

Literature review on skills development frameworks for small and medium-sized contractors in the green building sector

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Introduction

In 2011 the Department of Public Works adopted a Green Building National Framework aimed at creating a collaborative enabling environment for construction and operation of sustainable environment activities by the public and private sectors in South Africa (Department of Public Works, 2011). The green building sector in South Africa is growing exponentially, as indicated by increased certification of 180 green buildings between 2007 and 2016 (Green Building Council of South Africa (GBCSA), et al, 2016).

The transformation and mainstreaming of the green building sector in South Africa is reliant upon massive development of green building-related skills. The general shortage of critical skills as well as poor quality of existing skills in South Africa, and in the construction and building sector in particular, is well documented (construction industry development board (cidb), 2003; Kraak, 2005; cidb, 2007; McGrath and Akoojee 2007). Too often the skills-related problems in building projects are blamed for poor performance as manifested through shoddy workmanship, too many injuries and fatalities due to accidents and cost and time overruns.

The green building sector is markedly different from the traditional building sector. Green building means “applying the principles of sustainable development to a comprehensive construction cycle from the extraction and beneficiation of raw material, through the planning, design and construction of buildings and infrastructure, until their final deconstruction and management of the resultant waste” (International Research Council for Building and Construction (CIB), 2002). While design and construction/building processes are familiar processes in the traditional building economy, manufacturing processes are not well understood. Manufacturing plays an increasingly important role in the green building sector. Green building is a holistic process aiming to restore and maintain harmony between the natural and built environments while creating settlements that affirm human dignity and encourage economic equity (Department of Public Works, 2011).

A clear distinction should also be made between entrepreneurial activities and general business management to avoid confusion and over-generalisation when dealing with these two concepts. While the former is concerned with early development and start-up activities of the firm, the latter deals with the aspects of managing an established firm (Urban, 2008). Skills development frameworks explored in this chapter should thus be navigated carefully, taking into consideration these overlapping aspects of small business development.

This chapter is an exploratory study based on literature review. The aim is to identify current skills development frameworks in the building sector and also presents an analysis of their characteristics.

Thematic analysis was used to analyse a number of articles in order to develop an appropriate framework for supporting future skills development programmes and tools for the green building sector.

Defining a green contractor

Generally speaking a green enterprise is one that embraces the core principles of sustainable development in all aspects of its operations, products and services. The sustainability principles entail managing an enterprise in a manner that takes care of social and economic progress while maintaining the environmental balance. The desire for such an enterprise to 'do good and no harm' is as strong as its profit motive and equally important in terms of the goals of the business (International Labour Organisation (ILO), 2013a).

A green construction contractor thus takes great care in ensuring that it uses green materials to construct buildings. Green materials are typically produced from renewable resources, processed using low energy, and have low or no volatile organic compounds (VOCs). A green contractor cares for the well-being of its employees in terms of health and safe working methods and fair remuneration processes – promoting the so-called smart jobs or descent work. The use of skilled local labour is maximised as far as possible and gender equality is strongly promoted within an enterprise. A green contractor therefore adopts principles, policies and practices that improve the quality of life for their customers, employees and the communities in which they operate (International Labour Organisation (ILO), 2013a).

Literature on entrepreneurship and skills development frameworks

Entrepreneurship has a long history dating as far back as the fourteenth century. The term 'entrepreneur' was defined by Cantillon in the seventeenth century (Schumpeter, 1954). Nowadays the teaching of business and entrepreneurship skills is a common practice in many institutions of education, including in many schools; and this development has helped greatly to debunk the myth that 'entrepreneurs are born, not made'.

The problem of shortage of critical skills as well as poor quality of existing skills in South Africa, and in the construction and building sector particularly, is well documented (construction industry development board (cidb), 2004; Kraak, 2005; cidb, 2007; McGrath and Akoojee 2007). A cursory observation into the National Scarce Skills List (Department of Labour, 2010) shows that building and manufacturing skills account for 60% of the total skills shortage in South Africa which is estimated at 42,850. The research on construction industry skills by the construction industry development board (cidb) (2011) concluded that less than 5% of lower level owner contractors (Grade 2-4) have a management qualification. Around 30% of employees in this category do not have a technical qualification.

