean of 4.06 was realized implied that, although some contractors may have have some little management knowledge, there is critical need for contractors in road construction to hire professionals trained in project management, or undertake project management courses to enhance their management skills, henceroad performance. The opinionswere ratherdivergent, given a higher standarddeviation of 1.227 againsta composite standar ddeviation of 0.346. Meaning the line item does not influence the performance of roadconstructionpro jectspositively even though majority agree. This is due to high score in neutral opinion.

Statement 54, management knowledge in road construction is necessary to ensure road performance. Out of 153 respondents, 13(73.9%) strongly agreed and 37(24.1%) agreed. None of the respondent had a descenting opinion, but rather 3(2.0%) remained neutral. A mean of 4.72 greaterth antheco mpositeme an of 4.06 impliedthatmanage ment knowledge is verynecessary in road cons tructions infrastructural projects. A standard deviation of 0.493 comapred toastandard deviationof0.346 proved that respondents' opinions were inconsistent with one another. The line item influence performanceeof roadcon structioninfrastructurl projects positively.

Statement 55, a proper management system will provide proper oversight in construction. Out of 153 respondents, 97(63.4%) of respondents strongly agreed it would, 53(34.6%) agreed, none disagreed and the rest 3(2.0%) were neutral. The mean was 4.61 higher than 4.06 implied that a proper management system would ensure onsite construction operations. It also means that if road contractors are keen on having a functional management system then cases of deviation in road designs or planned would highly be

avoided. A standard deviation of 0.527 washigher thant he composite sta ndardde viation of 0.346 indicatingthatopinions werediverging. This is due to neutral score of opinion.

Statement 56, most contractors have the necessary project management system. Out of 153 respondents, 70(45.8%) strongly agreed, 80(52.2%) agreed, none disagreed and 3(2.0%) held a neutral position on the same. A mean of 4.44 with washigher thannthe composite meanoff 4.06. This impliesthat construction firms have necessary project management system but they need to effectively use it; if road performance has to be realized. A higher standarddeviationof 0.536 was obtained onthisline item compared to theco mpositestandard deviationof0.346, hencedivergence ofopinions due to neutral opinions.

Statement 57, the number of years of the management personnel in road construction guarantee road performance. Out of 153 respondents, 34(22.2%) strongly agreed, 76(49.7%) agreed, 10(6.5%) strongly disagreed, 13(8.5%) disagreed and 20(13.1%) did not assume any side. A lower mean of 3.73 compared to a composite mean of 4.06 obtained implied that the number of years a management personel has had in road construction can not guarantee performance. A standard de viationof 1.102 washi gher thanthe compo sites tandarddeviation of 0.346 demonstrating a sharp inconsistency in opinions among the respondents. This indicates that the lineitem influence performance of road construction infrastructural projects negatively.

Statement 58, most of the road construction contractors operate with management teams that meet minimum requirements in terms of experience. Out of 153 respondents, 24(15.7%) strongly agreed, 52(34.0%) agreed, 1(0.6%) strongly disagreed, 29(19.0%) disagreed and 47(30.7%) remained neutral. A lower mean of 3.45 against a composite mean of 4.06 was obtained. This implies that not all (most) constractors are able to hire management teams that meet minimum requirement and this could be due to the cost of hiring of these professionals in the market. A highstan dard deviationo f0.993 obtained washigherthanthe composite standard deviation of 0.346 which implied thatopinions

weredive rgent. This means the line item influence on road construction project is negative.

Statement 59, experience of the management personnel in construction does guarantee highly done road. Out of 153 respondents, 5(3.3%) strongly agreed, 19(12.4%) agreed, 64(41.8%) strongly disagree, 48(31.4%) disagreed. On the other hand a few of the respondents 17(11.1%) remained neutral. A line mean of 2.04 below the composite mean of 4.06 indicated that a well done road or a quality road would not be guaranteed by the mere experience of the management personel in construction. Thefore, this implied that there is need to support the management team with proper team and resources to contribute to a better final product. Furthermore, a standard of 1.152 compareind to a compositesddtandard deviation suggested that the opinions were divergent.

4.8.2 Qualitative Analysis of Management Ability of Contractors

Results of interviews with road construction engineers indicated that management ability influenced largelythe performanceofoad constructin infrastructturral projects. The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the road construction engineers:

> *"Good management skills will always lead to proper co-ordination of duties hence quality output; poor management leads to intermitted work, unrests or strikes, demonstration among work team; lack of morale due to delayed payments or salaries and this derail the effort of the team to work towards a good product; management can not entirely influence road performance because managers need adequate financial support to build quality roads; good management ensures discipline among workers, easy to lead, direct, supervise hence good performance; it also means the work done is being thoroughly supervised and given the needed attention; management of road projects is highly required during implementation of the project but performance is determined by other factors expecially by the road user."*Road Construction Engineers' Opinions (2019)

Results of interviews with public service vehicles (PSVs) drivers indicated management ability influenced largely the performan ceof road cons tructioninfrastrructural projects.

The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the PSVs drivers:

> *"If contractors and their subcontractors can provide the required management on the site, then definitely we are likely to witness quality products of our own roads; proper management will provide oversight during construction and this means that, for example, materials are mixed properly and no wastage minimized; if a contractor is committed to providing necessary oversight during construction, then definitely the technical team on the ground will tend to produce a good road as per the expectation of the client who is in most cases the government and us as the citizens are that government; management also needs to communicate a clear system otherwise things will be done in a hurry and without following due diligence to ensure conformity to road specifications as planned or designed in the work plan; sometimes it is not proper to lay blame on contractors management capability because we as the drivers what we witness on these roads like heavy trucks are putting pressure on the road leading to early deterioration; contractors management ability has got nothing to do with the performance of the road; management of projects requires highly skilled personell but that is only applied when building the projects but performance needs our own disclipline like stop overlapping"*PSVs Drivers' Opinions (2019).

4.8.3 Inferential Analysis of Management Ability of Contractors

The inferential analysis was performed by use of correlationandregression to showthe relationshipdirection and strength of the independent and dependent variables. The analysis was based on the third objective which sought to establish how management ability of contractors influence road construction infrastructural projectsper formancein NairobiCounty, Kenya. The independent variable was management ability, operationalized by the indicators: past performance; quality control; management knowledge; project management system; and experience of management personnel. Performanceofroad constructioninfrastructural projects was the dependent variable and was operationalizedusing the followingindicators: road quality; mobility and speed; comfort and convenience; road user benefits; and road safety.

4.8.3.1 Correlation Analysis of Management Ability of Contractors and Performanceof Road ConstructionInfrastructural Projects

Correlation analysis usingPearon's Product Momenttechnique was doneto establish the relationshipbetw eenthe various dimensionsof management ability of contractorsand performa nceofroad constructi oninfrastructural projects. The values obtained from the correlational analysis ranged between +1 and -1. In this regard, +1 impliedperfect positivecorrelation, while -1 implied perfectnega tivecorrelation.

Having 0.000 implied no correlation; the modular values 0.001 to 0.250 implied weak correlation; 0.251 to 0.500 implied semi-strong correlation; 0.501 to 0.750 implied strong correlation; and 0.751 to 1.000 impliedvery strong correlation. The findingswere shown in t able 4.18.

Table 4.18: Correlation Matrix of Management Ability of Contractors and Performance of Road Construction Infrastructural Projects

Variables		Performance of RoadConstruction Infrastructural Projects	Management Ability ofContractors
Perform ance of Road Construction Infr astructural Projects	Pearson Correlation	1	0.057
	Sig. (2-tailed)		0.485
	n	153	153
Management Ability of Contractors	Pearson Correlation	0.057	1
	Sig. (2-tailed)	0.485	
	n	153	153

As shown in Table 4.18, at 0.05 levelof signif icance, therewa sstatistically insignificant correlationbetween management abilityof contractors and performanceof road construction infrastrcturalprojectts(p-value<0.05). The correlation, according to the foregoing measurement framework was weak since the correlation coefficient was 0.057.

4.8.3.2 Regression Analysis of Management Ability andPerfformance of Road Construc tionInfrastrructural Projects

The followinghypothesis was testedusing linearregressional modell to meet the requirrements ofthe third bjective:

Test of Hypothesis 3

3. H_0: Management ability of contractors does notsignificantly influenceperformance of road construction infrastructural projects.

H_1: Management ability of contractors significantly influe ncesperformance ofroad constructioncinfrastructural projects.

The null hypothhesiswas tested using the belowlinear regresssionmodel:

$y = a + B_3X_3 + e$

Where:

y - Performance ofroad constructioninfrast ructural projects

X_3- Management ability of contractors

B_3 – Regression coefficient

a – Regression constant

e – Error term

The results were as shown in Table 4.19, 4.20 and 4.21.

Table 4.19: ANOVA for Management Ability of Contractorsand Performanceeof RoadConstructi on Infrastructural Projects

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.043	1	0.043	0.491	0.485[b]
	Residual	13.381	151	0.089		
	Total	13.424	152			

a. DependentV ariable: Performance of Road

b. Predictors: (Cons tant), Manag ement Ability of Contractors

From Table 4.19, the use of ANOVA revealed the regression model'sgoodness offit. It was establishedfrom the model that the f-significance value of p=0.485 was greterthan

0.05(p= 0.00 >0.05). Thecalculated F(0.491) was insignificantlyless than the critical value of F= 3.904. Therefore, the modelwas insignificant.

Table 4.20: Model Summary for Management Ability of Contractorsand PerformanceofRoad ConstructionInfrastructural Projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	0.057[a]	0.003	-0.033	0.29768

a. Predic tors: (Constant), Management Ability of Contractors

From Table 4.20, the degree and nature of correlation between management ability of contractorsand performanceroad constructioninfrastructtural projects was determined by the "R" at 0.057. This demonstrates that despite a weak correlation, management ability would still to a smaller extent influence performance of road construction infrastructural projects. A coefficient of determination R^2=0.003 implies that 0.3% changein performance ofroad would be explainedby the manage mentability. At this juncture, 99.7% chang ein performance ofro adconstruction infrastructu ralprojects is explained by other factorsoutside the management abilityof contractormodel. This means that management ability can not be used to explain performance of roads being used, after completion. The value obtained here is almost insiginificant.

Table 4.21: Model Coefficientsfor ManagementAbilityof Contractors and Performance of RoadConstruction in frastructuralprojects

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	3.160	0.284		11.117	0.000
	Management Ability of Contractors	0.049	0.070	0.057	0.701	0.485

Model: {B=0.049, t=0.701, F(1,151)= 0.491,p=0.485>0.05}
a. Predictor Variable: Management Ability of Construction
b. Dep endentVariable: Performanceof Road Construction Infrastructural Projects

The results in Table 4.21 indicate that management ability had statistically significant influence on performance of road construction infrastructural projects {B=0.049, t=0.701,

F(1,151)= 0.491,p=0.485>0.05}. The unstandardized beta (B) coefficient for management ability of contractors is 0.049. The beta value imply that a unit increase in performance of road construction infrastructural projects corresponds to 4.9% increase in management ability of contractors.

Using thestatistical findings, theregression model canbesubstituted as follows:

$y = 3.160 + 0.049X_3$

Where:

y - Performance of roadconstruction infrastructuralprojects

X_3 - Management ability of contractors

From table 4.21, the predictor variable management ability of the contractors, the probabilityof the t statistic(0.701) forthe b coefficientis 0.485>0.001 which isgreater than the levelof signi ficance 0.05. Based on thisresults, we fail toreject the nullhypothesis that the slopeassociated withmanagement ability is equal tozero (b=0). Hence, it was concluded that management ability of contractors had insignificantinfluence on performanceof roadconstructioninfrastructural projects. Even though, the b coefficient associated with managment ability of contractors (0.049) is positive, indicating a direct relationship.

The findings ofthe currentstudy shows that management abilityof thecontractors (0.3%) can not be used to explain the performance of the road in the post delivery stage. The findings, therefore, contradicts a studyby Aje *et al.*(2009) who evaluated the impactof contactors' managementcapacity on the time and cost of performance of construction projects. The statisticalfindings showed that contractors' management capability was a significant criterion in the appraisal of potential construction contractors' performance in the course of prequalification as well as tender assessment. It should, however, be noted that time and cost indicators are tied to the traditional iron triangle which explain mostly the implementation of a project.

