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Applying Total Quality Management Principles to Improve Supply Chain Performance and Project Quality of Constituency Development Funds in Zambia

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Abstract— *In 1995, the Zambian government introduced the Constituency Development Funds (CDF) to support grassroots development. Despite a substantial increase in financial allocations, many CDF construction projects have failed to meet quality standards, hindering their intended benefits. This persistent problem is often rooted in the inefficient execution of the project's supply chain, from material procurement to delivery and project management. This study examines the impact of Total Quality Management (TQM) principles on improving the supply chain performance and, consequently, the overall quality of CDF projects. The research sought to answer three questions: (i) Are TQM principles implemented in the execution of CDF construction projects? (ii) To what extent are TQM principles applied in delivering projects within Mufulira Central Constituency? and (iii) What are the potential benefits of implementing TQM principles within the CDF project supply chain? Using a deductive quantitative research design, a judgmental sample of 358 respondents was drawn from a population of 433 at the Mufulira Municipal Council, including staff, contractors, and members of the CDF and Ward Development Committees. Data was collected using structured questionnaires with a Likert scale, and reliability was assessed with Cronbach's alpha. The findings indicate that TQM principles were not widely implemented in the management of CDF project supply chains. However, the research reveals that integrating TQM would significantly improve supply chain efficiency, leading to higher project quality, reduced costs, and shorter delivery times. The study recommends that the Ministry of Local Government and Rural Development (MLGRD) should develop policies to conduct TQM and supply chain management workshops for all stakeholders. Furthermore, top management should champion a cultural shift to instill a systems-based approach, ensuring that all aspects of the supply chain are managed with a focus on quality. These measures are crucial to transforming the CDF into a more effective tool for sustainable community development.*

Key Words: *Constituency Development Funds (CDF); Total Quality Management (TQM); Project Quality; Supply Chain Management; and Stakeholder Engagement.*

I. Introduction

The Constituency Development Fund (CDF) was established in Zambia in 1995 with the main goal of giving local communities the power to plan and carry out development initiatives. at the grassroots level (Ministry of Local Government and Housing, 2006). The CDF was envisioned as a key mechanism for decentralizing development, enabling citizens to participate directly in decisions affecting their livelihoods and local infrastructure (Chellah, 2017). This initiative was meant to bridge the gap between national development plans and the specific needs of individual communities, thereby fostering inclusive growth and poverty reduction (Lungu, 2008).

However, despite the noble intentions and substantial financial investments, the implementation of many CDF-funded projects has been plagued by significant challenges. Reports and anecdotal evidence consistently suggest that these projects frequently fail to meet acceptable quality standards, often exceeding their allocated budgets and failing to adhere to specified timelines and scope (Zulu, 2019). This systemic failure has not only led to the wastage of public resources but has also limited the practical benefits intended for the communities. The persistent problems of poor quality, cost overruns, and delays indicate a critical gap in project management and oversight within the CDF framework.

In light of these challenges, this study posits that the principles of Total Quality Management (TQM) could provide a robust framework for improving the quality and effectiveness of CDF-funded construction projects. TQM is a management philosophy that emphasizes continuous improvement, a customer-centric approach, and the involvement of all stakeholders to enhance product and service quality (Deming, 1982). By applying these principles, it may be possible to address the root causes of poor project performance, ensuring that community projects are delivered efficiently and to a high standard. Therefore, this research aims to examine the impact of applying TQM principles to Constituency Development Fund-funded construction projects in Zambia, with a specific focus on the operational and quality management challenges observed in Mufulira Central Constituency.

II. Background of the Study

The Constituency Development Fund (CDF) was established in Zambia in 1995 with the aim of funding minor community development initiatives that would raise the quality of life for the population. Under the Ministry of Local Government and Housing (PMRC, 2014), the 2006 CDF Guidelines regulated CDF development projects as one of its

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initiatives. However, the application of TQM principles in CDF construction projects in Zambia has been minimal. In 2010, a significant number of CDF construction projects in Mufulira failed to meet the required quality standards, particularly concerning timelines, scope, and schedule specifications (Auditor General's Office, 2010). Musenge (2013) argues that the poor delivery of CDF construction projects in Zambia is partly attributed to lack of adequate community involvement. This system approach to CDF management is a positive TQM principle to improve projects delivery.

In 2014 fourteen CDF construction projects in Mufulira central constituency were embarked on. However, only four projects were successfully implemented to good quality standards (PMRC, 2014). One of the worst cases was the construction of a secondary school in Kansuswa township of Mufulira central constituency at a CDF cost of K9 million (Times of Zambia Newspaper, 2014). By March 2024 this project was still incomplete (MMC, 2024). In 2021 there were three construction projects awarded in Mufulira central constituency and all of them did not meet the quality standards stipulated in the scope of works (MMC, 2023). This prompted Mufulira municipal council to initiate an annual Road show sensitization program in September 2022 under the theme: *'CDF for all leaving no one behind'* (MMC, 2023). However, due to lack of proper training coupled with the nature of the program CDF quality problems persisted.

In order to improve CDF projects delivery the government revised the CDF guidelines in 2022 (MLGRD, 2022). In spite of this, in the central constituency of Mufulira, twelve and fifteen CDF building projects were begun in 2022 and 2023, respectively. But only one project was successfully delivered in 2022 and only two were delivered to good quality standards in 2023 respectively (MMC, 2023).

III. Research Problem

According to the Post Newspaper (2012), CDF stakeholders claim that corruption plays a role in the implementation of CDF projects, while others attribute the poor execution of these projects to external factors such as bureaucratic processes, political interference, and fluctuations in the cost of materials. Musenge (2013) further argues that CDF-funded community construction projects in Mufulira and other districts are often of substandard quality, left incomplete, vandalized after completion, or take excessively long to be delivered. As a result, the government incurs significant expenses. Similar to other constituencies, CDF projects in Mufulira district have failed to meet quality standards in terms of scope, schedule, and cost. According to the Mufulira Municipal Council, of the 25 CDF construction projects undertaken in Mufulira Central constituency under the 2021 and 2022 CDF allocations, 7 were of poor quality, 18 were not completed on time, and 6 experienced cost overruns due to being abandoned and reassigned to new contractors or redone because of substandard work (MMC, 2023).

The Mufulira Municipal council (MMC) at the ninth ordinary council dated 27th September 2023 under minute No. PWD/296/09/2023 reveals that many CDF construction projects under the 2021 and 2022 allocation were delivered to poor quality standards. The rehabilitation of kansuswa market did not meet the agreed specifications according to the scope. As a result the project was delayed by 2 months 12 days and had cost overruns of K44,797.56 (MMC, 2023).The construction of a public toilet at kansuswa bus station which was supposed to be completed on 17th July 2023 was delayed and had not been completed as at 27th November 2023. Moreover, the Auditor General's report No. OAG/54/1/1 on implementation of CDF projects in Mufulira district dated 23rd July 2023 reveals that 4 construction projects that were funded in the 2021 and 2022 allocation were not successful in terms of project quality: The rehabilitation of Kalanga secondary school under hanky Kalanga ward which was scheduled to be complete in September 2022 was still incomplete as at June 2023, nine months after the completion period.

