A FRAMEWORK FOR INCORPORATING QUALITY INTO LOW-COST HOUSING PROJECTS IN SOUTH AFRICA

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Abstract

The South African constitution (1996) Article 26(1) enshrines everyone has the right to have access to adequate housing” to its citizens. However, over the years in the post-apartheid government a focus has been on quantitative low-cost housing delivery and less on the quality of these houses. Notwithstanding challenges that citizens encountered, limited research has been conducted on quality management practices in the South African low-cost housing industry. The purpose of this paper is to suggest a framework that could be applied in the industry and discuss how best quality practices could be implemented in the low-cost housing construction industry. A literature review was conducted on the application of quality in the construction of low-cost housing in South Africa. This was done through analysis of media reports, published articles, legal disputes and others. Although South Africa has established well-functioning quality management systems in other industries, low-cost housing has never been a focus. The primary emphasis is still on quantity and very limited on quality. Contractors perceive quality as a peripheral issue and afford less attention to its value. The framework in this study encapsulates policy issues, customer needs, strategy approaches and others.

Keywords: Quality, construction contractors, low-cost housing, South Africa

1. INTRODUCTION

According to Section 26 of the Constitution of the Republic of South Africa (1996), everyone has the right to “access adequate housing”; constitutional right guarantees us access to basic needs and enforces minimum standards but does not address the basic quality of the product. While important, addressing the supply of adequate housing alone is not sufficient to improve the well-being of families. Rather, quality housing should be seen as a foundation for creating strong, stable communities; requiring comprehensive investments to create the kinds of neighbourhoods in which families can thrive. The South African government is the single biggest housing client; its goal is to build 300,000 houses a year with a minimum of one million low-cost houses to be constructed within five years. Notwithstanding, the government’s focus is on quantitative housing delivery with qualitative shortcomings, however the focus has now shifted to the quality of the product. Many recipients of low cost houses receive a defective product that does not conform to quality requirements due to poor workmanship which manifest through cracks, water leaks etc. A continuous quality monitoring system is required, to ensure that quality is incorporated into the house being built in order to protect the rights of the recipients of low cost houses. Quality start by understanding customer requirements and transforming those requirements into an output (product/service) that will satisfy the customer, quality is fitness for purpose (Juran,
1992), a degree to which a set of inherent characteristics fulfils requirements—need or expectation (ISO 9000, 2005). In construction, quality is defined as a totality of features required by a product or service to satisfy a given need (Chan and Chan, 2004), it focuses on eliminating defects and variations and seeks to avoid waste of time, materials, and financial resources due to rework (Love, Edward & Smith, 2005: 197). It is said that quality has the potential to not only increase competitiveness and organizational effectiveness but also improve product quality and organizational performance (Ahire et al., 1996). The primary objective of this article is to suggest a framework that could be applied in the industry and to discuss how best quality practices could be implemented in the low-cost housing construction industry in South Africa.

2. LITERATURE REVIEW

2.1. Quality management in the construction industry

The construction industry in general operates in a uniquely project-specific and complex environment, combining different investors, clients, contractual arrangements and consulting professions. If the quality of the final product is poor, it also puts the safety of the end users at risks, eventually it impacts directly on communities and the South African public at large. Improved efficiency and effectiveness in construction will enhance quality of the final product, productivity, health, safety, environmental outcomes and value for money (Marx, 2012: 2). Cost, time and quality are the three basic and most important performance indicators in construction projects followed by others such as safety, functionality and satisfaction (Chan and Ada, 2004). Construction labours tend to focus more on the number of hours worked and quantity of work done rather than the quality of work executed. In regard to this, all stakeholders involved in construction projects have a role to play in order to deliver a quality product. Construction impacts the quality of life for building facilities and plays a major role in a nation’s economy and development. Construction sector is globally considered to be a basic industry on which the development of a country depends (Faroqui, Masood and Aziz, 2008). To a great extent, the growth of a country and its development status is generally determined by the quality of its infrastructure and construction projects.