The current findings also show the number of years of the management personnel in road construction does not guarantee road performance (line item mean of 3.73 against a composite mean of 4.06); most of construction contractors do not operate with management teams that meet minimum requirements in terms of experience (3.45 line item mean as opposed to 4.06 composite mean); and finally, experience of management personnel in construction does guarantee highly well done road was refuted by a line item mean of 2.04 against 4.06 the composite mean implying that experience of management personnel in construction does not guarantee well done road projects. The findings does not support a study by Omran, *et al.* (2012) who established thatthe most significantfive determinants of project performance are: planningeffort; experience of project team leader; design and specification adequacy; monitoring for cost progress; as well as the leadership skills. This implies that the indicators used by Omran *et al.,* are basically suitable in explaining performance up to the implementation stage of the project and not in post-delivery stage. The findings further contradict Ntuli *et al.* (2014) study which determined that regardless of the amount of resources dedicated to the contractors, it would add no much value if the tender awards are given to those who do not have management capacity. Implying that management capacity is largely tied to implementation stage of road infrastructural projects.

The findingsof the c urrent study alludethat previous management commitment can easily be repeated in the current road performance (line item mean of 4.10 against composite mean of 4.06) and that road performance depends on the leadership guidance (line item mean of 4.33 against 4.06 the composite mean) which is in support of Mwakajo and Kidombo (2017) who revealed that project leadership requires the capacity to undertake tough decisions, deal with human resource issues, and to invoke authority as and when may be necessary in pursuit of a project in light of various constraints. The findings of the research demonstratedthat 88% oftherespondents concurred that the projects were professionally and accurately led albeit it was only confined to the project completion rather than in the post delivery phase. Hence the findings of the current study shows that

performance during post-delivery of the project can not be blamed on the contractors' ability to manage projects.

The current findings also failsto resonate withEl-Maaty, Akal and El-Haraway(2016) study thatshowed that the most criticalparameters that positively impact quality are: owner's inspection team efficiency; owner's clarity of responsibilities for each key stakeholder; unstandardized pavements; experience of the staff involved in the entire project cycle; as well as quality and type of asphalt applied in process of construction. Accordingly, Naik, Sharma and Kashiyani (2015) noted that contractors' inadequacies revolved around issues to do with weak planning and scheduling, lack of adequate relevant information, poor agility in making of decisions and inadequacy in coordination among the participants. To this point, the current study has revealed that having a proper management system would provide proper oversight in construction to completion only (line item mean of 4.61 against a composite mean of 4.06). However, this findings can only be linked to initial stages of road construction indicating that during the life of the project or in the post-delivery stage, management factors can not be used to gauge road performance.

The third objective is therefore supported by data since management ability of a contractor was found to insignificantly influence performance of road construction infrastructural projects in the post-delivery stage. In relation to the foregoing comparable studies, thecurrent studyhas adducedempirical evidence in support of theirearlier findings. Thus concluding, management ability doesnot influence perfor manceof road construction infrastructural projects. As a result, the nullhypothesis is considered valid.

4.9 Contractors' Safety Recordand PerformanceofRoad Construction InffrastructuralProjects

This section presentsdescriptive and correlationanalyses oncontractors' safetyreccord.

4.9.1 Quantitative Analysis of Contractors' Safety Record

Safety in construction is a key aspect that need to be factored when measuring road performance. The study therefore examined the influence contractors' safety record on performance of roads. Therespond ents wereasked to, ina scaleof 1-5; score various statements relating to specific indicators of safety record of a contractor. The dimensions of safety record under which the indicators were drawn were safety policy management system; insurance policy; compliance behavior; adequacy of standards in addressing safety outcome; and certification in OSHA. The Likertscaleranged from 5-Stro nglyAgree (SA), 4-Agree (A), 3-Ne utral(N), 2-Disagree (D), and1-StronglyDisagree (SD). Theresults wereas showninTable4.22.

Table 4.22: Contactors' Satety Record and Performance of Road Construction infrastructural projects

No.	Statements	5(SA) F (%)	4(A) F (%)	3(N) F (%)	2(SD) F (%)	1(D) F (%)	Mean	SDV
	(a) Safety Policy Management system							
60.	Most contractors have a safety policy management system	7 (4.6%)	76 (49.7%)	50 (32.7%)	20 (13.0%)	0 (0.0%)	3.33	1.050
61.	Safety for most contractors is a priority to road perfromance after completion	19 (12.4%)	63 (41.2%)	60 (39.2%)	8 (5.2%)	3 (2.0%)	3.54	0.925
62.	Safety is taken into account for future road performance	23 (15.0%)	42 (27.5%)	30 (19.6%)	15 (9.8%)	43 (28.1%)	3.10	1.245
63.	Road contractors find it necessary to have a policy management system to ensure road performance because the projects they undertake are one-time	24 (15.7%)	46 (30.1%)	63 (41.2%)	0 (0.0%)	20 (13.0%)	3.48	0.911
	(b) Insurance Policy							
64.	Construction personnel under insurance policy can also feel obligated to provide and enforce safety measures which can contribute to road performance and particularly road user satisfaction	23 (15.0%)	97 (63.4%)	27 (17.6%)	0 (0.0%)	6 (4.0%)	3.90	0.690
65.	Most construction companies do have insurance policy	23 (15.0%)	29 (19.0%)	43 (28.1%)	21 (13.7%)	37 (24.2%)	2.97	1.262
	(c) Compliance behaviour							

No.	Statements	5(SA) F (%)	4(A) F (%)	3(N) F (%)	2(SD) F (%)	1(D) F (%)	Mean	SDV
66.	Contractors level of compliance to safety administration is clear	7 (4.6%)	29 (19.0%)	65 (42.5%)	20 (13.0%)	32 (20.9%)	2.81	1.037
67.	Contractors fully comply to safety requirements	17 (11.1%)	42 (27.5%)	29 (19.0%)	27 (17.6%)	38 (24.8%)	2.90	1.294
68.	The environment in which contractors operate does appraise compliance to safety procedures	13 (8.5%)	11 (7.2%)	40 (26.1%)	22 (14.4%)	67 (43.8%)	2.52	1.095
	(d) Adequacy of standards in addressing safety outcome							
69.	Construction contractors have adequate standards to address issues of road performance	31 (20.2%)	52 (34.0%)	56 (36.6%)	3 (2.0%)	11 (7.2%)	3.63	0.951
70.	Adequate safety standards guarantee road performance	23 (15.0%)	86 (56.2%)	29 (19.0%)	15 (9.8%)	0 (0.0%)	3.67	1.058
71.	Construction safety standards are reviewed and conform to international standards	66 (43.2%)	47 (30.7%)	36 (23.5%)	2 (1.3%)	2 (1.3%)	4.13	0.908
	(e) Certification in OSHA							
72.	Construction firms/contractors certified in OSHA tend to have good record in road performance	71 (46.4%)	49 (32.0%)	31 (20.3%)	2 (1.3%)	0 (0.0%)	4.22	0.860
73.	Certification in OSHA is a must to ensure road performance in construction is adhered to	24 (15.7%)	24 (15.7%)	56 (36.6%)	12 (7.8%)	37 (24.2%)	3.07	1.159
	Composite mean and standard deviation						**3.38**	**0.544**

In Table 4.22, the means of 14 items used to generate data on contractors' safety record were summed up and used to compute the compositemean and standarddeviati onthat resulted to 3.38 and 0.544respectively.

Statement 60, most contractors have a safety policy management system. Out of 153 respondents, 7(4.6%) strongly agreed, 76(49.7%) agreed, 20(13.0%) strongly disagreed, and those with neutral opinions were 50(32.7%). The results returned a mean score of 3.33, whichwas slightlylower than thecomposite meanof3.38, and a standard deviationof 1.050, which went slightly above thecomposite standar ddeviationof 0.544, whichindicated clearly divergentopinions fromthe respondents. Therefore, this shows that majority of firms and contractors remain noncommittal to ensuring strong safety policy management systems are in place to guarantee road performance. The national

construction agencies like NCA and EBK should be firm on contractors and construction firms to instutionalize strong safety policy management that will enhance learning and transfer of best practices.

Statement 61, safety for most of the constractors is a priority to road performance after road completion. Out of 153 respondents, 19(12.4%) strongly agreed, 63(41.2%) agreed, 8(5.2%) strongly disagreed, 3(2.0%) disagreed and 60(41.2%) expressed a contrary opinion by remaining neutral. Arising from thisresult was a mean of 3.54 compared to a lower compositemean of 3.38. Alsoobtained wasa sta ndard de viationof 0.925 higher thanthe composite standard deviation of 0.544 whichindicated that opinions were divergent. This implies thatfor most contractors safety is treated as a priority for future road performance.

Statement 62, safety is taken into account for future road performance. Out of 153 respondents, 23(15.0%) strongly agreed, 42(27.5%) agreed, 15(9.8%) strongly disagreed, 43(28.1%) disagreed and 30(19.6%) chose to remain neutral. The mean recorded was 3.10 below the composite mean of 3.38. However, the the standard deviationwas 1.245 abovet he composi testandard deviation of 0.544hence inconsistentin opinions. This is a clear indication that construction firms are not keen on considering safety for future road performance, therefore there is imperative need for engineering bodies and authorities to put more empasisis on the fact that contractors must observe safety to enhance road pefromance. Contractors and their fims should also be willing to invest in current technology when constructing roads.

Statement 63, contractors find it necessary to have a policy management system to ensure road performance because the projects they undertake are sometimes one-time. Out of 153 respondents, 24(15.7%) strongly agreed, 46(30.1%) agreed, 20(13.0%) disagreed and 63(41.2%) remained neutral. Arising from this statement was a mean of 3.48 abovethe composite eanof 3.38. This impliest hat construction firms appreciates theneed to necessarily have a safetypolicy management system in place to be able to

contribute to well performing roads in terms of safety aspects. A higherstandardde viationof 0.911 comparedto acomposit estandarddevationof 0.544 demonstrates that opinions were diverging. This line item had a high score on neutral opinions.

Statement 64, construction personnel under insurance policy can also feel obligated to provide and enforce safety measures, which can contribute to road performance and particularly road user satisfaction. Out of 153 respondents, 23(15.0%) strongly agreed, 97(63.4%) agreed, 6(4.0%) disagreed and 27(17.6%) expressed neutral opinion. The statement a mean of 3.90 higherthanthe compositemeanof 3.38. This statement implies that having an insurance policy within a construction firm is important to cater not only for the operations of the firm but also the personnel therein hence road performance. The standarddeviationwas 0.690 slightly higher compared tothe compositest andarddeviationof 0.544, hence divergence in opinions.

Statement 65, most construction firms do have insurance policy. Out of 153 respondents, 23(15.0%) strongly agreed, 29(19.0%) agreed, 21(13.7%) strongly disagreed, 37(24.2%) disagreed, and the rest 43(28.1%) neutral. The mean scorefor this lineitem w as 2.97 lowerthan3.38 the comp osite mean. The implication is that majority of firms do not have insurance policy which significantly influences contractors' safety recordand performa nceofroadconstru ctioninfrastruuctural projects. However, it is imperative for the concerned agencies and authorities in road construction industry oversee enforcement of the policy and keep it reviewed where necessary to catch up with the changing trends. Obtained wasast andard deviationof 1.262 highercompared to thecomposite of 0.544 meaning thatopinions wereinconsistent

Statement 66, contractors level of compliance to safety administration is clear. Out of 153 respondents, 7(4.6%) strongly agreed, 29(19.0%) agreed, 20(13.0%) strongly disagreed, 32(20.9%) disagreed and those with neutral to this line item were 65(42.5%). A recorded mean of 2.81 wasdisma llybelow thecom posite meanof 3.38. The standard deviation for thislineitemwas 1.037 higher than 0.544 thecompo site standard deviationwhich indicated that therespondents' views were not consistent. It is therefore evident that compliance to

safety administration is not clear and that this could be as a result of either contractors not being aware of what is required of them or total ignorance despite the earlier results suggesting that construction firms and contractors at large have safety policy management system. Most importantly, periodic seminars and refresher courses should be encouraged among the contractors to enhance learning. This will eventually improve and positively contribute towards a strong safety record of the contractor hence road performance in the country.