On 3rd November 2022 the council engaged Jozanga Investments Ltd to do water reticulation projects in 7 sites over a period of 8 weeks commencing in November 2022 and ending in January 2023. However, a physical inspection done in June 2023 reveals that the projects had still not been completed at gasto primary school in Bwananyina ward, kansuswa secondary school in kansuswa ward and kamuchanga primary school under kamuchanga ward (Auditor General's Office, 2023).The bus shelter construction project at rainbow in kasempa ward was still in progress as at November 2023, this project was scheduled to complete on 9thOctober 2023.Other projects that were delayed involved the rehabilitation of roads in various wards including: David Lunda ward, Hanky Kalanga ward, Chachacha ward, Kawama and Mutundu, were the roads project was delayed by 9 months. The rehabilitation of roads in Kamuchanga and Kasempa wards were also delayed by a month, and the road networks were of poor quality. Then although the roads projects delivered in Kafue and Kansuswa wards were completed on time, they were of poor-quality standards and needed to be redone. This implies an escalation both in time and costs involved, causing the government to spend huge sums of money on the same projects (MMC, 2023). This poor-quality delivery of CDF construction projects in Zambia prompted this study: Exploring the effects of Total Quality Management Principles (TQM) on Constituency Development Funded Construction Projects in Zambia; A Case of Mufulira Central Constituency.

IV. Research Objectives

i. To determine whether total quality management (TQM) principles are applied in CDF construction projects in Mufulira Central Constituency
ii. To determine the extent to which TQM principles are applied in the delivery of CDF construction projects in Mufulira Central Constituency
iii. To establish the benefits of TQM principles in delivering CDF construction projects in Zambia. A case of Mufulira Central Constituency

Chimungu Alex and Mweshi Geoffrey Kapasa, "Applying Total Quality Management Principles to Improve Supply Chain Performance and Project Quality of Constituency Development Funds in Zambia," *International Research Journal of Advanced Engineering and Science*, Volume 10, Issue 3, pp. 154-167, 2025.

V. Research Design

The study type is a exploratory from the survey, particularly: A survey of Mufulira Central Constituency whereby primary data will be collected through delivery and collected questionnaires. The quantitative research method will be used due to the large number of respondents. The data sources for this research also includes secondary sources. The quantitative method refers to the collection of numerical data from the information obtained in form of the questionnaires and surveys (Kumar, 2011). The responses were then analysed and the findings addressed the research questions.

VI. Research approach and method

This study adopted a deductive research approach, which involves formulating research questions or hypotheses and subsequently testing their validity through data collection and analysis (Salomao, 2023). A quantitative research method was employed, as Fischer (2011) explains that this approach allows for data to be gathered in numerical form and analyzed using statistical tools or other relevant techniques. Both primary and secondary sources were utilized in this research.

VII. Literature Review

Quality of Construction Projects

From a linguistic standpoint, the word "quality" is derived from the Latin term ‘qualis’, which means "exactly as the thing truly is." On a global scale, quality is defined as the extent to which a set of inherent characteristics meets specified requirements (BS EN ISO9000, 2000). While there is no single universally accepted definition of quality, it is commonly understood as fulfilling requirements and specifications or surpassing customer expectations and satisfaction (Dale, 2003). Chimene (2013) defines quality as the degree of value or the extent to which a product or service meets project requirements.

There are various factors that cause quality shortfalls in construction projects. There is usually lack of consistency in the release of funds for construction projects. Then these funds are often released or paid out in smaller quantities. As a result quality delivery of construction projects is affected negatively. Poor quality of projects is also attributed to lack of management skills on the part of contractors, the inability of contractors to properly execute projects (Mukumbwa, 2013). Scope creep without a corresponding timely release of funds is another common cause of quality shortfalls (Choudhry et al, 2012).

Total Quality Management (TQM) Of CDF Construction Projects

Thus is a system of management where every project member or staff member as well as the associated business processes are committed to maintaining high standards of work in order to generate value for money products and services which meet and preferably surpass the requirements and expectations of consumers. The emphasis of TQM is customer satisfaction (Dale, 2003). In this research study, the customers are basically the residents of communities in various constituencies in Zambia who benefit from the CDF construction projects. TQM ultimately comprises quality and continuous improvement. Scholars have found that there is a positive association between TQM and the performance of organizations (Mohammed et al, 2012).

Quality management is made up of four elements: Quality control, Quality improvement, Quality planning, and Quality assurance (Karia and Asaari, 2006). The process of implementing all these four components in an organization is known as Total Quality Management (TQM) (Rose, 2005).

Quality Control vs. Quality Assurance under CDF construction projects

Quality control entails tracking and recording the results of quality-related activities to assess performance and recommend improvements. This approach helps project teams pinpoint the underlying causes of quality concerns and implement corrective measures (PMI, 2013). On the other hand, Project Quality Assurance involves reviewing quality requirements and evaluating quality control outcomes to ensure adherence to the required standards (Gaskin, 2023).

The Quality control approach is adopted under CDF construction projects to ensure good quality delivery in terms of meeting the time, scope and cost constraints. However, as Neyestani (2017) states, ‘quality control does not necessarily improve quality, it is simply a defect identification tool’. In Quality control which is basically monitoring, if construction projects have been delivered to poor quality, extra CDF costs are incurred to achieve good quality. Hence time overruns are the result. On the contrary the focus of quality assurance is defect prevention because it is process oriented. In other words quality is inculcated from the project planning stage to ensure good quality delivery throughout the life cycle of a project (Oakland, 2003).

Check Sheets of Construction Projects

Check sheets are structured checklists used for data collection. They help in systematically organizing information to enable the efficient gathering of relevant information concerning probable quality problems. These sheets are particularly useful for gathering attribute information during inspections, allowing for the identification of defects simultaneously. An example is a building plan requirements checklist used to check whether an architectural building plan has all the quality standard requirements (PMBOK, 2000).

A checklist of CDF building plans for example should include requirements such as the floor plan, foundation plan, elevations and roof plan, sections, window/door schedule, site/location plan, fence details and construction notes (MMC, 2023). A checklist of CDF building plans requirements can be a very useful tool to help ensure that the building plans comply with the necessary building requirements and thereby meet the required scope. This tool can be useful to help CDF construction team managers ensure that projects are constructed to the required quality standards.