Therefore, in order for construction clients and end users of completed facilities to realize best value, the concept of quality culture must be stressed in the industry to improve the quality of product and services (Idrus & Sodangi, 2010). The willingness to change the quality culture and the commitment of top management towards quality will determine the success of total quality management in the industry (Isik, Arditi, Dikmen and Birgonul, 2009).

In order to implement an infrastructure project effectively and efficiently, the construction enterprise must adopt a management system that will serve as guide to ensure that projects are successfully completed within the constraints of best quality, on time schedule, and at the minimum cost possible (Juanzon, 2015:186).

In developing a total quality culture in construction, one important step is to develop a construction team who would commit to the quality process and develop a true quality attitude. Even if dealing with subcontractors, the main contractor should only select subcontractors who have demonstrated quality attitude and work performance on previous jobs (Pheng & Teo, 2004:8). Quality in construction projects should involve obtaining the commitment of the client to quality, generating awareness, staff participation and motivation, developing a quality culture, developing a process approach, preparing project quality plans for all levels of work, measuring performance and instituting continuous improvement (Low & Peh 1996:40). Management of construction companies are focusing on quality issues as a competitive edge. Delivering projects that satisfy client requirement has become a main priority in maintaining good business relationships (Juanzon, 2015:186). TQM can be used by construction firms to fulfil customers’ expectations and requirements, and be competitive (Al-Sehali, 2001).

The primary objective of implementing a qual-
ity management system (QMS) is to help an organization demonstrate its ability to meet customer requirements. Many companies implement QMS as an initiative to solve quality problems, to meet the needs of the final customer, to reduce “cost of poor quality”, to achieve on time and within budget project completions, and to maintain well informed and highly motivated team of staff. The benefits of implementing a quality management system include improvement in "bottom line" profit, improvement in productivity, better efficiency, cost reduction, reduced waste, improved service delivery, promotion and standardization of good working practices, effective management of risks, greater marketing appeal and improved public relations (Mitra, 1993:13).

The difficulty in defining quality is to translate future needs of the user into measurable characteristics, so that a product can be designed and turned out to give satisfaction at a price that the user will pay (Deming, 1986). Al-Musleh (2010:14) defines quality as perfection through control, accuracy, and completeness whereas Drucker (1985) states that quality in a product or service is not what the supplier puts in, but it is what the customer gets out and is willing to pay for. The core of a total quality approach is to identify and meet the requirements of both internal and external customers. Quality is simply meeting customer requirements, it is perceivable; it is a measurable move from mere satisfaction to delight and reputation for excellence. By consistently meeting customer requirements, we can move to a different plane of satisfaction – delighting the customer. There is no doubt that many organizations have so well ordered their capability to meet their customers’ requirements, time and time again, that this has created a reputation for ‘excellence’ (Oakland, 1995:4). According to Manders (2015), previous studies on the impact of QMS revealed that the majority of scholars found the positive effect of QMS on projects.

2.2. Challenges related to low-cost houses in South Africa

All houses built are to conform to the building standard. Defects within new buildings are areas of poor quality and non-compliance with the Building Code published with acceptable tolerances and standards.