Statement 67, contractors fully comply with safety requirements. Out of 153 respondents, 17(11.1%) strongly agreed, 42(27.5%) agreed, 27(17.6%) strongly disagreed, 38(24.8%) disagreed and 29(19.0%) gave a neutral opinion. The mean was 2.90 belowthe compo sitemeanof 3.38. This impliesthat contractorsare not fullycomplying with safety requirements which is adversely affecting performance of the roads to some extent.The statement had astandard deviationof 1.294 higherthan thecompositestandarddeviation of 0.544 indi catingthat the opinions were divergent. This statement influences performance of roadconstruction infrastructuralproject negatively.

Statement 68, the environment in which contractors operate does appraise compliance to safety procedures. Out of 153 respondents, 13(8.5%) strongly agreed, 11(7.2%) agreed, 22(14.4%) strongly disagreed, 67(43.8%) disagreed and 40(26.1%) neautral. Based on a lower mean recorded of 2.52 compared toa composi temean of 3.38, the resultsimp ly that theconstruction environment in which contractors work in does not support compliance behavior to satey by contractors. This could be due to corruption that needs and must be eradicated for construction firms to operate freely to be able to deliver quality roads hence road performance. This also explains failure of strictness to follow stipulated safety guidelines in road construction. There is therefore need to lay down penalties of not demonstrating compliance and in most of the cirscumstances certificate of practice should be re-called from those not ready or willing to comply. This will bring back professionalism in the industry. A standarddevitionof 1.095 higher than the composite composite standard deviationof0.544 signaled diver gencein opinions.

Statement 69, construction contractors have adequate standards to address issues of road performance. Out of 153 respondents, 31(20.2%) strongly agreed, 52(34.0%) agreed, 3(2.0%) strongly disagreed, 11(2.2%) disagreed, whilest a significant number of respondents 56(36.6%) remained neutral. A mea nof3.63 higher thanthe compositemeanof 3.38 impliedthat contrctors have adequate standards in road construction to realize road performance. There ishowever need for enforcement of the same standards to realize maximum performance on our roads. A standadeviationof 0.951 higher than the composite standard deviation of 0.544 signifiedopinionswere divergent.

Statement 70, adequate safety standards guaranteed road performance. Out of 153 respondents, 23(15.0%) strongly agreed, 86(56.2%) agreed, 15(9.8%) strongly disagreed and 29(19.0%) chose to be neutral. The analysis further revealed that the line item mean was 3.67 above 3.38 the composite mean. This implied that contractors having adequate standards in road construction can highly guarantee road performance. Astandard dev iationof 1.058 below 0.544the compositestand arddeviation demonstrated that the opinions were not consistent. It therefore points out the need for the contractors and their firms to enforce the safety standards within their mandate to avoid some of the accidents happening on our roads, hence performance.

Statement 71, construction safety standards are reviewed and conform to international standards. Out of 153 respondents, 66(43.2%) ofthe respond ents stronglyagreed, 47(30.7%) agreed, 2(1.3%) strongly disagreed, 2(1.3%) disagreed, and the remaining 36(23.5%) gave neutral opinions. A mean of 4.13 higherthan thecompositemea nof 3.38 was derived from the statement. This implied that national safety standards are not only conforming to the international standards but also regularly reviewed. This the construction industry in Kenya is abrest with the changing trends globally resulting to better performance. A derived linesta ndarddeviationof 0.908 above thecomposite standarddeviation of 0.544 implied that the opinionswere consistent.

Statement 72, Opinions whether on the constructions or contractors certified in OSHA tend to have good record in road performance was positively upheld by 71(46.4%) of respondents who strongly agreed, 49(32.0%) agreed, 2(1.3%) strongly disagreed, none disagreed and 31(20.3%) tended to remain neutral. A mean of 4.22 higher than a compositemeanof 3.38 was realizedwhich implied thatcertification in OSHA does positively build contractors' safety record profiles andalso has a significantinfluenceon theoverall road performance. Obtained on this statement was a standard deviation of 0.860higherthan the compositestandarddeviati on of 0.544 an indication thatrespondents' opinionsdiverged.

Statement 73, certification in OSHA is a must to ensure road performance in construction is strictly adhered to. Out of 153 respondents, 24(15.7%) strongly agreed, 24(315.7%) agreed, 12(7.8%) strongly disagreed, 37(24.2%) disagreed and 56(36.6%) elicited neutral opinions. A lower mean of 3.07 compared to the composite mean of 3.38 was derived on this statement. This implied that being certified as a constractor or a construction firm would not significantly influence performance of road in terms of safety. This is to mean that there are other critical factors that may need to be considered to ensure performance of the road. A standar ddeviationof 1.159 obtainedwas abo vethecompo sitestandard deviationof 0.544which showed divergenceinthe opinions.

4.9.2 Qualitative Analysis of Contractors' Safety Record

Results of interviews with road construction engineers indicated that contractors' safety record influenced largely the performanceofroad constructioninfrastructural projects. The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the road construction engineers:

> *"Safety and healthy environment promote morale of employee thus lead to better performance of the person and which can easily translate to overall good performance of the road; a compliant contractor ensures a health and safe construction environment even after project completion. A case in point is the pollution from dust if controlled and managed well the end road will be safe to use; quarry or borrow pits when backfilled after*

> *project completion ensures security of the environment; a safe and a healthy policy among employees is a continued support even after the project completion; a safety record of any contractor that is focused on adhering to safety procedures put in place ensures an anticipated highly performing road that is properly marked, has enough road signs; contractors who peg their work on safety are likely to have roads constructed with clearly marked roads and even the issue bumps will be addressed in such a way that they will not be a reason for frequent accidents happening on our roads; if all contractors engaged or contracted to undertake road construction work have a clear policy on how to incorporate safety, then performance in terms of safety of pedestrians and even the motorists will be assured."* Road Construction Engineers' Opinions (2019)

Results of interviews with public service vehicle (PSVs) drivers indicated contractors' health and safety record influenced largelythe performanceof road construction infrastructuralprojects. The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the PSVs drivers:

> *"A contractor with a clean record of observing safety procedures in his or her previous work will definitely work towards repeating the same in the current assignment; if the safety record of a contractor says that he or she has done well in the past then even with another project, a contractor will work to ensure the same or more results are achieved with another road project given to her; contracts that observe the previous work of a contractor with a keen interest to safety record will tend to produce roads that are performing good in terms of less accidents reported; Safety record should also look at the policy put in place by the contractor or the construction firm because this will provide the proof that the contract being awarded will produce good results in terms of a road that is well performing even after its completion."*PSVs Drivers' Opinions (2019)

4.9.3 Inferential Analysis of Contractors' Safety Record

The inferential analysis was performed by use ofcorrelation andregression to showthe reltionship, direction and strength of the independent and dependentvariables. The analysis was basedon the fourthobjective whichsought to examine howcontractors' safety recordinfluenceperformance ofroad construction infrastruturalprojects inNairobiCounty, Kenya. The independent variable was contractors' safety record, operationalized by the

indicators: safety policy management system; insurance policy; compliance behavior; adequacy of standards in addressing safety outcome; and certification in OSHA. Performanceof roadconstrction infrastru cturalprojects was the dependent variable and was operationalized usingthefollowi ng indicators: road quality; mobility and speed; comfort and convenience; road user benefits; and road safety.

4.9.3.1 Correlation Analysis of Contractors' Safety Recordand Performance of RoadConstructionInnfrastructural Projects

Correlation analysis usingPearson's ProductMomment techniquewas done toestablish the relationship betweentheva rious dimensions of safety record and performance of road construction infrastructural projects. The values obtained from the correlational analysis ranged betwe en+1 and -1. Inthis regard, +1 impliedperfectpos itivecorrelation, while -1 implied perfect negative correlation. 0.000 implied no correlation; the modular values 0.001 to 0.250 implied weak correlation; 0.251 to 0.500 implied semi-strong correlation; 0.501 to 0.750 implied strong correlation; and 0.751 to 1.000 impliedvery strongcorrelation. The findingswere as showninT able 4.23.

Table 4.23: CorrelationMatrixfor Contractors' SafetyRecordand Performance of Road Const ructionInfrastructural Projects

Variable		Perfo rmance ofRoad Construction Projects	Contractor's SafetyRecord
Performance of Road Construction Projects	Pearson Correlation	1	0.657**
	Sig. (2-tailed)		0.000
	n	153	153
Contractor's Safety Record	Pearson Correlation	0.657**	1
	Sig. (2-tailed)	0.000	
	n	153	153

**. Correlation is significant at the 0.05 level (2-tailed).

From Table 4.23, at 0.05 levelofsignificance, therewas statistically significantcorrelation between contractor'ssafety recordand performance of roadcon structioninfrastructurl projects (p-value<0.05). The correlationwas strong since it had acoefficient of 0.657.

4.9.3.2 Regression Analysis of Contractor's Safety Record of a Contractor and Performance of Road Construction Infrastructural Projects

The followinghypothesis wastested usinglinear regressional model tomeet the requirements of the fourth objective:

Test of Hypothesis 4

4. H_0: Contractors safety record does notsigni ficantly influencethe performance ofroad constructioninfrastr uctural projects in NairobiCoun ty, Kenya.

H_1: Contractors safety record significantly influencethe performan ceof road constructioninfrastructural proje cts in Nairobi County, Kenya.

The null hypothesiswas tested using thebelow linear regressionmodel:

$y = a + B_4X_4 + e$

Where:

y - Performance of road construction infrastructural projects

X_4- Contractors' safety record

B_4 – Regression coefficient

a – Regression constant

e – Errorte rm

The results a re shownin 4.24, 4.25 and 4.26.

Table 4.24: ANOVA for Contractors' SafetyRecord andPerformance of Road Constructionnfrastructural Projects

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressi on	5.791	1	5.791	114.558	0.000[b]
	Residual	7.633	151	0.051		
	Total	13.424	152			

a. Dependent Variable: Performance of Road

b. Predictors: (Constant), Contractors' Safety Record

From Table4.24, it wasimportant to establish thegoodness of fitof the regressionmodel. The ANOVA established that the model'sf-significancevalue of p=0.000was lessthan 0.05 (p= 0.00 <0.05). The calculated F(114.556) wassignificantly larger than the critical value ofF= 3.904. The implicationof this result isthat the modewas considered significant.

Table 4.25: ModelSumm ary for Contrac tors' SafetyRecordand Performan ceof RoadConstruction InfratructuralProjects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.657[a]	0.431	0.428	0.22484

a. Predictors: (Constant), Contractors' Safety Record

From Table 4.25, the degree and nature of correlation between contractors' safety record andperformance roadconstruction infrastructu ralprojects was determinedby the "R" which resulted to 0.657. This shows that contractors' safety record has strong or big influence to roadp erformance in NairobiCounty. Arising from R-squared is 0.431 which means that 43.1% variation is explained by contractors' safety record. On the other hand, it also meant that there could be other factors accounting to 56.9% that would explain variations inperformance ofoad constructioninfra structuralprojects but are notcovered in thismodel.

Table 4.26: Model Coefficientsfor Contractors' SafetyRecord andPerformance ofRoad Construction Infrastructur al Projects

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.145	0.115		18.692	0.000
Contractors' Safety Record	0.359	0.034	0.657	10.703	0.000

a. DependentVar iable: Performance of Road Constru ctionInfrastructural Pro jects
Model: {B=0.359, t=10.703, F (1,151)= 114.558, p=0.000<0.05}

The results in Table 4.26 indicate that contractors safety record hadstatistically significant influence onperformance ofroad construction infrastructuralprojects {B=0.359, t=10.703, F (1,151)= 114.558, p=0.000<0.05}. Theunstandardized beta (B) coefficient for contractors' safety record is 0.359. The beta valueimply that a unit increase in performanceo froad constructioninfrastructural projects corresponds to 35.9% increase in contractors' safety record.

Using the statisticalfindings, the regressionmodelcan besubstituted asfollows:

$y = 2.145 + 0.359X_4$

Where:

y - Performance ofroad construction infrastructuralprojects

X_4 – Contractors' safety record

From Table 4.26, for the predictor variable contractors safety record, the probality of the t statistic (10.703) for the b coefficient is 0.000<0.001 which is less than the level of significance 0.05. The findings suggests thatthe null hypothesiswas rejected thatthe slope associatedwith contractors' safety record is equal to zero (b=0). Furthermore, the b coefficient associated with financial ability of the contractor (0.359) is positive, which is an indication that a direct relationship exists. These findings warranted rejection of the null hypothesis (H_0) which stated that contractors' safety record does not significantly influence performance of road construction infrastructural projects. Hence, we conclude that contractors' safetyrecord influenceperformance of road construction infrastructural projects andaccept the alternatehypothesis.