Quality Metric Under CDF Construction Projects

Chimungu Alex and Mweshi Geoffrey Kapasa, “Applying Total Quality Management Principles to Improve Supply Chain Performance and Project Quality of Constituency Development Funds in Zambia,” *International Research Journal of Advanced Engineering and Science*, Volume 10, Issue 3, pp. 154-167, 2025.

A quality metric refers to a tool that describes how the quality control process will measure a particular product or project attributes. For example, if the objective for a project is to maintain the budget approved by 10%, then this specified quality metric must be used to measure the cost of every product or deliverable. Thus, quality measures are helpful in carrying out quality assurance and quality control procedures. Supposing the Community Development Fund (CDF) has been approved to fund Mufulira – market shelter rehabilitation that calls for repairing and enhancing the current market shelter in Mufulira, Zambia (Enalización *et al.*, 2010).

Under this project the following quality metric can be constructed to assess the development and accomplishment of the "Mufulira – market shelter rehabilitation". The Project Completion Rate can be the quality metric with the calculation as follows: Project Completion Rate (%) = (Completed Project Milestones / Total Project Milestones) x 100 (Sharma, Tabandeh and Gardoni, 2018). The k*ey considerations for the project may be to e*stablish the due dates and clear project milestones for each, to regularly update the number of milestones based on the project development and to keep an eye on the completion rate (Cox, Prager and Rose, 2011). This statistic offers a clear picture of how well the project is progressing forward in terms of meeting its specified milestones. While a lesser rate could point to possible problems that need to be addressed, a higher rate of completion shows that the project is on schedule.

Principles of Total Quality Management

TQM is a management system of effective strategy, communication, tools and methods whereby all employees and stakeholders are engaged to achieve quality services, processes, culture, and products in an organization in order to satisfy the customers (Rice, 2024). TQM involves the application of its principles at every level of the projects, branches or organization (Hoonakkera, et al., 2010). These principles address a number of issues such as technical, managerial and issues concerning people among other things. These TQM principles include the following:

Customer focus- the ward residents

Organizations for their existence depend on their customers and therefore, it is their duty to understand the customer needs, both the current and future needs. Under the delivery of CDF construction projects contractors should ensure that construction projects are delivered to good quality standards and possibly exceed the stated requirements. Many authorities have claimed that the construction industry has been lagging behind with regard to delivery of projects so as to satisfy the customers (Hoonakkera, et al., 2010). Kojo (2014) further notes that the success of projects in companies or organizations where TQM is adopted largely depends on meeting or even exceeding customer satisfaction.

System approach to management

This involves managing interrelated processes of an organization or project as a system which contributes to the organization's efficiency and effectiveness in achieving its goals or objectives (Cox and Dale, 2001). Many projects and programs are not completed on time because interrelated processes which eventually lead to project success are not managed as a system and there is usually no sense of urgency in management.

To ensure that CDF projects are delivered to good quality standards in terms of schedule, cost and to the required scope, there are three departments under local authorities involved. These are the finance department which should ensure a timely release of funds at every stage of the development project, the quantity survey section under planning which guides on the costs involved. Moreover, the engineering department ensures that the project deliverables are to the agreed scope. Kerzne (2011) states that the 'triple constraints of quality (scope, cost and time) are mutually dependent'. This means that if the engineering department increases the scope without the involvement or timely involvement of the other relevant departments, the cost and time will be affected and consequently the quality standard.

Mutually beneficial supplier relationships

An organization and its suppliers should be related to the point that they should enjoy mutual benefits. This relationship should create the ability of both parties to enhance value of the organization's deliverables (Dale, 2003). Good quality management in terms of efficiency depends on organizations relationships with suppliers. Good quality delivery can only be achieved when the client receives the product exactly when they need it. This method is called Just- In- Time (Daniel, etal, 2007). The significance of these mutual beneficial relationships with suppliers cannot be overemphasized. Parikka (2023) explains that both the organization and its suppliers should engage in frequent communication and improve their relationships. The organization and its suppliers should regularly communicate and share their expectations as well as identify and implement improvements.

Education and training

The organizational members from bottom to top level management should be provided with the relevant level of education, standard and training in order to ensure that they are well equipped with understanding of quality management skills, attitudes, concepts and competencies so that they are best suited to implement quality management principles and continuous improvement. Management should ensure that lessons or workshops on quality management are arranged on a regular and timely basis (Dale, 2003). Dale (2003) contends that "in the absence of training problems solving is difficult, and, without education attitude and behavior change cannot take place" (p. 28).

Tools and techniques

To ensure the high-quality delivery of products and services, organizations should utilize a range of tools and techniques. These tools are essential for saving time and reducing costs, particularly when integrated with project management software. They also play a crucial role in addressing quality-related issues. Without the effective application of appropriate quality tools and techniques, problem-solving becomes challenging. These methods are designed to support project improvement and can be incorporated into daily project or business management processes. To achieve quality outcomes, organizations and

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project teams must carefully select the most suitable tools and techniques (Landau, 2022).

Measurement and feedback

Measurements should be carried out as a project progress using specified results indicators in order to identify whether or not the project is being implemented in accordance with the specified standards and requirements that are set at the beginning of a project (Dale, 2003). For construction projects it is vital to use certain tools and techniques to ensure that the project is completed on time and to the required scope and cost. Such tools and techniques include check sheets, Earned value analysis among others.

A risk mitigation strategy should as well be put in place to avoid delays (Edkins *et al.*, 2013). The project manager should be notified of any deviations from the project specifications these should be recorded (Cox, Prager and Rose, 2011). Moreover, the project team members must ensure that projects are delivered on time, within budget and quality requirements without wastage of resources (Anyanwu, 2013). Stakeholder Feedback should also be done. It involves the collection of inputs from all parties involved in the project, including community members, commuters and the local government to discover any issues or provide recommendations.

Cultural change

Cultural change involves changing people's attitudes, working practices and behavior in various ways. The organizational team members should be able to take individual responsibility for their quality assurance (Dale, 2003). Therefore, employees must be able to inspect their own works so that defects are not passed on to the next process. The attitude towards mistakes is that they should be perceived as an opportunity for improvement and once these defects are identified the team members should seek to eliminate the various kinds of wastes.

Triple constraints of quality

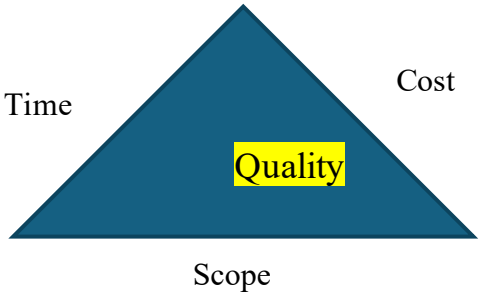
There are three factors known as scope, time and cost which affect project quality. These factors are mutually dependent, which means that any change in one will have an impact on one of the other two or all the two other constraints (Kerzner, 2011). There are three basic trade-off dynamics that exist among the triple constraint variables (scope, cost and time). The first relationship is that increasing scope or making an effort to achieve scope necessitates an increase in time and/or cost.