Various researchers give a number of reasons for the causes of poor quality housing. (Hollard, Montgomery-Smith and Thomas, 1992) categorized problems surrounding the achievement of quality in building into two broad areas: design and construction. (Cook and Hinks, 1992) summarizes the factors that are responsible for structural instability in building structures as: improper soil investigation; inadequate design; unforeseeable loading; unforeseeable environmental conditions; use of substandard materials; poor supervision; poor workmanship and inadequate maintenance. The Building Research Establishment (BRE, 1977) also attributes the causes of structural defects in buildings to faulty designs and poor quality of construction. According to BRE, 50% of all failures are caused by faulty design, 35% due to poor construction, 12% due to poor quality supplies and 11% due to misuse of the building. (Page and Murray, 1996) highlighted the primary reasons for occurrence of structural failures as unforeseeable ground conditions; lack of proper site investigation; unforeseeable loadings; inadequate design; poor detailing; faulty workmanship and/or poor supervision of construction; use of inferior materials and lack of maintenance. The government has encountered a number of challenges in this program. (Dlodlo, 2011) mentioned that the quality of the houses has been a big issue. The contractors who are involved are not always competent to carry out the tasks in building trades. South Africa suffers a deficit when it comes to building trade artisans such as bricklayers, plumbers etc. As a result, the service that some contractors have rendered has been inadequate resulting in the construction of poor quality houses. The result is that the government has had to rectify such poor workmanship in many of the municipalities. Rectification of such poor workmanship has had a huge financial impact. It actually means financial resources planned for further housing development have to be diverted to finance the rebuilding of such poor constructed houses. The challenges also include...
poor design of houses; houses that are environmentally unsound; houses that are not suitable to the local climate, and houses that entail high maintenance costs.

Street protests in most townships, for example recently in Protea Glen in Soweto where two people lost their lives due to severe hailstorm and strong winds which wreaked havoc damaging 3.152 households have left people doubting the capacity of government’s housing agency to enforce proper construction standards.

Apart from poor workmanship, some housing building programs are rarely completed on time. This delay has affected contractors as well as the government since there is always budget overruns. Housing Projects are not completed and handed over on time. The Ministry of Human Settlements has spent more than R2 billion over the past three years to fix low cost houses that had been poorly built by contractors. A Statistics SA General Household Survey conducted between 2002 and 2010 revealed that 31 percent of 1.8 million people who received low cost houses regarded them as substandard and uninhabitable. A subsequent national survey in 2011 found that 17 percent of low cost house owners complained about the walls and 18 percent about the roof. Ever since, the government has every year engaged in this damage control exercise to rebuild the houses throughout the country: a total 7 450 units in 2011/12; 9 177 in 2012/13 and 10 507 units in 2013/14 (Makatıle, 2015).

The National Home Builder’s Registration Council (NHBRC) is a statutory body that aspires to achieve quality in low income housing so as to protect home owners who occupy homes within the sector; they have identified quality related problems in the housing sector, which include amongst others:

- Structural
- Poor workmanship;
- Structural
- Use of substandard building material, and
- No on-site quality control and supervision.

2.3. Improvement initiatives

Literature review related to improvement initiatives in the construction industry revealed similar aspects. (Zunguzane, 2012) proposed that project monitoring and inspections during the construction phase should be ensured by project stakeholders such as municipal inspectors and NHBRC officials; there should be a set of uniform standards to be adhered to by all contractors involved in the provision of low-income houses; low-income housing projects should be awarded to competent contractors: contractors’ experience and capability should be evaluated before the contract is awarded. (Al-monami, 2000) proposed that construction companies should use quality planning, employee’s satisfaction and quality systems to improve their performance. (Emuze et al, 2012) recommended that low income housing delivery in South Africa may be improved by making sure that all parties involved in the process are quality focus. Quality focus should entail total quality management of all processes, from the design stage to the construction stage. To avoid dissatisfaction with the final product, where possible, the client (government) should involve the end user (house recipient) and should endeavour to lead the quality improvement drive. The need to expedite housing delivery because of huge backlogs should not be allowed to form the basis for building poor quality low income houses.