The findings of the study indicate that contractors' safety record influences performance of the road. The findings therefore support a study by Kartam and Bouz (1998) who discovered that weak systems for accident recording and reporting were a conduit for hiding the pervasive safety gaps. The culture of keenness to safety issues has also been said to critically set the attitude the significance of organizational safety.

The current findingsfrom descriptive analysis of theoutcome variable, performanceof roadconstruction infrastructural projects, onroad safety as a dimension, found that although reported cases of accidents have reduced (line item mean of 3.78 against 3.35 the composite mean), bumps are not provided in the right designated places (line item mean of 3.13 against a composite mean of 3.35), pedestrians' walkways are not adequately provided (line item mean of 2.99 against a composite mean of 3.35), foot bridges are not sufficiently provided (line item mean of 1.98 against a composite mean of 3.35) and bus stops are not well placed in the right designated areas (line item mean of 2.22 against a composite mean of 3.35). The findings supports De Saram *et al.*, (2005) who examined the non-material accident costs, includingpain and suffering, andloss of qualityof life and reportedthat the said costscomprised approximatelythirty percent of direct costsof accident. There is critical need to re-focus our energy in improving road safety to enhance performance of road construction infrastructural projects.

This finally confirms the Domino theory of accident causation borrowed in the current study and as advanced H.W. Heinrich in 1931. The first three of the five sequential antecedents from the Domino theory explains the scenario here (Hosseinian & Torghabeh, 2012). In the first antecedent, the social ecosystem and ancestry which are among the process of knowledge acquisition at workplaces encompassing culture, values, and attitudes; lacking of skills as well as technology for task performance, poor ecosystem and social conditions leads to human fault. The second antecedent shows that carelessness which mainly is a description of adverse personal attributes, acquired or otherwise. Such carelessness are antecedent to poor work conditions. And from the third antecedent, hazardous human acts, with risky conditions encompassing the faults as well as technical failures leading to accidents (Such as poor or lack of installation of foot bridges and clear marking of the road). The theory has overly been used during assessment of a contractor for award of the tender to undertake construction works without factoring in the aspect of performance during post-delivery of the project hence the need for its adoption in this regard.

The current study has established that contractors compliance behavior is not good. The study has also revealed that compliance to safety administration is not clear, contractors donot fullycomply to safetyrequirements andthe environment in which contractors operate do not care to appraise compliance to safety issues or procedures. The findings therefore point out the need for basic safety investment in construction industry (as found by Feng (2013). Further, the findings set a call for disaster preparation, planning, use of protective equipment (in this case, accident prevention mechanisms such as foot bridges) and management engagement as found by Jannadi and Bu-Khamsin (2002) while studying on safety determinants in the Saudi Arabian context.

The current studyfound that most ofthe contractors do not have safety policy management system (a lower line item mean of 3.33 comparedto thecomposite mean of 3.38). This results are in support of Diugwu, Baba and Egila (2012) study whose findings indicated that 55.9% of construction firms have no safety and health policies in their organizations. This implies that there is need to strengthen the OSHA aspects within construction industry to avoid the massive accidents occurring in the post-delivery stage of the road projects, upon completion.

The fourth objective was, therefore, supported by data since contractor's safety record was found to significantly influence performance of road construction infrastructural projects. In relation to the foregoing comparable studies, the current study has adduced empirical evidence in support of their earlier findings.

4.10 Combined Contractors' CapacityEvaluation inTender Awardand Performanceof RoadConst ruction Infrastruct ural Projects

This sectionpresents thedescriptive analysis and correlation analysis of the combined contractors' capacity evaluation in tender award.

4.10.1 Quantitative Analysis of Combined Contractors' Capacity Evaluation in Tender Award

Financial ability, technical ability, management knowledge, and contractors' safety record combined, were referred to as contractor's capacity evaluation in tender award. The combinedinfluence of thesefactors onperformance of road construction infrastructural projectswas testedusing inferentialstatisticsin this section as the fifth objectiveas shown inTable 4.27.

Table 4.27: Combined Contractors' Capacity Evaluation in Tender Award and Performance of Road Construction Infrastructural Projects

Variable	n	Mean	Std. Deviation
Financial Ability of Contractors	153	3.79	0.533
Technical Ability of Contractors	153	3.69	0.377
Management Ability of Contractors	153	4.06	0.346
Contractor's Safety Record	153	3.38	0.544
Compo siteMean andStandard De viation		**3.73**	**0.45**

The highest aggregate mean score, as shown in Table 4.27, was on the management ability dimension, with a score of 4.06; followed byfinancial ability, with mean score 3.79; technical ability, with meanscoreof 3.69; and contractors' safety record, with mean scoreof3.38. The most consistent scores were on the management ability, with the least standard deviation of 0.346.

The influence of combined contractors' capacity evaluation in tender award was established by computing the composite mean. At this juncture it is clear that the combined mean is 3.73 andthestandard deviation is0.45. This shows that overall contractors' capacity evaluation in tender award was executed above average. Measured on a 5-point scale, this is average result which entails that combined contractors' capacity is immensely significantly needed for improvedperformance of roadconstruction infrastructuralprojects. However, there is need for more effort in selection of contractors especially based on safety record so that safety

measures can be adhered to by contractors to avoid unnecessary pedestrians and motorized accidents.

4.10.2 Qualitative Analysis of Combined Contractors' Capacity Evaluation in Tender Award

Results of interviews with road construction engineers indicated that the overall contractors' capacity evaluation in tender award influence to a great extentperformance of roadconstruction infrastru cturalprojects. Theresults ofthe interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the road construction engineers:

> *"The financial capacity, political, management and education background all these can lead to or slow down the performance of the road by misappropriation of the resources; can improve performance if proper evaluation is followed for example financial and capacity of contractor owned; corruption will still venture into the process in a competitive evaluation; in Kenya tribalism, nepotism and corruption have never allowed a properly designed system to function; unfortunately, construction and infrastructural industries are worth it; by ensuring all the key factors of contractor evaluation work together, this will inform delivery of quality roads and that this will also promote the name of those in construction industry. With no doubtit isimportant to notethat good performance can be achieved in wholesome; this means that none of these factors can work independently to produce good results. Road construction that is expected to perform well should and must not leave out either financial, technical, safety and management aspects; I have seen in some instances where some contractors ignore the technical ability and end up hiring cheap labour; this is detrimental to the road performance in the future. Therefore, all these factors: technical, financial, management and safety of the contractor must be factored in during construction; combining all the factors will enhance quality in road construction hence good road performance; if contractors could be keen by observing all these factors (financial, safety, management and technical) there could be no complaints about road performance."* Road Construction Engineers' Opinions (2019)

Results of interviews with public service vehicle (PSVs) drivers indicated that the overall contractors' capacity evaluation in tender award influenced to a great extentperformance

of roadconstruction infrastructure alprojects. The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the PSVs drivers:

> *"The financial capacity, political, management and education background all these can lead to or slow down the performance of the road by misappropriation of the resources; I think if all factors held together there will be improvement in road construction project; performance will be enhanced; our roads will be safe in that the following will be there to measure performance: properly marked roads, adequate signs, well done bumps, foot bridges located in the right areas; there will be little deviations for example materials used will be of good quality and adequate enough to produce good roads; combining all aspects of contractors' capacity evaluation in tender award will mean our contractors are forced to do good job and ensure minimal mistakes are recorded; there will be a great improvement in our roads performance; quality roads will be produced; our roads will not have potholes; contractors will be focused on producing excellent roads with high performing rate; as it stands the potholes show up few years after completion of the road or even within the year in which a road is launched but if all the factors combined, then we are likely to see quality roads."*PSVs Drivers' Opinions (2019)

4.10.3 Inferential Analysis of Combined Contractors' Capacity Evaluation in Tender Award

The inferential analysis was performed by useofcorrelation and regressionto show therelationship, direction and strength of the independent and dependent variables. The analysis was based on the fifth objective of the study which sought to determine the combined influence of contractors' capacity in evaluation tender award on performance of road construction infrastructural projects in Nairobi County, Kenya. Contractors' capacity in evaluationtender award was acombination ofindependent variables inthe study. Performanceof road constructioninfrastructural projectswas the dependent variable and was operationalized using the following indicators: road quality; mobility and speed; comfort and convenience; road user benefits; and road safety.

4.10.3 Correlation Analysis of CombinedContractors' CapacityEvaluation in Tender Awardand Performance of Road Construction Infrastructural Projects

Correlation analysisusing Pearson's Product Moment technique was done to determine the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects. The intention of this operation was to determine the strengthand direction ofrelationship between the independent and dependent variables. The resultsare presented inTable4.28.

Table 4.28: Correlation Matrix of CombinedContractors' Capacity Evaluation in Tender Awardand Performance of Road ConstructionInfrastructural Projects

Variables		Combined Contractors' Capacity Evaluation in Tender Award	Financial Ability of Contractors	Technical Ability of Contractors	Management Ability of Contractors	Contractor' Safety Record
Performance of Road Construction Infrastructural Projects	Pearson Correlation	0.542**	0.669**	0.157	0.057	0.657**
	Sig. (2-tailed)	0.000	0.000	0.052	0.485	0.000
	n	153	153	153	153	153

**. Corre lation is significant at the 0.05 level (2-tailed).

The correlation matrix in Table 4.28 showsthat thecombined contractors' capacity evaluationin tenderaward, that notall the four indicators, namely: financial ability of contractors; technical ability of contractors; managementability of contractors; and contractors' safety record, hadstatistically significantrelationship with performance of road construction infrastructural projects. Thisisbecause financial ability of contractors and contractors' safety record had $p<0.05$ and a strongstrong positive correlationwith performance ofroad constructioninfrastructural projects ($R=0.669$, and $R=0.657$ respectively).

On the other hand, technical ability of contractors and management ability of contractors had weak positive correlation withperformance ofroad construction infrastructural projects ($R=0.157$ and $R=0.057$, respectively). Combined contractors' capacity evaluation in tender award had statistically significant and strong positive relationship with performanceof roadconstruction infrastructural projects ($R=0.542$, $p<0.05$).

4.10.2: RegressionAnalysis of CombinedContractors' CapacityEvaluation in Tender Award andPerformanceof Road Construction Infrastructural Projects

The following hypothesiswas tested using simplelinear regression modelto satisfy therequirements of thefifth objective:

Test of Hypothesis 5

5. **H_0:** The combined contractors' capacity in evaluation tender award doesnot significantly influenceperformance of roadconstru ction infrastructural projects.

   H_1: The combined contractors' capacity in evaluation tender awardsignificantly influence performanceof road constructioninfrastructural projects.

The null hypothesiswas tested usingthe followingmultiple regressionmodel:

$y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$

Where:

y - Performanceof roadconstruction infrastructural projects

β_1, β_2, β_3 and β_4= Regression coefficients

X_1 – Financial ability of Contractors

X_2– Technical ability of Contractors

X_3 – Management ability Contractors

X_4– Contractors' safety record

a – Regression constant

e – Erroterm

The results were as shown in the Table 4.29, 4.30 and 4.31:

Table 4.30: ANOVA for Combined Contractors' Capacity Evaluation in Tender Award and Performance of Road Construction Infrastructural Projects

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.151	4	2.288	79.226	0.000[b]
	Residual	4.274	148	0.029		
	Total	13.424	152			

a. DependentVariab le: Performance of Road Construction Infrastructural Projects
b. Predic tors: (Constant), Contractors' Safety Record, Management Ability of Contractors, Financial Ability of Contractors, TechnicaAbility of Contractors

From Table 4.30, ANOVAwas used to establishthe goodness of fitofthe re gression model. Establishedfromthe model was the f-significancevalue of p is less than 0.05 (p=0.00 <0.05). The calculated F(79.226) was significantlylarger than the critical value of F=2.433, hence the model wasconsideredsignificant.