The second relationship is that any pressure to achieve time or reducing time of project completion necessitates a decrease of scope and an increase in project cost. Moreover, the third relationship shows that if cost is reduced or in the event of pressure to reduce cost, it becomes necessary to reduce the scope and/or increase the time (Wyngaard, 2011). The figure below shows the triple constraints triangle also called the project management triangle or the iron triangle.

Project scope

Project scope refers to the specific tasks necessary to successfully complete a project. It involves defining a structured framework of deliverables for the project team while establishing clear boundaries for stakeholders (Hakoune, 2022). According to Landau (2023), scope encompasses the total work required to finalize a project. To create an effective project scope statement, well-defined objectives should be established and communicated to all team members and relevant stakeholders. However, the process is even more effective when team members actively participate in defining goals, deliverables, and timelines.

Triple Constraints Triangle



Source: (Kerzner, 2011)

One of the major things that affect the success of construction projects with regard to quality delivery is scope creep. Scope creep is difficult to spot because as the name suggests it comes on slowly. In other words, it creeps up on the project team. Scope creep is a scenario in which more work is needed than what was stipulated in the scope of works. In other words, the deliverables of the project go beyond the boundaries of the project (Daugherty, 2019). Therefore, project managers and team members must be sensitive to scope creep and should communicate quickly if additional works are required. Project teams must develop and share an effective and efficient communication plan (MacNeil, 2024).

Time of project delivery

Time refers to the completion of a project within the time frame stipulated in the contract without compromising quality and other requirements (McGinley, 2016). Time management in project delivery is very important because it has a direct impact on the scope and project cost. Project Time Management refers to the management of the timely completion of projects as well as the associated processes required. It involves establishing the project procedures, policies, and managing the project schedule, then the activities required to achieve the project deliverables are defined. Further, the next step in the process is to estimate the activity resources, durations and to develop the schedule. Finally, the schedule baseline is monitored to ensure that the planned schedule is achieved (PMBOK, 2000).

Cost of construction projects

Cost refers to the monetary amount or the value equivalent which is paid to perform or implement a project (PMBOK, 2000). Many projects incur cost escalations, especially construction projects. Cost escalation is a situation whereby the final costs exceed original estimates. Cost overruns occur when the actual expenses for a project exceed the initially planned budget (Choudhry et al., 2012). As noted by Abadie et

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al. (2013), the construction industry often faces challenges such as delayed project payments and scope creep, among other issues, leading to additional costs. To keep these overruns to a minimum, good project cost management is crucial. It involves four key steps: resource planning, cost estimation, cost budgeting, and cost control (Hexagon, 2024).

Steps under project cost management

Resource planning refers to the identification process of the resources required to deliver a project until it is completed such as people, materials and equipment among other things. Under the Work Breakdown Structure (WBS), the project team should create the activities and subtasks. After planning, the costs related to all the resources required to execute the project should be quantified. This is called cost estimation. The goal is to avoid or minimize the deviation between the estimated and actual costs (Hexagon, 2024). Many CDF construction projects in Mufulira constituency have not succeeded due to poor estimation of costs involved (Auditor General's Office, 2023). This is followed by cost budgeting which is basically attaching costs to the identified project individual tasks (PMBOK, 2000). The final step is cost control, the process of ensuring that the estimated project cost meets the actual costs incurred throughout the project lifecycle as well as taking corrective actions.

The Earned Value Analysis (EVA)

The earned value analysis (EVA) is an important analysis used to measure and control the performance as well as the progress of a project (Mohammad, 2019). The EVA compares the schedule and cost performance of a project to the real schedule and cost performance (PMBOK, 2000). Additionally, it helps monitor the project's progress from a comprehensive percentage standpoint. With it, one may compare the baseline project costs, the actual costs, and the anticipated expenses (Acebes, et al., 2013).

Benefits of TQM in construction projects

Effective implementation of Total Quality Management (TQM) in the construction industry offers numerous advantages, including increased employee awareness of quality, reduced waste, enhanced customer satisfaction, lower quality-related costs, timely project completion, improved organizational performance, stronger relationships among project teams and suppliers, and a competitive edge, among other benefits (Love et al., 2004). Research has consistently shown a positive correlation between TQM and project performance outcomes. In their study on the relationship between TQM, innovation performance, and quality performance, Projogo and Sohal (2003) also found that TQM positively impacts project quality performance.

TQM Implementation and Benefits in the Egyptian Construction Industry

A study conducted within the Egyptian construction industry explored ways to enhance TQM implementation. A comparative analysis was carried out on two contractors operating in Egypt—one local Egyptian contractor (Contractor A) and a Japanese contractor (Contractor B). The objective was to identify the challenges and benefits each company faced while applying for TQM. The study examined how both organizations implemented TQM and the tools they used to support their practices. Interviews and site visits to both contractors' project sites were conducted as part of the research (Elghamrawy & Shibayama, 2008).

Contractor A: The Egyptian Contractor

Contractor A is the local Egyptian contractor which is a construction company. Under contractor A the study researched on factors that caused failure to deliver good quality standards of construction projects (Elghamrawy and Shibayama, 2008). It was found that there was resistance from many stakeholders to implement TQM policies. They stated that TQM policies take several years to provide "payoffs" and so it would be a misdirection of resources (Pheng and Teo, 2004). But it was the non-application of TQM principles and programs that lead to costs of rework, errors, waste, customer complaints and time delays among other things.

The study also revealed that there was lack of full commitment of the CEO toward the quality management policies. Training programs were mostly directed to engineers with a focus on technical issues. The middle, top managers as well as the general workers were not included. Moreover, these biased training sessions were not even enough (Summerville and Robertson, 2000). The other problem was a lack of standardization of measuring and data collection tools and techniques. This explains the variation in quality levels that was experienced among the same projects (Elghamrawy and Shibayama, 2008).

Contractor B: The Japanese contractor

Contractor B is a Japanese contractor based in Egypt who has been performing very well in local construction projects. The study revealed the reasons this contractor performed extraordinarily well in quality management. Contractor B spent a lot of time studying projects specifications in order to deliver the projects exactly on time and to the required scope. The monitoring of projects was not done at predetermined long intervals but both the construction progress activities as well as the quality of materials were constantly monitored (Leghari and Shibayama, 2008). Hence, the approach was quality assurance. The Japanese success was partly due to their implementation of the TQM concepts and guidelines (Summerville and Robertson, 2000).