An extensive literature survey has been carried out by (Metri, 2005) to look at TQM frameworks. Various TQM frameworks have been established, this has helped identify a set of critical factors for successful quality management implementation in construction projects. Critical success factors (CSFs) consist of activities, which must be completed to achieve the organizational vision and objectives. For the purpose of this study, in total, fourteen important TQM frameworks viz. Deming prize, MBNQA, EQA, Saraph et al., Oakland, Flynn et al., Babbar and Aspelin, Ahire et al., Black and Porter, Pheng and Teo, Ang et al., Zhang et al., Nwabueze and Thiagarajan et al., were chosen from the TQM literature for the purpose of establishing TQM CSFs for incorporating quality into low cost housing. A detailed analysis.
of the frameworks with respect to CSFs is carried out and presented in Table 1. The analysis of Table 1 & 2 revealed that 13 out of the 14 frameworks have three CSFs in common: process management, education and training, and customer satisfaction. The analysis further revealed that 11 out of the 14 frameworks have four CSFs in common, viz., top management commitment, supplier quality management, employee empowerment and involvement and information and analysis. The strategic quality management and design quality management CSFs have their presence in nine and eight frameworks respectively. Quality culture, CSF, however, occurs only in the Black and Porter framework (Black and Porter, 1996). However there is ample evidence from the literature on the culture and success of quality initiatives. Most researchers have emphasised the importance of organizational culture for the implementation of quality initiatives in their studies. Culture is more powerful than anything else in the organization. Culture, "how we do things around here in order to succeed," is an organization’s way of behaving, identity, pattern of dynamic relationships, "reality,"or genetic code (Schneider, 1994). It has everything to do with implementation and how success is actually achieved. No management idea, no matter how good, will work in practice if it does not fit the culture. Therefore, according to the analysis quality culture is considered as one of the important CSFs of TQM. The other CSFs (namely, business results, impact on society & environment, benchmarking, resources and statistical process control) are presented in very few frameworks (Table 1 ). Benchmarking and statistical process controls are the techniques used normally for the process improvement. Hence in the real sense they are not considered as CSFs. They are part of the process management CSF. It is a well-known fact that business results are the outcome of the above-mentioned nine important CSFs. Hence it is wise to consider them as a CSF. Similarly, impact on society and environment, and resources are mainly a part of top management commitment and partially other CSFs will take care of them.

Thus, the examination of TQM frameworks has revealed that not all the frameworks are comprehensive, but in many respects these frameworks complement one another. Therefore, blending salient features of these frameworks by identifying the most popular quality elements as well as examining their impact in the construction industry is the best approach for the establishment of critical factors for incorporating quality into low cost housing. The following ten CSFs have emerged out of the above analysis:

1. Top management commitment
2. Quality culture
3. Strategic quality management
4. Design quality management
5. Process management
6. Supplier quality management
7. Education and training
8. Empowerment and involvement
9. Information and analysis

3. PROPOSED FRAMEWORK: A STRATEGY FOR INCORPORATING QUALITY IN LOW COST HOUSING

The rationale for developing a framework is that it provides the structure for launching quality initiatives in a planned manner and offers step-by-step guidance on how to proceed if a set of goals is to be achieved. The advantage of having such a tool is, therefore, that it can be used to develop plans for improvement at each stage of the construction process and to programme the allocation of resources and personnel. A framework should cover the whole process and be useful for both building and civil engineering projects (Delgado-Hernandez and Aspinwall A, 2008). In constructing the framework, the literature related to quality in construction (housing) was reviewed and categorized into four items in order to address the question ‘How to incorporate quality in low cost housing?’ Based on the critical success factors discussed in the previous section, the proposed framework will consist of three main levels:

1. Management Commitment, to establish the quality policy, objectives, give direction, mission and vision of the company
2. Construction Phases
### Table 1: Analysis of TQM Frameworks