Table 4.29: Model Summaryfor CombinedContractors' Capacity Evaluation in Tender Award and PerformanceofRoad Construction Infra structural Projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.826[a]	0.682	0.673	0.16993	0.682	79.226	4	148	0.000

a. Predictors: (Constant), Safety Record, Management, Finance, Technical
b. Dependent Variable: Performance of Road Construction Infrastructural Projects

Table 4.29 showsthat thereis averystrong positive relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects (R=0.826). This implies that combination of contractors' capacity evaluation in tender award has a strong influence on road performance. Alsoobtained fromTable4.26 is a coefficient of determination, adjusted R-square which is equal to 0.682. This implies that 68.2% of changes in performance of road construction infrastructural projects are attributed to contractors' capacity evaluation in tender award. However, there are other factors accounting to 31.8% and not covered under the model hence the need for further research.

Table 4.31: ModelCoefficients forInfluence of CombinedContractors' Capacity Evaluation inTender Award

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	2.782	0.173		16.073	0.000			
	Finance	0.230	0.033	0.413	6.990	0.000	0.669	0.498	0.324
	Technical	-0.233	0.066	-0.295	-3.524	0.001	0.157	-0.278	-0.163
	Management	-0.183	0.064	-0.213	-2.879	0.005	0.057	-0.230	-0.134
	Safety Record	0.386	0.040	0.707	9.766	0.000	0.657	0.626	0.453

a. Depend entVariable: Performance of Road Construction Infrastructural Projects

Table 4.31 shows that thestandardized beta (β) coefficientsfor the indicatorswere as follows: financial ability of contractors, 0.413; technical ability of contractors, -0.295; management ability of contractors, -0.213; and contractors' safety record, 0.707. The beta valuesimply that a unitincrease in performanceof road constructioninfrastructural projects wascorresponded to 41.3% increase in financial ability of contractors; 29.5% decrease in technical ability of contractors; 21.3% decrease in management ability of contractors; and 70.7% increase in contractors' safety record respectively.

Using the statistical findings, the regression model for the fifth hypothesis was substituted in the following manner:

$y=2.782+0.414X_1-0.295X_2-0.213X_3+0.707X_4$

Where:

y - Performance of roadconstruction infrastructuralprojects

X_1 – Financial Ability of Contractors

X_2– Technical Ability of Contractors

X_3 – Management Ability of Contractors

X_4– Contractors' safety record

The null hypothesis (H_0) which stated that the combined contractors' capacity evaluation in tenderaward doesnot significantly influenceperformance of roadconstruction infrastructural projects was rejected since all the p-values were less than 0.05. Thus, an alternative hypothesis (H_1) stated, the combined contractors' capacity evaluation in tender award significantly influence performance of road construction infrastructural projects, was accepted.

The findings of this current study, from the model coefficients table, reveal that the two predictors of the outcome variable within the model of contractors' capacity evaluation in tender award are financial ability of contractors and contractors' safety record. The findings therefore support a study by Nwanyanwu (2015) who pointed out that the cash flow of an organization establishes its capacity to execute projects and ability to acquire raw materials required for manufacturing activities. The findings point out the need to strengthen the contractors' financial ability as Olang'o (2018) noted that several road construction projects in Kenya have had time overruns in their completion due to poor cash flow management. The findings further support Nyangwara and Datche (2015) that delayed payments could result to material unavailability.

The current findings show that the contractors' technical and management ability are not good predictors of performance of road construction infrastructural projects. This is line with Igochukwu and Onyekwena (2014) who determined that the other challenges facing these contractors in capital management as obtained from oral interviews could be traceable to the following factors which are by no means exhaustive: lack of sufficient knowledge on working capital management, usually a one man business and in most cases with poor technical skill, inadequate manpower with no corporate organization, cashflow challenges, highcost of constructionfinance, recklessspending, poorfunding, undercapitalization, diversionof contract fundsby uses other thanthe project and poor project planningand control.

The current study has demonstrated that several criteria or indicators of assessing the contractors are important to improve the model of assessment and thus arrive at the right competent contractor for future performance of the road projects. This findings resonate with the findings of the study by Atieno and Muturi (2016) who evaluated the factors that influence the performance of road construction projects. They established a positive correlation between contractor's competency, construction parties' financial management, timely availability of construction resources, and conflicts towards the realisation of increasedperformance ofroad constructionprojects. The findings further support Abiodum, Segbenu and Oluseye (2017) focused their study on the determinants of performanceof contractors in thedelivery of construction projectsand concluded that good planning, competentleadership and good communication oughtto be enhanced to improve performance of contractors on construction projects.

Hypothesis 5 was, therefore, supported by data since combinedcontractors' capacity evaluation in tender awardwas found tosignificantly influenceperformance of roadconstruction infrastruc turalprojects. The current study, thus, adduced empiricalevidence in support ofthefindings of the abovestudies. The findings indicate that having a strong model of assessment with multiple predictors would increasecontractors' performance andhence contribute to roadperformance inpost-delivery stage.

4.11 ModeratingInfluence of Process Monitoring onRelationship betweenContractors' Capacity Evaluation in Tender Award and Performance ofRoad Constructi on InfrastructuralProjects

This section presents the descriptive and correlation analyses of process monitoring as a moderator on the independent and the dependent.

4.11.1 QuantitativeAnalysis of ModeratingInfluence ofProcess Monitoring

To assess the moderatinginfluence ofprocess monitoring onthe relationshipbetween contractors' capacityevaluation in tender award androad performance, the respondentswere askedto, inascale of1-5, scorevarious statements relatingto specific

indicatorsof process monitoring. The dimensions of process monitoring under which the indicators were drawn were compliance with construction specification; compliance with regulatory bodies' requirements; compliance with county by-laws; and adherence to allocation and utilization of resources for accomplishment of project's objectives. The Likert scale ranged from 1-Stro nglyDisagree (SD), 2-Di sagree (D), 3-Ne utral(N), 4-Agree (A), and 5-Strongl yAgree (SA). The resultsareshown in Table4.32.

Table 4.32: Moderating Influence ofProcess Monitoring on Relationship between Contractors'Capacity Evaluation inTender Award, andPerformance of Road Construction Infrast ructuralProjects

No.	Statements	5(SA) F (%)	4(A) F (%)	3(N) F (%)	2(D) F (%)	1(SD) F (%)	Mean	SDV
	(a) Compliance with construction specification							
74.	Firms/contractors who comply with construction specification to tend produce highly quality roads whose performance meet road user satisfaction	93 (60.8%)	45 (29.4%)	15 (9.8%)	0 (0.0%)	0 (0.0%)	4.51	0.670
75.	Contractors are keen on complying with road construction specifications	17 (11.2%)	53 (34.6%)	53 (34.6%)	15 (9.8%)	15 (9.8%)	3.27	1.102
76.	Construction specifications are met by most of the road construction contractors	19 (12.4%)	43 (28.1%)	43 (28.1%)	31 (20.3%)	17 (11.1%)	3.10	1.193
77.	Contractors who meet minimum requirement, try to make improvements after completing their tasks.	7 (4.6%)	41 (26.8%)	59 (38.6%)	44 (28.8%)	2 (1.2%)	3.05	0.891
	(b) Compliance with regulatory bodies' requirements							
78.	Construction regulatory bodies' requirements are adequate to address and contribute to road performance	63 (41.2%)	89 (58.2%)	0 (0.0%)	0 (0.0%)	1 (0.6%)	4.39	0.565
79.	Compliance with regulatory bodies like NCA does guarantee road performance	42 (27.5%)	80 (52.3%)	31 (20.2%)	0 (0.0%)	0 (0.0%)	4.07	0.689
80.	All contractors comply with regulatory bodies' requirements	40 (26.1%)	50 (32.7%)	55 (35.9%)	3 (2.0%)	5 (3.3%)	3.76	0.972
	(c) Compliance with County by-laws							
81.	The county by-laws are adequate in addressing the issues of road performance	9 (5.9%)	60 (39.2%)	76 (49.7%)	8 (5.2%)	0 (0.0%)	3.46	0.688
82.	Contractors/construction adhere to County by-laws	30 (19.6%)	65 (42.5%)	28 (18.3%)	10 (6.5%)	20 (13.1%)	3.49	1.252

No.	Statements	5(SA) F (%)	4(A) F (%)	3(N) F (%)	2(D) F (%)	1(SD) F (%)	Mean	SDV
83.	Contractors/firms that adhere to County by-laws tend do well in terms of road performance	34 (22.2%)	65 (42.5%)	51 (33.3%)	3 (2.0%)	0 (0.0%)	3.85	0.784
	(d) Adherence to allocation and utilization of resources for accomplishment of project's objectives							
84.	All contractors allocate enough resources to construction works hence good road performance	19 (12.4%)	39 (25.5%)	34 (22.2%)	43 (28.1%)	18 (11.8%)	2.99	1.230
85.	Contractors utilize the right materials and equipment to ensure quality work done	26 (17.0%)	52 (34.0%)	26 (17.0%)	33 (21.5%)	16 (10.5%)	3.25	1.265
86.	Allocation and utilization of right materials and equipment does always lead to road performance	61 (39.9%)	35 (22.9%)	22 (14.3%)	5 (3.3%)	30 (19.6%)	3.60	1.515
	Composite mean and standard deviation						**3.60**	**0.505**

In Table 4.32, the means of 13 items used to generate data on process monitoring were summed up and used to compute thecomposite meanand standarddeviation thatresulted to 3.60 and 0.505 respectively.

Statement 74, firms or contractors who comply with construction specification tend to produce highly quality roads whose performance meet road user satisfaction. Out of 153 respondents, 93(60.8%) strongly agreed, 45(29.4%) agreed and 15(9.8%) gave neutral responses. The mean realized was 4.51, which wasabove thecomposite mean 3.60. With ahigher standarddeviation of0.670 compared tocompositemean of 0.505, the responses received were convergent. The overall results suggests that most contractors complying or following the stipulated construction specifications are bound to yield better results in terms of road performance. This is considered a positive thing to influence individual contractor's ethical behavior.

Statement 75, contractors are keen on complying with road construction specifications. Out of 153 respondents, 17(11.2%) strongly agreed, 53(34.6%) agreed, 15(9.8%) strongly disagreed, 15(9.8%) disagreed and 53(34.6%) gave undecided or neutral responses. Themean 3.27 was slightlylower thanthe compositemea n of 3.60 whereasthe standard

deviationof 1.102 was abovethe composite oroverall standard deviationof 0.505 suggesting thatthe respondents' opinions took a divergent direction. This implies that contractors are not keen on complying with given specifications as far as construction of road is concerned. By being keen, it could also mean that contractors should pay special attention to the right composition of materials before and during construction.

Statemement 76, construction specifications are met by most of the road construction contractors. Out of 153 respondents, 19(12.4%) strongly agreed, 43(28.1%) agreed, 17(11.1%) strongly disagreed, 31(20.3%) disagreed and 43(28.1%) remained neutral. The meanbased onthis findingswas 3.10 belowthe composite meanof3.60. This implied thatnot all contractorsare keen with their work hence they do not meet construction specifications. There is need, for instance, for the contractors to work with all trained personnel on the construction to avoid cases of deviation. This will also contribute to the life of the roads whereby roads will take time before they develop potholes and other defects. A standard eviationof 1.193 which was higher than thecomposite standarddeviation of 0.505 proved thatopinions weredivergent.

Statement 77, contractors who meet minimum requirement, try to make some improvements after completing their tasks. Out of 153 respondents, 7(4.6%) strongly agreed, 41(26.8%) agreed, 2(1.2%) strongly disagreed, 44(28.8%) disagreed and 59(38.6%) were held neutral views on this statement. A much lower mean of 3.05 compared to 3.60 composite mean implied that contractors are not ready to make an extra effort to do better beyond their limit. This is a wake up call for all institutions working with contractors and construction firms to put more emphasis on quality of completed road projects. The statementhad a standarddeviati on of0.891 above thecompos iteof 0.505 hencedivergence ofopinions.

Statement 78, construction regulatory bodies' requirements are adequate to address and contribute to road performance. Out of 153 respondents, 63(41.2%) strongly agreed, 89(58.2%) agreed and 1(0.06%) showed disagreement. The correspondingmean as per

thisitem was 4.39above thecompositemean of 3.60. This impliedthat there areadequate regulatory requirements in the road construction industry. This therefore signify that technical drawbacks to road performance could be arising from elsewhere. Something that need to be checked thoroughly. A higherstand arddeviationof 0.689 compared to the composite whichwas 0.505 signalleddivergence in opinionscollected.