Application and Benefits of TQM in the Turkish Construction Industry

Ensuring acceptable levels of quality has long been a challenge in the construction industry (Shoshan & Celik, 2018). Compared to other sectors, the construction industry has been slower in adopting the Total Quality Management (TQM) approach, making its implementation crucial (Al-Musleh, 2010). A study was carried out in Turkey to investigate the implementation of TQM in the Turkish construction business in order to solve this issue.

The research explored both the benefits and critical success factors associated with TQM implementation. The study focused on five major cities in Turkey, from which 32 construction firms were randomly selected. The findings revealed that key factors contributing to high-quality project

delivery—meeting scope, schedule, and budget requirements—include strong leadership and commitment from top management, organizational culture, effective communication between leadership and workers, quality education, and active employee involvement (Shoshan & Celik, 2018).

TQM and the Construction Projects in Yemen

A study conducted in Yemen investigated the relationship between TQM and project performance, as well as the impact of TQM on construction projects. The findings indicated that effective TQM implementation enhances competitiveness, productivity, and quality. However, the study also revealed that TQM was largely absent in Yemen's construction industry. Further analysis demonstrated that applying TQM contributes to reduced project completion times, lower costs, and better project scope management. The key takeaways from TQM adoption in Yemen were its role in improving competitive advantage, productivity, and teamwork, among other benefits (Saeed & Hassan, 2012).

Theoretical framework

The theories of TQM discussed below have had much influence on the development of Total Quality Management in various organizations throughout the globe.

Deming's Quality Theory

W. Edwards Deming in the year 1986 stated that top managers must change the organizational culture and be involved in all stages of the improvement process, to motivate the rest of the organizational members (Deming, 1986). In the implementation of CDF construction projects some contractors tend to abandon projects and others do not meet the stipulated scope (Ashokkumar, 2007). So, to enhance good quality delivery Deming established the fourteen (14) steps for management. Some of the key steps which are relevant to this research include taking on appropriate leadership. Administrators of CDF projects should learn about quality management principles and techniques and thereby improve quality of CDF construction projects.

Another step is to stop depending on monitoring or inspections to achieve quality as stipulated under the CDF guidelines in Zambia (National Assembly of Zambia, 2012). Monitoring does not improve quality, the focus should be on 'quality assurance' (Dale, 2003). Then the practice of awarding businesses or contractors on the basis of price tag should stop. The next step is that barriers between departments should be broken to facilitate teamwork (Dale, 2003). To ensure good quality project delivery these departments should operate as a team in a coherent manner while still being independent because projects scope, time and costs are mutually dependent.

Juran's Quality Theory

Joseph Juran developed the Juran's Quality theory in 1999. In an organization, it argues that quality enhancement must be a component of management. In other words, quality management must not be treated separately from the daily management practices, it must be a culture. As such they are able to produce good quality deliverables consistently without burden (Juran and Godfrey, 1999). The Auditor General's Office (2023) revealed that 'some CDF construction projects in Mufulira district were not completed on time due to late release of funds by the finance department under Mufulira Municipal council'. This explains why quality management part of the organizational management must be because projects are run under parent organizations (Juran and Godfrey, 1999).

VIII. Research Methodology

Research approach

A deductive research approach was adopted for this study, as it follows a quantitative survey-based method. This approach involves reviewing existing literature and theories before testing hypotheses derived from them (Sheppard, 2020). A quantitative method was employed to collect and analyze data on the application of TQM principles in CDF construction projects, specifically in Mufulira Central Constituency. This method was chosen due to the large sample size and limited resources available. The study utilized structured delivery-and-collection questionnaires to administer specific questions. Quantitative research involves explaining a phenomenon by collecting numerical data and analyzing it using statistical or mathematical techniques (Aliaga & Gunderson, 2002, as cited in Apuke, 2017).

Strategy justification

The study utilized a survey research design, which facilitated the collection of quantitative data from the selected population through delivery-and-collection questionnaires (Sreekumar, 2023). This method was chosen because it allowed for data collection from a large population. Another reason for selecting this approach was the sensitivity of the study topic, as it pertains to CDF, making statistical representation preferable for respondents who value anonymity. Furthermore, the sample size was substantial, covering ten wards within the case study constituency (Lichtman, 2006).

Research paradigm

According to Ulz (2023), a research paradigm consists of the underlying beliefs and assumptions that shape a study's framework. The term paradigm is derived from the Greek word paradeigma, meaning "pattern," and was first introduced by Thomas McNamara (2006). This study adopted a positivist research paradigm, primarily due to the large sample size involved. Additionally, this paradigm was suitable given the sensitivity of the research topic related to CDF. The majority of survey participants would feel uneasy about providing information through interviews, among other methods. The positivist paradigm also applied well to this research because CDF is something many are familiar with. In this regard the positivist research is relevant because it leads to quantitative based study (Saunders et al., 2007).

Deductive approaches

This research intends to take a deductive approach because the TQM principles are hypothetically considered to bring

Chimungu Alex and Mweshi Geoffrey Kapasa, "Applying Total Quality Management Principles to Improve Supply Chain Performance and Project Quality of Constituency Development Funds in Zambia," *International Research Journal of Advanced Engineering and Science*, Volume 10, Issue 3, pp. 154-167, 2025.

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about good quality delivery of CDF construction projects. Quantitative research method uses statistical techniques for data analysis and is mainly deductive (Saunders et al., 2007). In essence, this approach moves from a broad perspective to a more specific focus. The study involved an in-depth review of existing literature and theories, followed by testing hypotheses derived from them (Sheppard, 2020). Consequently, the research utilized a survey design, incorporating a quantitative methodology due to the large sample size and resource constraints.

3.4 Sampling frame

The sample units were derived from MMC staff, contractors, CDF Committee (CDFC), Ward Development Committees (WDCs) and ward residents of Mufulira central constituency (Field Survey, 2023). According to the Zambia Statistics Agency Mufulira central constituency has a population of 93,070 people out of which 45,612 are males and 47,458 are females (ZSA, 2022). The populations of individual wards in the constituency are as follows: Bwananyina has a population of 17,683 people, Hanky Kalanga, 12,099, Mutundu, 7,446, Kawama, 12,168, Kamuchanga, 6,515, Kasempa, 7,259, Kansuswa, 9,307, Kafue, 1,607, David Lunda, 2,420, and Chachacha has 16,566 people (ZSA, 2022). The survey area will be Mufulira Central constituency. The choice of this sampling frame was influenced by the participant's proximity as well as varying demographics for reliability of the research. Out of the 93,070 residents of Mufulira central constituency, the sample size is calculated using the formula below as posited by Udofia (2011).