<table>
<thead>
<tr>
<th>TQM frameworks</th>
<th>Critical success factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deming prize (2004)</td>
<td>X X X X X X X X X X X X</td>
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<tr>
<td>MBNQA (2004)</td>
<td>X X X X X X X X X X X</td>
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<tr>
<td>EQA(2004)</td>
<td>X X X X X X X X X X X X</td>
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<tr>
<td>Saraph et al (1989)</td>
<td>X X X X X X X X X X</td>
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<tr>
<td>Oakland (1993)</td>
<td>X X X X X X X X X X</td>
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<tr>
<td>Flynn et al. (1994)</td>
<td>X X X X X X X X X</td>
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<tr>
<td>Babbar and Aspelin (1994)</td>
<td>X X X X X X</td>
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<td>Ahire et al. (1996)</td>
<td>X X X X X X X X X X X</td>
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<tr>
<td>Black and Porter (1996)</td>
<td>X X X X X X X X X</td>
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<tr>
<td>Pheng and Wei (1996)</td>
<td>X X X X X X</td>
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<tr>
<td>Ang et al. (2000)</td>
<td>X X X X X X X X X</td>
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<tr>
<td>Zhang et al. (2000)</td>
<td>X X X X X X X X X</td>
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<tr>
<td>Nwabueze (2001)</td>
<td>X X X X X X X X X</td>
</tr>
<tr>
<td>Thiagarajan et al (2001)</td>
<td>X X X X X X</td>
</tr>
</tbody>
</table>

*Source: Metri, 2005

*Note: 1 - Top management commitment; 2 - Strategic quality management; 3 - Process quality management; 4 - Design quality management; 5 - Education and Training; 6 - Supplier quality management; 7 - Customer satisfaction; 8 - Employee empowerment and involvement; 9 - Business results; 10 - Information and Analysis; 11 - Benchmarking; 12 - Resources; 13 - Impact on society and environment; 14 - Statistical process control; 15 - Culture.

### Table 2: Prioritisation of Critical Success Factors

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Critical Success Factors</th>
<th>Frequency of Occurrence</th>
<th>Prioritised Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Process management</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Education and Training</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Customer satisfaction</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Top management commitment</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Supplier quality management</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Employee empowerment and involvement</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Information and Analysis</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Strategic quality management</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Design quality management</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>Business results</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>Impact on society and environment</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>12</td>
<td>Benchmarking</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>13</td>
<td>Resources</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>14</td>
<td>Statistical process control</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>15</td>
<td>Quality Culture</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>
and Operational Control, each stage of the process is supported by quality control and improvement initiatives. Resource management to support the operation, this level consists of processes such as involvement of people, finance, technology etc.

3.1. Management Commitment

Literature evidence suggests that one of the biggest problems facing organizations is the lack of commitment by top management. Genuine commitment only happens when top management have a clear appreciation of a positive benefit / cost ratio. Leaders establish unity of purpose and direction of the organisation; they should establish a customer focused vision and maintain the internal environment in which people can become fully involved in achieving the organisation’s objectives. Top management should ensure that quality is entrenched in the organization, they should participate in quality meetings, formulate and establish quality policies and objectives, provide resources and training, oversee implementation at all levels of the organization and take overall ownership of the quality management system. To implement TQM successfully, top management must first believe in it, they also have to demonstrate it by commitment. Management commitment must be driven by a strong desire to improve the quality of products produced by the company. (Yasamis et al, 2000) argued that quality conscious companies have a strong culture, which is helpful for customer satisfaction.

What is evidence of genuine commitment? As depicted in (Figure 1 : Proposed framework), management must establish a quality policy, this is the peak document of the quality system – a declaration of intent / a statement of commitment to delivering quality products and services to the customers. The policy should be reviewed at least annually, and updated as necessary. Most importantly, it should be shared and communicated with everyone in the organisation. According to (Seaver, 2001), the quality policy plays a key role in corporate quality. From the customer perspective the quality policy may be the only evidence that customers will have, prior to setting up a working relationship with a company, about its commitment to providing both corporate and product/service quality. He argued that organisations should aim to exceed customer expectations (delight customers) and that the quality policy should be a reflection of management commitment and how a company aims to satisfy customer requirements and expectations. Consequently, in the framework under development, the quality policy can be considered as a good indicator of the awareness within the low-cost housing construction companies, which in turn reflects management commitment to quality.

3.2. Construction phases

The second levels consist of the stages involved in the construction process and how the operation is managed and controlled. The construction activities have been broken down into sub activities. Once the client has given approval on a project, a construction company is approached to carry out the work. The customer will supply requirements, the appointed construction company analysis the requirements and define the project with regard to: location, project plan, budget, time frame and other relevant features.