Statement 79, compliance with regulatory bodies like NCA does guarantee road performance. Out of 153 respondents, 42(27.5%) strongly agreed, 80(52.3%) agreed and 31(20.2%) wereneutral while nonedisagreed. Themean of 4.07above thecomposite mean of 3.60 implies that complying with the authorized agencies such as NCA positively influences performance. It is therefore important for all contractors to abide by the regulatory requirements if quality and performance must realized. A standard deviation of 0.689 compared to a lower composite standard deviation of 0.505 is an indication thegathered opinionstended to diverge.

Statement 80, all contractors comply with regulatory bodies' requirements. Out of 153 respondents, 40(26.1%) strongly agreed, 50(32.7%) agreed, 5(3.3%) strongly disagreed. 3(2.0%) disagreed and 55(35.9%) were of neutral views. The mean 3.76 wasslightly abovethecompositemean of 3.60 indicating that all contractors comply with regulatory bodies requires. Although this maybe true, enforcement is still an issue among some contractors when it comes to groundwork. This area needs keen supervision. The derived standard deviationof0.972 was belowthe composite standarddeviationof 0.505implying that the viewswere divergent.

Statement 81, the county by-laws are adequate in addressing the issues of road performance. Out of 153 respondents, 9(5.9%) strongly agreed, 60(39.2%) agreed, 8(5.2%) disagreed while 76(49.7%) were neutral. A mean of 3.46 below the composite mean of 3.60 showed that county by-laws were not adequate. There is therefore need for the County government to collaborate with construction authorities and road construction engineering firms to draft more workable laws that would see sanity restored in road

construction within the urban centres for realization of improved road performance, especially now that governance powers have been decentralized. With a standard deviationof 0.688 abovethecomposite of0.505, thefindings revealed that the opinions varied among the respondents.

Statement 82, contractors or construction firms adhere to County by-laws. Out of 153 respondents, 30(19.%) strongly agree, 65(42.5%) agree, 20(13.1%) strongly disagree, 10(6.5%) disagree and 28(18.3%) neutral. A mea nof 3.49 higherth an thecompositemean on this statement implied that contractors are not adhering to the county by-laws. Despite majority agreeing, the recorded standard deviation 1.252 comparedto the composite standarddeviation o f 0.505also meantthat opinions were divergent.

Statement 83, contractors or firms that adhere to County by-laws tend to produce good results in terms of road performance. Out of 153 respondents, 34(22.2%) strongly agreed, 65(42.5%) agreed, a dismall fraction of 3(2.0%) disagreed and others 51(33.3%) gave a neutral response. On this statement, the derived meanwas3.85 higher than the composite of 3.60. This therefore implies that it is true that besides adhering to other regulations in construction, observing County by-laws would also significantly enhance road performance. The standarddeviation was 0.784 belowthe compositestandard deviation which was0.505 indicatingthat opinions gatheredwerediverging.

Statement 84, all contractors allocate enough resources to road construction works hence good road performance. Out of 153 respondents, 19(12.4%) strongly agreed, 39(25.5%) agreed, 18(11.8%) strongly disagreed, 43(28.1%) disagreed and 34(22.2%) remained neutral. The line item mean of 2.99 was less than the composite mean of 3.60 indicating a critical need for contractors to allocate and use enough resources during construction for this in turn is highly likely to affect or influence road performance in terms of quality Repondents opinions diverged givenastandard deviationof 1.230for the lineitem compared tothe compositestandard deviationof0.505.

Statement 85, contractors utilize the right materials and equipments to ensure quality work done. Out of 153 respondents, 26(17.0%) strongly agreed, 52(34.0%) agreed, 16(10.5%) strongly disagreed, 33(21.5%) disagreed and 26(17.0%) maintained a neutral stand. The line item mean was 3.25 and the composite mean 3.60. This implies that most contractors do not utilize the right materials for construction and equipments to contribute to quality work in road construction. It also means that those that have could be obsolescent and need replacement to realize quality in completed projects, hence road performance. A standard deviation of 1.265 was obtained which tended tohigher thanthe composite sta ndarddeviationof 0.505henceinconsistency in opinions gathered.

Statement 86, allocation and utilization of the right materials and equipment does always lead to road performance. Out of 153 respondents, 61(39.9%) strongly agreed, 35(22.9%) agreed, 30(19.6%) strongly disagreed, 5(3.3%) disagreed and the remaining 22(14.3%) gave a neutral opinion. The mean and the composite mean were the same at 3.60. This shows that on average, those contractors allocating and utilizing the right materials and equipments in road construction can lead to good road performance. There is still need to improve this to realize full impact in road performance even though sources of funds remain a constraint in road construction. Generated fromthis statementwas a standarddeviation of 1.515higher thanthe compositewhich is 0.505indicating the respondents'opininionswere divergent

4.11.2 Qualitative Analysis ofthe ModeratingInfluence of ProcessMonitoring

Results of interviews with road construction engineers indicated that process monitoring influenced largely the relationship between contractors' capacity evaluation in tender award andperformance ofroad constructioninfrastruc turalprojects. The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the road construction engineers:

> *"The role of process monitoring is toensure that thecontractor meetthe required capacityin order tosecure a sound performance at right time of contract termination; If process monitoring is enforced through adherence to regulations, then the final output will be good. Performance of roads*

> *will only be of highly quality if only compliance with construction specification is observed; Process monitoring will help in ensuring that contractor capacity is evidenced in the final product that is a road that is well performing after its completion; Process monitoring will not curb or eliminate rogue contractors but will ensure the road constructed meets at least minimum mark of quality; With strict adherence and enforcement of process monitoring in construction, we are likely to see roads constructed are of high quality and deviations that lead to roads with potholes and accidents are avoided."* Road Construction Engineers' Opinions (2019)

Results of interviews with public service vehicles (PSVs) drivers indicated that process monitoring influenced to a great extent the relationship between contractors' capacity evaluation in tender award andperfo rmance oroad constructioninfrastructur alprojects. The results of the interviews were, therefore, consistent with the quantitative data. The following are key responses obtained from the PSVs drivers:

> *"Adequacy of a contractor in terms of financial ability will be early detected to ensure enough funds are put in place to help produce quality roads; Sometimes we can see the road is not performing because of poor workmanship but if process monitoring is made part and parcel of road construction then we are likely to see highly performing roads; I read a newspaper sometime this year (2018) and it noted that the number of footbridges that had been planned for Outer Ring road were at least 10 but a driver we are not to see them anywhere; In short, if road specifications are duly followed to the later then issues of changes in design will not be expected or experienced; With process monitoring being there, you will likely see a road that has properly done signage, zebra crossing for pedestrians and general quality will be something for us citizen to be."*PSVs Drivers' Opinions (2019)

4.11.3 Inferential Analysis of Process Monitoring

The inferential analysis was performed by use of correlationanregression analysesto show the relationship, directionand strength of the independent and dependent variables. The analysis was based on the sixth objective which sought to assessthe moderating influenceof processmonitoring on therelationship betweencontractors' capacity evaluationin tender awardand performa nceofroadcon struction infrastructuralprojeects

inNairobi County, Kenya. The indicatorsofpro cessmonitoring were: compliance with construction specification; compliance with regulatory requirements; compliance with county by-laws; and adherence to allocation and utilization of resources for accomplishment of objectives of the project. Performanceof roadconstruction in frastructuralpprojects was the dependentvariable and was operationalized usingthe followingindicators: road quality; mobility and speed; comfort and convenience; road user benefits; and road safety.

4.11.3.1 Correlation Analysis of Moderating Influence of Process Monitoring on the Relationship between Contractors' Capacity Evaluation in Tender Award and Performance of Road Construction Infrastructural Projects

Correlation analysisusing Pearson's ProductMoment techniquewas done toestablish the relationshipbetween the variousdimensions of process monitoring and performance of road construction infrastructural projects. The values obtained from thecorrelational analysisranged be tween+1 and -1. In t his regard, +1 imp liedperfect positive correlation, while -1 impliedpe rfect negative correlation. 0.000 implied no correlation; the modularvalues 0.001 to 0.250 impliedweakcorrelation; 0.251 to 0.500implied semi - strongcorrelation; 0.501 to 0.750impliedstrong correlation; and0.751 to 1.000implied verystrongcorrelation. The findingswere asshownTable 4.33.

Table 4.33: Correlation Analysisof ModeratingInfluence of ProcessMonitoring on the Relationshipbetween Contractors' CapacityEvaluation inTender Award and Performance of RoadConstruction InfrastructuralProjects

Correlations

Variable		Perform ance of Road	Process Monitoring
Perform ance of Road Construction Infras tructural Projects	Pearson Correlation	1	0.540**
	Sig. (2-tailed)		0.000
	n	153	153
Process Monitoring	Pearson Correlation	0.540**	1
	Sig. (2-tailed)	0.000	

	n	153	153

**. Correlati on is significant at the 0.05 level (2-tailed).

According to Table 4.33, at0.05 levelof significance, therewas statistically significant correlation betweenprocess monitoring andperformance ofro adconstruction infrastructuralprojects (p-value<0.05). Thecorrelation was strong since ithad a coefficient of0.540.

4.11.3.2 RegressionAnalys is ofModeratingInfluence of ProcessMonitoring on Relati onship betweenContractors' CapacityEvaluation in Performance of Road Construction Infrastructural Projects

The following hypothesi swas tested usingmultiple regressionmodel tosatisfy the requirementsof the sixthobjective:

Test of Hypothesis 6

6. **H_0:** Process monitoring does notsignificantly moderatethe relationship between contractors' capacity evaluationin tender award and performanceof road construction infrastructuralprojects.

   H_1: Process monitoring significantly moderate therelationship between contractors' capacity evaluation intender award andperformance of roadconstruction infrastructuralprojects.

The null hypothesis wastested using the belowr egressionequation:

$y = a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_{10} + \beta_6X_1X_{10} + \beta_7X_2X_{10} + \beta_8X_3X_{10} + \beta_9X_4X_{10} + e$

Where

y=Performance of roadconstruction infrastructuralprojects

a= Regression constant

β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8, and β_9 = Regression coefficients

X_1= Financial ability of Contractors

X_2= Technical Ability of Contractors

X_3= Management Ability of Contractors

X_4= Contractors' Safety Record

X_{14}= Process Monitoring

e=Error term

The results arepresented inTables 4.34, 4.35 and 4.36.

Hypothesis 6 was tested using hierarchical regression model recommended by Holmbeck (1997). In this operation, the influence of contractors' capacity evaluation in tender award (financial ability, technical ability, management knowledge, and process monitoring) on performanceof road constructioninfrastructural projectswas tested in step one, after which the moderating variable (process monitoring) wasintroduced insteptwo. Moderationis assumed to takeplace if the influenceofthe interaction betweenthe focalindependent variable andmoderator ondependent variableis significant. Accordingto Baron and Kenny (1986), amoderator is any qualitativeorquantitative variablewhich affects the strength and direction of relationshipbetween the focalindependent variable andthe dependentvariable.

According toHolmbeck (1997), a moderator isone that affects therelationship between twovariables, so that the natureand impact of the focal independent variable on the dependentvariablevaries according to the values of the moderator.

Step 1: Influence ofcontractors' capacityevaluation in tender awardon performanceofroad constructioninfrastructural projects.

In step one, contractors' capacity evaluation in tender award was regressed on performanceof road constructioninfrastructural projects. The results arepresented in Table 4.34.

Step 2: Influence of contractors' capacity evaluation in tender award and process monitoring on performance of road construction infrastructural projects

In steptwo, the influenceof the moderator(process monitoring) wasintroduced on the relationshipbetween contractors' capacityevaluation in tender award andperformance of roadconstr uction infrastructural projects. The results arepresented in Table4.34.