Where n = sample size, 1 = Unity; e = Level of significance = 0.05; N = Universe or population =93,070.

$$'n' = \frac{93{,}070}{1+93{,}070\ (0.05^2)}$$

Therefore, n' = 398. The total sample size for the residents of Mufulira central constituency is 398 residents.

Reliability

The consistency and stability of research results are referred to as reliability (Whittemore, Chase, et al., 2001). The Cronbach's alpha test, which was run using SPSS version 16, was used to evaluate reliability. The interpretation of Cronbach's alpha adheres to a conventional standard:

TABLE 1: Cronbach's alpha test under SPSS

Reliability Statistics	
Cronbach's Alpha	N of Items
.972	12

Source: (Field data, 2024)

The consistency and stability of research results are what constitute reliability (Whittemore, Chase, et al., 2001). The Cronbach's alpha test, using SPSS version 16, was carried out to determine reliability. The Cronbach's alpha test produced a score of 0.972, as shown in the table above, which demonstrates outstanding reliability:

IX. Findings and Analysis

Gender of respondents

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	236	65.9	65.9	65.9
	Female	122	34.1	34.1	100.0
	Total	358	100.0	100.0	

Source: (Field survey, 2024)

The portrays the gender distribution of respondents:

Age range of respondents

Participants were asked to specify their age range. The findings indicate that 21 out of 358 respondents (5.9%) were between 20-30 years old. A total of 112 respondents (31.3%) fell within the 31-40 age range, while 130 respondents (36.3%) were between 41-50 years old. Additionally, 95 respondents (26.5%) were aged 51 years and above. As a result, the oldest age range was between 41 and 50, while the youngest was between 20 and 30. Age is important in research to avoid bias because people's preferences and experiences vary with age groups. For example there is a high level of influence by peer pressure among the younger generation (Sandberg, 2016). The bar chart below shows the age ranges of respondents:

Academic qualifications of respondents

The findings on academic qualifications were that out of the 358 respondents 99 had grade 12 certificates as their highest academic qualifications representing 27.7% of the respondents, 53 respondents had certificates representing 14.8%, 104 respondents had Diplomas representing 29.1%. Then 90 had Bachelor's degrees represented by 25.1% and 12 had Masters Degrees represented by 3.4%. The academic qualifications of these respondents show that they are able to grasp the concepts in the questionnaires and analyze CDF issues responsibly. Personal and social characteristics of respondents such as academic qualifications have an important role to play in analyzing the influence of responses about the research problem (Gjonca and Calderwood, 2004). Table 4 below shows the Academic qualifications of respondents:

Roles of CDF Administrators in the constituency

The respondents were further asked to state what roles they played in the constituency. Identifying roles and other demographics helps researchers to analyze the association between variables and outcomes (Kamal, 2024). Moreover, it ensured that the responses were not biased. The figure below shows that out of the 358 respondents, Mufulira Municipal council (MMC) staff were 5 represented by 1.4%, the contractors were 7 represented by 2%, the CDF Committee members and WDCs were 8 members each group represented by 2.2% while the Ward residents were 330 respondents represented by 92.2%.

Assessment of findings and analysis for each instrument

Application of TQM principles in CDF construction projects

Respondents were asked whether Total Quality Management (TQM) principles are applied in the execution of CDF construction projects in Mufulira Central Constituency. The responses are summarized in Table 5 below.

Chimungu Alex and Mweshi Geoffrey Kapasa, "Applying Total Quality Management Principles to Improve Supply Chain Performance and Project Quality of Constituency Development Funds in Zambia," *International Research Journal of Advanced Engineering and Science*, Volume 10, Issue 3, pp. 154-167, 2025.

Application of TQM principles in CDF construction projects

S/No.	Application of TQM Principles	SA	A	Neutral	D	SD	Mean	Std. Dev
1	Education and training workshops	10	36	30	166	116	2.04	1.031
2	Use of quality management tools and techniques	10	49	11	151	137	2.01	1.103
3	Cultural change	7	41	28	162	120	2.03	1.024
4	System approach to management of CDF construction projects	57	17	7	115	162	2.14	1.443

Note: Grand mean= 2.06, N= 358, SA= Strongly agree, A= Agree, D= Disagree, SD= Strongly disagree
Source: (Field survey, 2024)

The findings show that application of the principle of education and training workshops bears a mean of 2.04 which is less than the grand mean of 2.06. Moreover, findings on the application of quality management tools and techniques and cultural change programs have means of 2.01 and 2.03 respectively which are both less than the grand mean. Therefore, findings reveal that most respondents disagree that education and training workshops, use of quality management tools and techniques and cultural change programs are applied in the delivery of CDF construction projects. However, most respondents agreed that the system approach to management of CDF construction projects is applied. This is depicted by the corresponding mean of 2.14 which is above the grand mean. In a similar study in Egypt the adoption of TQM policies were considered a waste of resources (Pheng and Teo, 2004).

Extent of Application of TQM principles in CDF construction projects

Further, respondents were requested to indicate the extent to which TQM principles are incorporated into the execution of CDF construction projects.

Extent of Application of TQM principles in CDF construction projects

S/No.	Descriptive statistics	Mean response	Percentage	Rank
1	Education and training workshops on TQM principles	2.31	46%	2
2	Use of quality management tools and techniques	1.97	39%	3
3	Cultural change	1.81	36%	4
4	System approach to management of CDF construction projects	2.59	52%	1
	Overall Extent of Application of TQM principles		**43%**	

Note: Grand mean= 2.17
Source: (Field survey, 2024)

The data in the table emphasizes the different degrees to which the TQM principles are used in the execution of CDF building projects. The first ranked principle that was in application was the system approach to management of CDF construction projects at a mean response of 2.59 at 52%, this is followed by education and training workshops on quality management at a mean response of 2.31 at 46%. Moreover, the third ranked TQM principle was the use of quality management tools and techniques at 39% represented by a mean of 1.97. The fourth which is the least ranked principle that was applied was the cultural change of stakeholder's attitudes, behaviors and workings practices at a mean response of 1.81 represented by 36%. The overall extent of application of TQM principles is 43%. A similar study conducted in the construction industry in Turkey reveals that the construction industry has lagged behind the other industries in adopting TQM (Al-musleh, 2010).