At this stage it is important to gather as much information as possible from the customer and if possible the end users (the recipients of low income houses) should also be involved when the specification for the house is being drawn. Information gathering can be done through a questionnaire; the eight product dimensions as suggested by Garvin can also be used to classify customer needs (Table 3). Customer needs are then translated into a schematic technical design specification; the design team should ensure that they include all those features that will result in customer satisfaction. From the schematic design, the detailed design is then constructed in which technical characteristics are then translated into construction specifications (drawings, house plans, project schedule). Before construction resumes the design team need to sit and review the plans with the customer or end user, once the customer/ end user has approved the final plan, construction can resume.
(procurement) phase, the specification is translated into equipment, construction team, materials etc., at this stage the most important part is to monitor and control contractors and suppliers of building materials, inspection and sampling of materials is important because, if not properly managed; both supplier non-performance and non-conforming building materials may have an effect on the final product and will obviously result in a poor quality finished product which will lead to customer dissatisfaction.

### 3.3. Operational Control

Defects or failures in constructed facilities can result in very large costs. Even with minor defects, re-construction may be required and facility operations impaired. Increased costs and delays are the result. In the worst case, failures may cause personal injuries or fatalities. Indirect costs of insurance, inspection and regulation are increasing rapidly due to these increased direct costs. Project managers should ensure that the job is done right the first time. The most important decisions regarding the quality of a completed house are made during the design and planning stages rather than during construction. It is during these preliminary stages that component configurations, material specifications and functional performance are decided. Quality control during the actual construction consists largely of
Table 3: Product and quality service dimensions

<table>
<thead>
<tr>
<th>Product Quality Dimensions</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance - basic functions of the facility</td>
<td>Access – the ease with which the customer can contact the construction company</td>
</tr>
<tr>
<td></td>
<td>Communication – the ability to disseminate information about the construction project to the customer</td>
</tr>
<tr>
<td></td>
<td>Competence – the company’s ability to carry out the service offered to the customer</td>
</tr>
<tr>
<td></td>
<td>Courtesy – the degree of respect, politeness, kindness and consideration of the company’s personnel to the customer</td>
</tr>
<tr>
<td></td>
<td>Credibility – the ability of the company to do what it says it will do</td>
</tr>
<tr>
<td></td>
<td>Reliability – the degree to which construction activities are correct</td>
</tr>
<tr>
<td></td>
<td>Responsiveness – the ability to react to problems that have arisen during the project</td>
</tr>
<tr>
<td>Security – the ability to keep customer information confidential</td>
<td></td>
</tr>
<tr>
<td>Features – characteristics that supplement the basic functions of the facility</td>
<td>Security – the ability to keep customer information confidential</td>
</tr>
<tr>
<td></td>
<td>Durability – the amount of time that occupants can use the facility before replacement is required</td>
</tr>
<tr>
<td></td>
<td>Perceived quality – the degree of satisfaction that occupants experience with the facility’s image</td>
</tr>
<tr>
<td></td>
<td>Serviceability – the speed and ease with which maintenance can be carried out</td>
</tr>
<tr>
<td></td>
<td>Aesthetics – the degree of satisfaction that occupants experience with the facility’s look and feel</td>
</tr>
<tr>
<td></td>
<td>Tangibles – the appearance of both the personnel and the facilities of the company to the customer</td>
</tr>
<tr>
<td></td>
<td>Understanding the customer – the ability of the company to understand customer needs and offer personalised attention to the customer</td>
</tr>
</tbody>
</table>

Source: Garvin (1984); Parasuraman et al. (1985).

insuring conformance to original design and planning decisions. The number of non-conformances could be used as the measure of quality during the construction process, the specification of quality requirements in the design and contract documentation becomes extremely important. Quality requirements should be clear and verifiable, so that all parties in the project can understand the requirements for conformance. To ensure operational control, the following elements should be taken into consideration:

- Customer
- Supplier management
- Compliance
Product/
Resource
Employee
Conducting
Raising Non-Conformances and taking corrective and preventive actions where there are deviations

3.3.1. Customer Focus

An organisation depend on its customers and therefore should understand current and future customer needs, meet customer requirements and strive to exceed customer expectations. Zunguzane (2011) noted that the non-achievement of quality can result in the failure of a construction project and dissatisfaction of the client or building owner in South Africa. The study conducted by Emuze et al, 2012 concluded that occupants should have more say when it comes to housing designs as they could generate better ideas and solutions that improves client/end user satisfaction, some of the respondents were of the mind that there should be more communication with the contractors in the design process, and that owners may be more satisfied if given free hand to choose the materials and designs of their homes. Non achievement of quality leads to client dissatisfaction. One of the reasons why the provision of low-cost housing is so challenging is because of many different role players – usually operating from very different points of departure. While it is expected of government to supply housing, it is often said that no adequate consultative process is involved. This result in the target groups (end user) often rejecting the final product. In return, government might feel their attempts at helping the poor and homeless were not appreciated and, should they engage in similar future projects, might consult even less than before. According to Khumalo (2010: 2), one of the reasons for violent demonstrations and riots in South Africa is the lack of housing and the fact that available housing is likely to be badly constructed. 90% of building failures are due to problems arising in the design and construction stages Egbu et al. (2004). There should be a balanced approach among customers and other stakeholders (owners, people, suppliers, local communities and society at large). According to Aigbavboa and Thwala (2011), client satisfaction describes an “end-state”, where an individual or household is satisfied with the residential status (quality) they have attained. Because client satisfaction in housing context is based upon perceptions, the determinant factors essential to attain it could be different in each case. Campbell, Converse and Rodgers (1976) cited by Aigbavboa and Thwala (2011), further mention that client satisfaction in housing context is one of the predictors of life experience, where satisfaction with that variable may contribute to a person’s quality of life.

3.3.2. Process Approach- Documented Processes

For an organization to function effectively, it has to determine and manage numerous linked activities using resources, in order to enable the transformation of inputs into outputs. In construction often the output from one process directly forms the input to the next e.g. user requirements are used by the design team, who then passes them into project managers who will oversee the project. A desired result is achieved more efficiently when related resources and activities are managed as a process. Work becomes easier if processes are documented. In puts and outputs should be clearly defined, opportunities for continuous improvement should be identified. According to Jha and Kumar (2010), managing the process is key to engaging an organisation’s employees to take responsibilities for what they are doing in relation to satisfying the customers. Processes provide clarity of ownership for employees.

3.3.3. Supplier quality management

According to Metri (2005), supplier quality management includes fewer dependable subcontractors, reliance on suppliers process control, strong inter dependence of supplier and customer, purchasing policy, emphasizing quality rather than price, supplier evaluation and control and supplier assistance in quality development. Materials are often a major source of quality problems.
and affect buyer satisfaction. Instead of relying
on tools such as acceptance sampling to establish
the quality of incoming materials and component
parts, it is preferable for constructors to purchase
from a more limited number of approved or cer-
tified suppliers. Supplier non-performance may
have a direct impact on customer satisfaction e.g.
if materials are delivered late, it may delay the
project and the customer ends up complaining be-
because there is no progress on the project.

3.3.4. Training and Awareness

Training forces employees to not only possess
the adequate knowledge and skills to perform
their jobs, but also to possess specific values,
knowledge, and skills associated with TQM is-
issues and activities. Reasons cited for the fail-
ure of TQM initiatives include the lack of appro-
riate training and inadequate knowledge. Thus
employees will be motivated to engage in quality-
oriented behaviour when their roles and the rele-
vance of their training to overall quality goals are
clarified.

3.3.5. Product Quality

The final output of the construction project
consists of a product that should create customer
satisfaction. (Garvin, 1984) suggests eight di-
ensions of the product (Table 3), according to
Yasamis et al (2002), these are also applicable to
products in the construction industry.