Table 4.34: Model Summary for ModeratingInfluenceof Process Monitoring on the Relationship between Contractors' Capacity Evaluation in Tender Award and Performance of Road Construction Infrastructural Projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.826[a]	0.682	0.673	0.16993	0.682	79.226	4	148	0.000
2	0.837[b]	0.700	0.690	0.16559	0.018	8.863	1	147	0.003

Model: {F(5,147)=68.520, p=0.000<0.05}

a. Predictors: (Constant), Contractors' Safety Record, Technical Ability of Contractors, Financial Ability of Contractors, Management Ability of Contractors

b. Predictors: (Constant), Contractors' Safety Record, Technical Ability of Contractors, Financial Ability of Contractors, Management Ability of Contractors, Process Monitoring

The results in Table 4.34 show that in step one, the adjusted R-Squared is 0.673. This is to mean that contractors' capacity evaluation in tender award explained 67.3% of performance of road construction infrastructural projects. The F value was statistically significant {F(4,148)=79.226, p=0.000<0.05}; implying that contractors' capacity evaluation in tender award influences performance of road construction infrastructural projects.

Table 4.35: Model Summary for Moderating Influence of Process Monitoring on the Relationship between Contractors' Capacity Evaluation in Tender Award and Performance of Road Construction Infrastructural Projects

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.151	4	2.288	79.226	0.000[b]
	Residual	4.274	148	0.029		
	Total	13.424	152			
2	Regression	9.394	5	1.879	68.520	0.000[c]
	Residual	4.031	147	0.027		
	Total	13.424	152			

a. Dependent Variable: Performance of Road Construction Infrastructural Projects

b. Predictors: (Constant), Finacial Ability of Contractors, Technical Ability of Contractors, Contractors' Safety Record
c. Predictors: (Constant), Finacial Ability of Contractors, Technical Ability of Contractors, Contractors' Safety Record, Process Monitoring

From Table 4.35, the ANOVA was used in the study for establishing the model's significance or the model's goodness of fit from which an f-significance value of p less than 0.05 was established (p= 0.00 <0.05). The results showed that in both step one and step two, the calculated F were 79.226 and 68.520 significantly larger compared to the critical value of F= 2.433 and F=2.276 respectively. This implied that the model was significant.

Table 4.36: Model Coefficients for Moderating Influence of Process Monitoring on the Relationship between Contractors' Capacity Evaluation in Tender Award and Performance of Road Construction Infrastructural Projects

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.782	0.173		16.073	0.000					
	Finance	0.230	0.033	0.413	6.990	0.000	0.669	0.498	0.324	0.617	1.620
	Technical	-0.233	0.066	-0.295	-3.524	0.001	0.157	-0.278	-0.163	0.306	3.267
	Management	-0.183	0.064	-0.213	-2.879	0.005	0.057	-0.230	-0.134	0.393	2.547
	SafetyRecord	0.386	0.040	0.707	9.766	0.000	0.657	0.626	0.453	0.411	2.435
2	(Constant)	3.007	0.185		16.270	0.000					
	Finance	.212	.033	0.380	6.482	0.000	0.669	0.471	0.293	0.595	1.680
	Technical	-0.218	0.065	-0.277	-3.376	0.001	0.157	-0.268	-0.153	0.304	3.287
	Management	-0.209	0.062	-0.243	-3.339	0.001	00.057	-0.266	-0.151	0.385	2.597
	SafetyRecord	0.579	0.075	1.060	7.681	0.000	0.657	0.535	0.347	0.107	9.320
	ProcessMonitoring	-0.210	0.071	-0.357	-2.977	.003	0.540	-0.238	-0.135	0.142	7.053

a. Dependent Variable: Performance of Road Construction Infrastructural Projects

Using the statistical findings presented in Table 4.36, the regression model in step one can be substituted as follows:

$Y=2.782+0.413X_1-0.295X_2-0.213X_3+0.707X_4$

Where y= Performance of Road Construction Infrastructural Projects.

X_1= Financial ability of Contractors

X_2= Technical Ability of Contractors

X_3= Management Ability of Contractors

X_4= Contractors' Safety Record

In step two, the influence of moderating variable (process monitoring) was introduced on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects. The results in the Table 4.34 demonstrate that upon introduction of the moderating variable (process monitoring) and the interaction term to the model 2, the value of adjusted R-square increased by 0.690 This implies that contractors' capacity evaluation in tender award and process monitoring (together) explain 69.0% of performance of road construction infrastructural projects. The F-value was statistically significant $\{F(5,147)=68.520, p=0.000<0.05\}$.

Using the statistical findings in model 2 in Table 4.36, the following regression equation was obtained:

$Y=3.007+0.380X_1-0.777X_2-0.243X_3+1.060X_4+0.357X_5$

Where y= Performance of Road Construction Infrastructural Projects.

X_1= Financial Ability of Contractors

X_2= Technical Ability of Contractors

X_3= Management Ability of Contractors

X_4= Contractors' Safety Record

X_5= Process Monitoring

From the foregoing, it can be concluded that process monitoring significantly moderates the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects. Accordingly, we reject the null hypothesis (H_0), which stated that process monitoring does not significantly moderate the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects. We conclude that the strength of relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects depends on process monitoring. Thus, we use the alternative hypothesis (H_1) to state: process monitoring significantly moderate the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects

The study has found that even though majority of firms or contractors agree that complying with construction specifications would lead to construction of quality roads, the level of compliance is still weak and demands regular process monitoring. The findings echoes findings by Mwangu and Iravo (2015) who determined that M&E instruments are not fully employed by contractors as well as project supervisors in their project functions. The findings of the current study has established contractors do not strive to make improvement beyond the tasks allocated even after completing construction. It was also revealed that not all contractors are committed to allocating adequate resources hence poor performance of roads in the post-delivery stage. This colloborates with the findings of Byaruhanga and Basheka (2017) who established that project performance was affected by award of contracts to undeserving contractors due to weak systems of procurement; incompetence of staff involved in the procurement exercise; none existent contractor apparisal system; service delivery challenges due to delayed payments; weak internal M&E systems.

It has also been found that neither county by-laws on road construction are adequate nor contractors are keen to adhere and follow the existing ones. By introducing the interaction term (moderator) in the second model, the influence of combined contractors'

capacity improved significantly. This findings point out the need for effective monitoring as Hassan (2013) emphasized that monitoring has a critical influence in ensuring required quality standards are attained in the course of project implementation; which in turn has a significant on overall project performance. Similarly, the findings resonates with Umugwaneza and Kule (2016) who argued that organizations should consider monitoring and evaluation as mandatory at all levels of the projects. However, the findings are supported are supported by Ng'etich and Otieno (2017) who agree that to strengthen process monitoring in the road construction projects, there is need to to engage stakeholders, involve the right technical team and fundamentally avail funds.

Further, the findings of the current study show that R was 0.837 and adjusted R squared ($R^{2)}$ was 0.690 indicating that 69% of performance was as a result of the second model (combined contractors' capacity and process monitoring). This is a slight increase compared with the findings of Asinza, *et al*., (2002) who investigated on the effect of monitoring and financial capacity on quality of projects. Monitoring factors considered for the study were extent of monitoring and monitoring methods, which had a strong and significant positive relationship with project quality ($r = 0.893$, $p < 0.05$) followed by finacial capacity ($r=0.475.p<0.05$). The overall regression model gave R^2 of 0.354. This showed that about 35% of variations in project performance was as a result of monitoring and financial capacity. The current findigs shows therefore the need of combining various factors alongside project monitoring to yield better results in project performance. The findings further supports the Wanjala, *et al.* (2017) observed that monitoring techniques applied in an organization within state corporations have significant effect on the project performance ($\beta 3= 0.674$, $p<0.05$).

The study objective was supported by data, hence the strength of relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects depends on process monitoring.

The study used regression analysis to determine the influence of contractors' capacity evaluation in tender award and process monitoring on performance of road construction infrastructural projects. Coefficient of determination was used to explain the amount of change in dependent variable being explained by the independent variable while F-ratio was used to determine the statistical significance of the model. The hypotheses that were tested in this study are in Table 4.37.

Table 4.37: Summary of Results of Tests of Hypotheses

Objective	Hypothesis	Regression Model	Results	Decision as a Result of Empirical Evidence
1. To determine the extent to which financial ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya.	1. H_0: Financial ability of contractors does not significantly influence performance of road construction infrastructural projects.	$y= a + b_1X_1 + e$	{R=0.669, R^2=0.447, B=0.373, t=11.056, F(1,151)=122.235, p=0.000<0.05}	Reject null hypothesis
2. To assess how technical ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya.	2. H_0: Technical ability of contractors does not significantly influence performance of road construction infrastructural projects.	$y=a+b_2X_2+e$	{R=0.157,R^2=0.025, B=0.124, t=1.956, F(1,151)=3.827, p=0.052>0.05}	Fail to reject null hypothesis
3. To establish how management ability of contractors influence performance of road construction infrastructural projects in Nairobi County,	3. H_0: Management ability of contractors does not significantly influence performance of road construction infrastructural project.	$y=a+b_3X_3+e$	{R=0.057, R^2=0.003, B=0.049, t=0.701, F(1,151)= 0.491,p=0.485>0.05}	Fail to reject null hypothesis

Objective	Hypothesis	Regression Model	Results	Decision as a Result of Empirical Evidence
Kenya.				
4. To examine how contractors' safety record influence performance of road construction infrastructural projects in Nairobi County, Kenya.	4. H_0: Contractors' safety record does not significantly influence performance of road construction infrastructural projects.	$y=a+b_4X_4+e$	{R=0.657, R^2=0.431 B=0.359, t=10.703, F (1,151)= 114.558, p=0.000< 0.05}	Reject null hypothesis
5. To determine how the combined contractors' capacity evaluation in tender award influence performance of road construction infrastructural projects in Nairobi County, Kenya.	5. H_0: The combined contractors' capacity evaluation in tender award does not significantly influence performance of road construction infrastructural projects.	$y= a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + e$	Overall, the model had R=0.826, adjusted R^2=0.673, F(4,148)=79.226, p=0.000,0.05 Based on the model coefficient table, all the p-values for predictor variables (financial ability of contactors, technical ability of contractors, management ability of contractors and contractors' safety record) were less than 0.05.	Reject null hypothesis
6. To assess the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in Nairobi County, Kenya.	6. H_0: Process monitoring does not significantly moderate the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects.	$y = a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_{10} + \beta_6X_1X_{10} + \beta_7X_2X_{10} + \beta_8X_3X_{10} + \beta_9X_4X_{10} + e$	Step 1: R=0.826, adjusted R^2=0.673, F(4,148)=79.226, p=0.000<0.05 hence F-value statistically significant Step 2: R=0.837, adjusted R^2=0.690, F(5,147)=68.520, p=0.000<0.05 hence F-value statifically	Reject null hypothesis

Objective	Hypothesis	Regression Model	Results	Decision as a Result of Empirical Evidence
			significant	

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summary of findings, conclusions, recommendations, contribution of the study to the body of knowledge and suggestions for further research.

5.2 Summary of Findings

The broad objective of the study was to determine the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award, and performance of road construction infrastructural projects in Nairobi County, Kenya. Six specific objectives were pursued by testing six hypotheses. The population of the study entailed 210 respondents: 104 public service vehicles (PSVs) drivers and 106 road construction engineers (simply referred to as road contractors). 61 drivers were sampled from the eastern by-pass, and 43 from the outer-ring roads respectively. 22 consulting engineers, 22 consulting managing directors, 31 senior engineers, and 31 managing directors in construction companies. Data was collected using semi-structured questionnaire, and interview schedule.

Hypotheses were tested using simple, multiple, and hierarchical regressions. Simple regression model was used to determine the influence of each independent variable, namely: financial ability; technical ability; management ability; and contractors' safety record on performance of road construction infrastructural projects, which was the dependent variable of the study.

Multiple and hierarchical regression was used to test the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects.

5.2.1 Financial Ability and Performance of Road Construction Infrastructural Projects

The first objective of the study was to determine the extent to which financial ability of a contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya. The null hypothesis in this regard was that financial ability of contractors' does not significantly influence performance of road construction infrastructural projects. The foregoing null hypothesis was tested and the following were determined: $R=0.669$, $R^2=0.447$, $B=0.373$, $t=11.056$, $F(1,151)=122.235$, $p=0.000<0.05$. The null hypothesis was rejected and it was concluded that financial ability of contractors significantly influence performance of road construction infrastructural projects. It was also established that the financial ability of contractors explained up to 44.7% of performance of road construction infrastructural projects.