Benefits of using TQM principles on CDF construction projects

The findings on the benefits of using TQM principles on CDF construction projects are revealed in table 7 below:

Benefits of using TQM principles on CDF construction projects

S/No.	Descriptive statistics	Mean response	Percentage	Rank
1	Benefits of education and training workshops on TQM principles	4.07	81%	2
2	Benefits of using quality management tools and techniques on CDF construction projects	4.08	82%	1
3	Cultural change	3.95	79%	4
4	System approach to management of CDF construction projects	4.00	80%	3
	Overall Benefits of Application of TQM principles		**81%**	

Note: Grand mean= 4.03
Source: (Field survey, 2024)

Most respondents agreed that there are significant benefits of applying TQM principles on the delivery of CDF construction projects. The findings show that the overall benefits are estimated at 81%. The highest ranked TQM principle to yield the highest benefit is the use of quality management tools and techniques on CDF construction projects with a mean response of 4.08 at 82%. This is followed by the implementing education and training workshops with CDF stakeholders with a mean of 4.07 at 81%, then the system approach to management of CDF construction projects with a mean response of 4.00 at 80%. The least beneficial TQM principle is the bringing up of cultural change of all stakeholders attitudes, behaviors and working practices with a mean of 3.95 at 79%.

The literature review shows that similar findings were obtained in a comparative analysis of two contractors that were working in Egypt. The contractors under study included a local Egyptian contractor (contractor A) and a Japanese contractor (contractor B). These contractors were both located

Chimungu Alex and Mweshi Geoffrey Kapasa, "Applying Total Quality Management Principles to Improve Supply Chain Performance and Project Quality of Constituency Development Funds in Zambia," *International Research Journal of Advanced Engineering and Science*, Volume 10, Issue 3, pp. 154-167, 2025.

and operating in Egypt. The aim of the case studies was to examine how each organization implemented TQM and what tools were being used to promote good quality outcomes. Contractor A was not performing so well with regard to good quality delivery of projects because there was resistance from many of its stakeholders to implement TQM principles. On the other hand due to TQM implementation, Contractor B had been performing very well in delivering local construction projects in terms of time of projects completion, cost and adherence to scope among other benefits (Elghamrawy and Shibayama, 2008).

Hypothesis tests: Application of TQM principles in CDF construction projects

As previously mentioned, the hypothesis (H1) proposes that implementing TQM principles in the execution of CDF construction projects in Zambia will lead to high-quality project delivery in terms of scope, cost, and schedule. Conversely, the null hypothesis (H0) asserts that applying TQM principles in CDF construction projects in Zambia will not result in improved quality regarding scope, cost, and schedule. The correlation analysis is presented in Table 8 below.

Correlation analysis

Correlations

		TQM principles	Good quality CDF construction projects
TQM principles	Pearson Correlation	1	.435**
	Sig. (2-tailed)		.000
	N	358	358
Good quality CDF construction projects	Pearson Correlation	.435**	1
	Sig. (2-tailed)	.000	
	N	358	358

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

The bivariate analysis in SPSS, as presented in Table 8, indicates a positive correlation between the implementation of TQM principles and the successful delivery of CDF construction projects, with a Pearson Correlation value of 0.435. Additionally, this relationship is statistically significant, as the probability of a spurious correlation (0.000) is below the 0.05 threshold. Similar findings were reported in Chapter Two (literature review), referencing a study conducted in Yemen that examined the correlation between TQM and project performance. The study concluded that effective TQM implementation enhances competitiveness, productivity, and quality. Further analysis demonstrated that applying TQM positively impacts project completion time, costs, and scope (Saeed & Hassan, 2012).

4.2.1 Chi-Square Tests

Table 9: Chi-Square Tests

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.278E2[a]	135	.000
Likelihood Ratio	431.639	135	.000
Linear-by-Linear Association	67.631	1	.000
N of Valid Cases	358		

a. 145 cells (90.6%) have expected countless than 5. The minimum expected count is .00.

Since the Pearson Chi-Square value is .000 which is less than the standard cut value 0.05, the null hypothesis (H0) is rejected, and the alternative hypothesis (H1) is accepted.

Regression analysis

Regression analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.435[a]	.189	.187	.58307

a. Predictors: (Constant), Application of TQM principles

The R Square value (coefficient of determination) presented in Table indicates that 18.9% of the variations in the quality performance of CDF construction projects can be attributed to the implementation of Total Quality Management (TQM) principles. These principles encompass education and training, the utilization of quality management tools and techniques, cultural transformation, and a system approach to management.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.848	.065		59.529	.000
	Application of TQM principles	.246	.027	.435	9.122	.000

a. Dependent Variable: Good quality delivery of CDF projects

Table above shows that the application of TQM principles has a positive relationship to good quality delivery of CDF construction projects indicated by the unstandardized B coefficient (.246). The B coefficient reveals that if the application of TQM principles increases by 1-unit, good quality delivery of CDF construction projects will increase by .246 units. In other words, 24.6% of the application of TQM principles can predict good quality delivery of CDF construction projects. Moreover, the relationship is also significant because the Sig. value (.000) is less than the standard cut value 0.05 (.000< 0.05). Since the Sig. value or P-value is less than 0.05, the null hypothesis (H0) is rejected.

Assessment of validity

Validity of the measuring instruments quality refers to the accuracy and effectiveness of the data collected (Wilson (2014). Validity of research is also explained as the extent to which the requirements of scientific research have been followed during the process of gathering the findings of research. For all kinds of studies undertaken the assessment of validity is an important requirement (Kombo and Tromp, 2006). In this study the internal validity assessment was adopted, and it was found that the data collected was valid. The SPSS v.16 package was used to assess validity and the rule of thumb for validity is that the total significance level should be no more than or not less than 0.05 (George and Mallery, 2003).

Assessment of reliability

Chimungu Alex and Mweshi Geoffrey Kapasa, "Applying Total Quality Management Principles to Improve Supply Chain Performance and Project Quality of Constituency Development Funds in Zambia," *International Research Journal of Advanced Engineering and Science*, Volume 10, Issue 3, pp. 154-167, 2025.

This refers to the stability and consistency of a data collection instrument, ensuring that it yields the same results when used on the same subject under identical conditions (Thatcher, 2010). The internal consistency of the questionnaire was evaluated in this study using Cronbach's alpha. The following is how Cronbach's alpha values are interpreted, according to George and Mallery (2003): values over 0.9 denote exceptional reliability, values over 0.8 denote high reliability, and values over Above 0.7 is considered acceptable, between 0.6 and 0.7 is questionable, between 0.5 and 0.6 is bad, and below 0.5 is thought to be unacceptable. The reliability test conducted in this research produced a coefficient of 0.972, indicating a high level of reliability, as illustrated in Table 13.

Assessment of reliability

Reliability Statistics	
Cronbach's Alpha	N of Items
.972	12

Source: (Field survey, 2024)

X. Conclusion and Recommendations

RO1: Application of TQM principles in CDF construction projects

From the findings by the respondents, it can be concluded that to a large extent TQM principles were not applied in the delivery of CDF construction projects. These TQM principles which are relevant to CDF construction projects but not applied include: education and training workshops, use of quality management tools and techniques and cultural change programs. However, the system approach to management of CDF construction projects was applied. Although the system approach to management principle was applied, there was apparently a lack of consistency in relevant stakeholders working as a team in CDF projects delivery.