3.3.6. Service Quality

Delgado, 2012, mentioned that while product
quality is mainly associated with users and oc-
cupants of the finished product, in construction,
clients are the direct recipients of service quality.
Dimensions of service quality are equally applica-
ble in construction, whether it’s a design phase,
construction etc., while contractors are building
the house they are simultaneously offering a ser-
vice (Parasuraman et al, 1985).

3.3.7. Non-Conformances

According to ISO 9001 (2015), the organiza-
tion shall ensure that the product which does not
conform to requirements is identified and con-
trolled to prevent its unintended use or deliv-
er. Regular audits and inspections play an im-
portant part in construction; they help to de-
tect non-conformances early in the process to
avoid deviation from user requirements. Once
non-conformances are identified, corrective action
should be taken to eliminate the causes of noncon-
formities in order to prevent recurrence.

3.4. Resources Management

The third level consist of resources manage-
ment, in a study conducted by Emuze et al.
(2012), the interviews conducted with contrac-
tors shed more insights into the causes of poor
quality in low cost housing; they mentioned that
the standard of workmanship in the low income
housing sector is below what is expected. Ac-
cording to the contractors, the standard is drop-
ning considerably because of the unrealistic time-
frames and tight budget allocated by clients (gov-
ernment). They suggested that in order for work-
manship to improve, these shortcomings must be
addressed, especially procurement systems which
play a major role when it comes to factors such as
cost, quality and time, in other words they sug-
gested that pressures exerted by government in
the form of time and financial constraints have
major effects on the standard of quality in sector,
for example, if the budget is tight they end up pur-
chasing cheap material in order to at least make
profit. On the other hand, contractors should
ensure that they acquire skilled resources (espe-
cially artisans), or send available resources for
training. According to ISO 9001(2008), theorga-
nizationshalldetermine and provide the resources
needed to implement and maintain the quality
management system and continually improve its
effectiveness, and to enhance customer satisfac-
tion by meeting customer requirements. Person-
el performing work affecting conformity to prod-
uct requirements shall be competent on the basis
of appropriate education, training, skills and ex-
perience, where applicable; the organization shall
provide training or take other actions to achieve
the necessary competence. People at all levels are
the essence of an organisation and their full in-
volvement enables their abilities to be used for the organisation’s benefit. People need to take ownership of the system and continuously seek opportunities to make improvements and enhance competencies, knowledge and experience. Several scholars found that other work practices such as total quality management (TQM) result in productivity gains and have a positive impact on motivation and commitment of employees to the organization (Held, 1995; McDuffie, 1995; Osterman, 1994; Pfeffer, 1994). The work culture must be very conducive. There should be an active interaction amongst the peers and support from top management. The critical importance of the employee’s involvement in the quality process of an organisation should be based on the belief that the best process innovation idea comes from the people actually doing the job.

4. CONCLUSION AND RECOMMENDATIONS

The proposed framework addresses most of the limitations found in approaches discussed earlier in the study. It looks at quality of low cost housing from three different angles e.g. management commitment, construction and operation control which include customer focus, supplier management, handling of non-conformances and resources management which include involvement of people and support functions. Applying the framework in housing projects will ensure a better understanding of customer needs and in turn customers can be assured that their requirements will be built into the construction process. Poor quality of low cost housing is not unique to South Africa; according to literature many countries also experience quality problems in low cost housing. According to the Minister of Public Enterprises (2013), the government considers the construction sector a significant portion of both the gross national product and of employment and most important as part of the economic fibre which assisted in meeting economic and social objectives. This study is very timely and more than ever significant for the construction (housing) industry that experiences daily non-conformances, incidents and defects. The framework will contribute to the body of knowledge in the construction industry (especially in low-cost housing in South Africa) and will also assist construction contractors in developing and implementing quality improvement initiatives such as implementing a quality management system which will ensure that:

- Customer
- Quality building materials are used
- Competent,
- Regular

5. REFERENCES