5.2.2 Technical Ability and Performance of Road Construction Infrastructural Projects

The second objective of the study was to assess how technical ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya. The hypothesis that was tested under this objective is that technical ability of contractors' does not significantly influence performance of road construction infrastructural projects. The results were: $R=0.157$, $R^2=0.025$, $B=0.124$, $t=1.956$, $F(1,151)=3.827$, $p=0.052>0.05$. At this juncture we failed to reject the null hypothesis and based on the results, and it was concluded that technical ability of contractors does not significantly influence performance of road construction infrastructural projects. The results also showed that technical ability of contractors explained 2.5% of performance of road construction infrastructural projects.

5.2.3 Management Ability and Performance of Road Construction Infrastructural Projects

The third objective was to establish how management ability of a contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya. The null hypothesis that was tested is that management ability of contrctors does not

significantly influence performance of road construction infrastructural projects. The results were: R=0.057, R^2=0.003, B=0.049, t=0.701, F(1,151)= 0.491, p=0.485>0.05. At this point, we failed to reject the null hypothesis, and it was maintained that management ability of contractors does not significantly influence performance of road construction infrastructural projects. The results also showed that management ability of contractors explained 0.3% of performance of road construction infrastructural projects. This percentage clearly explains why management can not be a pointer to performance of roads during the post delivery stage.

5.2.4 Contractor's Safety Record and Performance of Road Construction Infrastructural Projects

The fourth objective was to examine how contractors' safety record influence performance of road construction infrastructural projects in Nairobi County, Kenya. The null hypothesis that was tested in this regard was that contractors' safety record does not significantly influence performance of road construction infrastructural projects. The results were: R=0.657, R^2=0.431, B=0.359, t=10.703, F (1,151)= 114.558, p=0.000<0.05. The null hypothesis was rejected based on the results, and it was concluded that contractors' safety record significantly influence performance of road construction infrastructural projects. The results showed that contractors' safety record explained 43.1% of performance of road construction infrastructural projects.

5.2.5 Combined Contractors' Capacity Evaluation in Tender Award and Performance of Road Construction Infrastructural Projects

The fifth objective was to determine how the combined contractors' capacity evaluation in tender award influence performance of road construction infrastructural projects in Nairobi County, Kenya. The null hypothesis that was tested in this regard was that combined contractors' capacity evaluation in tender award does not significantly influence performance of road construction infrastructural projects. The results showed that in overall, the model had R=0.826, adjusted R^2=0.673, F(4,148)=79.226, p=0.000<0.05.

Results from the model coefficient table indicated that all the p-values for predictor variables {financial ability of contactors ($p=0.000<0.05$), technical ability of contractors ($p=0.001<0.05$), management ability of contractors ($p=0.005<0.05$) and contractors' safety record ($p=0.000<0.05$)} were less than 0.05. The null hypothesis was rejected based on the results, and it was concluded that combined contractors' capacity evaluation in tender award significantly influence performance of road construction infrastructural projects. The results showed that combined contractors' capacity in tender award explained 67.3% of performance of road construction infrastructural projects.

5.2.6 Process Monitoring, Contractors' Capacity Evaluation in Tender Award, and Performance of Road Construction Infrastructural Projects

The sixth objective was to assess the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in Nairobi County, Kenya. The null hypothesis tested in this regard was that process monitoring does not significantly moderate the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects.

The results were presented in two steps. That is, in step 1: $R=0.826$, adjusted $R^2=0.673$, $F(4,148)=79.226$, $p=0.000<0.05$ hence F-value was considered statistically significant and in step 2: $R=0.837$, adjusted $R^2=0.690$, $F(5,147)=68.520$, $p=0.000<0.05$ hence F-value was statistically significant; the null hypothesis was thus reject, and it was concluded that process monitoring has significant influence on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects. Moreover the results revealed that upon introduction of process monitoring as a moderator, the percentage rose by 1.7% resulting to 69.0% of performance of road construction infrastructural projects.

5.3 Conclusions

This section comprises the conclusion made in light of the study objectives and hypotheses:

The first objective was to determine the extent to which financial ability of contractors influence performance of road construction infrastructural projects in Nairobi, Kenya. The indicators for financial ability were credit rating; bank goodwill; flexibility of loan agreements; turnover; and owned funds. The most dominant indicator was owned funds, followed by bank goodwill, turnover, credit rating, and flexibility of loan agreement, in that order. All the indicators of financial ability had statistically significant influence on performance of road construction infrastructural projects. Overall, financial ability had statistically significant influence on performance of road construction infrastructural projects.

The second objective was to assess how technical ability of contractors influence performance of road construction infrastructural projects in Nairobi, Kenya. The indicators for technical ability were experience in terms of catchment national and international; plant equipment; material quality; project size experience; and manpower availability. The most dominant indicator was material quality, followed by plant equipment, project size experience, catchment experience, and manpower availability, in that order. All the indicators of technical ability had statistically significant influence on performance of road construction infrastructural projects. Overall, technical ability had no statistical significant influence on performance of road construction infrastructural projects.

The third objective was to establish how management ability of contractors influence performance of road construction infrastructural projects in Nairobi, Kenya. The indicators for management ability were past performance; quality control; management knowledge; project management system; and experience of management personnel. The most dominant indicator of management ability was project management system, followed by management knowledge, past performance, quality control, and experienced

personnel respectively. Overall, management ability had no statistical significant influence on performance of road construction infrastructural projects.

The fourth objective was to examine how contrctors' safety record influence performance of road construction infrastructural projects in Nairobi, Kenya. The indicators for safety record of a contractor were safety policy; insurance; compliance; standards' adequacy; and OSHA certification. The most dominant indicator of safety record of a contractor was insurance, followed by OSHA certification, safety policy, compliance, and standards adequacy respectively. All the indicators of safety record of a contractor had statistically significant influence on performance of road construction infrastructural projects. Overall, safety record of a contractor had statistically significant influence on performance of road construction infrastructural projects.

The fifth objective was to determine how combined contractors' capacity evaluation in tender award influence performance of road construction infrastructural projects in Nairobi, Kenya. The dimensions for contractors' capacity evaluation in tender award were financial ability; technical ability; management ability; and contractor's safety record. The most dominant dimension of contractors' capacity evaluation in tender award was management ability, followed by technical ability, financial ability, and contractor's safety record respectively. All the dimensions of contractors' capacity evaluation in tender award had statistically significant influence on performance of road construction infrastructural projects. Overall, contractors' capacity evaluation in tender award had statistically significant influence on performance of road construction infrastructural projects.

The sixth objective was to assess the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in Nairobi, Kenya. The indicators for process monitoring were compliance specification; regulatory compliance; compliance with county by-laws; and adherence to allocation of resources. The most dominant indicator of

process monitoring was regulatory compliance, followed by compliance with county by-laws, compliance specification, and adherence to allocation of resources respectively. All the variables of contractors' capacity evaluation in tender award had statistically significant influence on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects. Overall, process monitoring had statistically significant moderating influence on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects.

5.4 Contribution of the Study to the Body of Knowledge

The contribution of the study to the body of knowledge is summarized in Table 5.1.

Table 5.1 Summary of Contribution of the Study to Body of Knowledge

Objective	Contribution
To determine the extent to which financial ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya; To assess how technical ability of contractors influence performance of road construction infrastructural projects in Nairobi County, Kenya.	From the current study it was found that measuring performance of roads in post delivery (upon completion) can only happen by use of financial and safety record of contractors. It is demonstrated through the study findings that contractors, however well trained in management and the technical capacity they possess, without finances or adequate sources of finance it could be almost impossible to build quality roads and meet most of the user or beneficiaries requirements. In the same manner deliberate poor adherence to safety procedures and its practical aspects such as erecting foot bridges and bumps in designated places can prove fatal hence poor performance. It is therefore advisable for management and technical abilities be delimited to the first phase of projects (construction/implementation) but not used to measure or explain performance issues in the post delivery stage of road projects.
To examine how contractors' safety record influence performance of road construction infrastructural	Weil (2001), Jannadi and Khamsin (2002) and Diugwu, Baba and Egila (2012) pointed out myriad issues that affected construction industry in terms of health and safety which included use of signage, planning and preparation, lack of adequate regulations

projects in Nairobi County, Kenya	and constrained safetyness and health of construction during implementation (construction stage). This study narrowed down to safety aspect to establish its influence on performance of the road during its life. In this case, it is assumed that the study was the first to apply safety part of OSHA to establish its influence on already completed road projects and currently are in use. It was established that the Domino theory of accident causation, by H.W. Heinrich, used mostly during construction phase or associated in most cases with the implementation of various projects could equally be used in explaining performance of road whereby the current study found that some of the accidents, if not all, are as a result of human acts and riskier conditions such as technical failures as explained by this theory in its five antecedents.
To assess the moderating influence of process monitoring on the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects in Nairobi County, Kenya	Bulle and Makori (2015), Byaruhanga and Basheka (2017) and Mwangu and Iravo (2015) confirmed through their studies M&E is inadequately utilized in projects. This study assessed the level of modearation process monitoring had on the relationship between using an interaction term. It was evident that process monitoring is a conditional factor that whose level of existence influence the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects. Thus, the study has found that despite the importance of assessing or evaluating a particular contractor based on the normal criteria, the use of process monitoring as a moderator would significantly influence performance of the road once entrenched in the contractor capacity evaluation in tender award and performance of road construction infrastructural projects.

5.5 Recommendations

This section comprises recommendations of the study based on the findings. The recommendations are in light of policy and practice.

5.5.1 Recommendations for Policy

The recommendations for policy are as follows:

1. The study has established that contractors' capacity evaluation in tender award significantly influences performance of road construction infrastructural projects. This implies that more stringent policies guiding selection of road construction contractors should be put in place by the Nairobi County Government, the National Construction Authority (NCA), the Kenya National Highways Authority (KeNHA) and the Ministry of Roads and Public Works in Kenya. The policies should specifically address the financial ability, technical ability, management ability, and contractor's safety record.

2. The study revealed that process monitoring significantly influences the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects. This means that not only should the above policy institutions (for example, NCA and KeNHA) prioritize standards relating to contractors' capacity evaluation in tender award, but they should also put premium on monitoring and evaluation of the projects. The policy interventions should specifically focus on compliance with construction specification, compliance with regulatory bodies' requirements, compliance with county by-laws, and adherence to allocation and utilization of resources for accomplishment of the objectives of the projects.

5.5.2 Recommendations for Practice

The recommendations for practice are as follows:

1. The road construction firms in Kenya should continuously configure their resource, system, and process capabilities in order to gain competitive. This is because such capabilities are likely to inform the award of a tender by the tenderers. The key areas that the firms should specifically address are the financial ability, technical ability, management ability, and safety record.

2. The study revealed that process monitoring significantly moderates the relationship between contractors' capacity evaluation in tender award and performance of road construction infrastructural projects. This means that the relevant regulatory bodies and other institutions charged with project oversight responsibilities should commit significant time and resources in monitoring the progress of various road construction infrastructural projects. The individual construction firms should also invest in process monitoring as an overall strategy to enhance the ultimate performance of the projects. The process monitoring interventions by the organizations ought to particularly focus on compliance with construction specification, compliance with regulatory bodies' requirements, compliance with county by-laws, and adherence to allocation and utilization of resources for accomplishment of the objectives of the projects.

5.6 Suggestions for Further Research

Suggestions for further research are as follows:

1. The current study focused on road construction infrastructural projects. Other researchers may consider investigating contractors' capacity evaluation in tender award, process monitoring, and performance of building construction projects. This is because the findings of the current study are limited to the road construction infrastructural projects.

2. The current study focused on Nairobi County, Kenya. Other researchers may consider focusing on the examining the same phenomenon in other counties, more so the rural counties, including Meru, Vihiga, Nyamira, and Kilifi. This is because Nairobi County is the most urban in Kenya, hence the findings of the study may not apply to rural contexts.
3. The current study modelled process monitoring as the moderating variable. Other researchers may consider modelling company characteristics such as age, and size, as the moderating variables. This is because it is still unknown whether older construction firms could perform better than their younger counter-parts. It is also not known whether larger construction firms could significantly outperform the smaller ones.

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