The research recommendation is that top management stakeholders of CDF projects should introduce education and training programs about TQM. All CDF construction projects stakeholders should receive education and training programs about TQM. Moreover, TQM steering committees should be formed to ensure adherence to TQM principles. Many scholars have found that there is a positive relationship between the application of TQM principles and good quality delivery of construction projects (Low and Jasmine, 2004).

RO2: The extent to which TQM principles are applied

The overall extent to which relevant TQM principles were applied in the delivery of CDF construction projects in Mufulira Central Constituency stands at 43%. To enhance the extent of applying TQM principles, the author recommends the use of the Deming's quality theory. W. Edwards Deming argues that top managers must change the organizational culture and be involved in all stages of the improvement process (Deming, 1986). If top management in a project or organization is not committed, the rest of the organizational members do not take their responsibilities and tasks seriously (Dale, 2003). This has been the case in the implementation of CDF construction projects. Some contractors tend to abandon projects and others do not meet the stipulated scope. Apparently, if top CDF administrators formulate penalties to such contractors, then there is going to be seriousness in the delivery of CDF projects (Ashokkumar, 2007).

Moreover, adopting the Juran's quality theory is recommended to improve the extent of applying TQM principles. According to Joseph Juran, quality improvement should be a fundamental component of a company's management. In other words, quality management should be a culture and should not be considered distinct from routine management procedures (Dale, 2003). The Auditor General's Office (2023) revealed that 'some CDF construction projects in Mufulira district were not completed on time because of the late release of funds by the finance department under Mufulira Municipal council'. This explains why quality management part of the organizational management must be because projects are run under parent organizations. This explains the 'triple constraints of quality' discussed in chapter two.
Research also recommends the introduction of TQM workshops to ensure that TQM principles and quality techniques are used to achieve the good quality CDF construction projects. Then TQM steering committees should be formed to ensure that the good quality projects are delivered.

RO3: Benefits of TQM principles in delivering CDF construction projects

Based on the findings, the overall benefits were found to be at 81%. Since there are essential benefits in applying TQM principles, obviously the recommendation is to apply them. But there is need to be tactful in implementing quality education. The stakeholders of CDF construction projects should be motivated by the relevant findings from this and other studies that there is a positive correlation between good quality delivery of construction projects and TQM principles application as Elghamrawy and Shibayama (2008) also states.

The Deming's quality theory should be adopted. As Deming suggests, CDF administrators should refrain from relying on project inspections to achieve quality. The CDF guidelines in Zambia provides that CDF projects shall be monitored at a frequency dependent on the nature, scope or type of project (National Assembly of Zambia, 2012). However, monitoring only reveals the flaws in quality; it does not enhance quality on its own. Hence, the author recommends 'quality assurance' as alluded to in chapter two. In quality assurance, quality is incorporated under all project life stages from project identification to completion. Therefore, as the name suggests, quality is assured.

Then the local authorities must refrain from awarding contractors on the basis of price tag. Moreover, to facilitate teamwork and promote the system management approach, barriers between departments should be broken (Dale, 2003). Various departments of local authorities are involved in the management of CDF construction projects. These include finance and procurement which are responsible for managing of CDF project costs. The audit, engineering and planning which deal with projects scope and schedule. There is need for these departments to operate as a system in a coherent manner

Chimungu Alex and Mweshi Geoffrey Kapasa, "Applying Total Quality Management Principles to Improve Supply Chain Performance and Project Quality of Constituency Development Funds in Zambia," *International Research Journal of Advanced Engineering and Science*, Volume 10, Issue 3, pp. 154-167, 2025.

while still being independent to ensure good quality project delivery. This is because projects scope, time and costs are mutually dependent.

According to Dale (2003) without the participation of everyone in the organization quality improvement cannot be achieved. Therefore, if the benefits must be realized, everyone must understand well the relevant TQM principles, how to apply them and other quality techniques and tools.

Practical implications of findings/recommendations

The research findings on the application of TQM principles are that both the application as well as the extent to which the principles are applied are generally very poor. This implies that if nothing is done the same trend of poor-quality delivery of CDF construction projects in terms of time, costs and scope will continue. The following considerations should be taken into account:

1) CDF construction project contractors must receive relevant training via workshops in quality management before being given authority to implement the projects;
2) TQM steering committees should be formed to ensure good quality implementation of CDF construction projects throughout the projects lifecycles. The steering committee should have authority to charge nun-complaint CDF stakeholders;
3) CDF contractors of construction projects should be jailed or refund the money back if they fail to meet the stipulated quality requirements;
4) Standardized quality management tools and techniques should be used in the management of CDF construction projects;
5) Quality control, which is quality results oriented, should be replaced by quality assurance, which is a proactive approach.

Managerial implications of findings/recommendations

In order to reduce project costs, delivery time and improve the quality of project implementation through the application of TQM principles, there should be deliberate policies or guidelines to authorize CDF projects stakeholders to apply the principles. The following considerations should be taken into account:

1) The ministry of local government and rural development (MLGRD) should create deliberate policies and revise the CDF guidelines on management of CDF construction projects that contractors must receive TQM training as a passport to implement the CDF projects;
2) The ministry of local government and rural development (MLGRD) should revise CDF guidelines to include creation of steering committees to ensure good quality projects delivery and should have authority to charge nun-complaint CDF stakeholders;
3) All CDF construction projects stakeholders should receive TQM training through workshops as a requirement to be part of the CDF administrators/managers;
4) The MLGRD should revise CDF guidelines to include use of standardized quality management tools and techniques in the management of CDF construction projects;
5) Top level managers/supervisors of CDF projects should encourage quality assurance which is a proactive approach as opposed to just monitoring of projects. This should be part of the guidelines.

Conclusions

Although TQM principles are not applied in the delivery of CDF construction projects to a great extent, the respondents agreed that there are significant and positive benefits of applying the TQM principles and quality techniques in the delivery of good quality CDF construction projects. To achieve this there is need to create deliberate policies and guidelines on management of CDF construction projects. The ministry of local government and rural development (MLGRD) and other top-level stakeholders should introduce education and training programs to equip CDF stakeholders with relevant tools and techniques to be applied in the delivery and management of these projects. Then TQM steering committees should be formed to ensure that quality tools and techniques are applied at all levels of the projects lifecycles. In addition, it is critical to bring about a cultural shift in order to alter stakeholders' attitudes, actions, and practices in relation to CDF construction project management. Such practices should involve a system approach to management.

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