In building projects, poor business management and poor project management are blamed for a number of performance-related problems (cidb, 2009), with the main culprits being:

- Poor quality of workmanship which compromises structural integrity of buildings and safety of the occupants;
- Time and budget overruns resulting in late completion of projects and delayed occupancy of buildings;
- Budget overruns resulting in reduced impact and compromised service delivery;
- Time overruns resulting in late completion of projects and delayed occupation of buildings; and
- Budget overruns resulting in reduced profitability and compromised service delivery.

The analysis of countries' experiences reveals that skill shortages constrain the transition to a green economy – in terms of filling the posts for new occupations and in terms of changing the skill profile of a large number of occupations (International Labour Organisation (ILO), 2011). The research also documents the need to provide opportunities for acquiring new skills to those who are at risk of losing jobs in the high-emissions industries (International Labour Organisation (ILO), 2011). The adoption of training frameworks varies according to different countries. Some countries develop training strategies

and policies to proactively anticipate and meet the challenges of new skills, whereas other countries adjust existing mechanisms and systems on an ad hoc basis (International Labour Organisation (ILO), 2011).

The availability of workers and enterprises with appropriate green skills is critical role for green transformation. Employers investing in the green technologies need to be able to find workers with the right skills (International Labour Organisation (ILO), 2011). Workers and communities that lose jobs in the 'brown' industries need opportunities to develop new skills for the green economy (International Labour Organisation (ILO), 2011).

The challenges relating to entrepreneurship and business skills internationally and in the South African construction sector have resulted in the development of a number of interventions and frameworks aimed to address these challenges.

Critical success factors for small enterprises

A number of critical success factors (CSFs) for small construction enterprises have been identified by many researchers across a number of countries (e.g. Moss et al, 2008; Dlungwana, 2011; Lu & Shen, 2008). In the effort to ensure the impact of skills development programmes, it is worthwhile assessing these programmes against these key success factors.

Based on the small contractor development programmes conducted in South Africa's Eastern Cape province, Dlungwana (2011) identifies the CSFs for contractors in the programme as tendering skills, project costing and project management. All these were grouped under the broad theme of business management skills.

In a study across three large provinces in China, Lu et al (2008) identified 48 critical success factors (CSFs) for Chinese contractors. The top ten of these CSFs were: Bidding strategy; An explicit competitive strategy; Relationship with government departments; Cost management; Sustainable development of human resources; Communication and coordination among functional departments; Risk management; Quality management; Strategic awareness and perspective and Site management. The findings of this research corroborated with research in many other countries although there were also notable differences, particularly in the order of importance of the CSFs.

Studies conducted in the UK show that good corporate governance practices on environmental and social issues enhances companies' shareholders value, or at the very least, protects their highly valuable reputations (Sustainable Construction Task Group (SCTG), 2002). A study showed that those companies with the respect for the environment (FTSE4Good companies) are considered to have performance than conventional FTSE100 companies. A similar study showed that on the Dow Jones index environment-friendly companies outperformed their other peers by 15% (Sustainable Construction Task Group (SCTG), 2002). Tan et al recognise the linkage between sustainability performance and business competitiveness (Tan et al, 2011). These studies demonstrate that implementation of sustainable construction practices can be a critical success factor because the positive messages created about a contractor may lead to competitiveness in the marketplace.

The World Bank identifies five key support areas for green SMEs that governments, developing agents and other actors in developing countries should promote (International Bank for Reconstruction and Development for Reconstruction and Development, 2014). These areas are entrepreneurship and business acceleration, innovation and finance, market development, technology development, and legal and regulatory framework.

The above CSFs are not exhaustive but provide an indication of some important aspects that should be used as benchmarks in assessing the impact of skills development.

Different approaches to skills development frameworks

Gibb's approach to entrepreneurship teaching entails 'generative learning', i.e. learning that embodies capacity to create and bring forward experience, rather than waiting for (and learning from) it (Gibb, 1997). Gibb argues that positivist-type approaches to small enterprise learning are inadequate as they do not harness understanding of the process of learning and he asserts that there is a best chance of successful learning if there is a thorough understanding of the process. Gibb also advocates for the learning process that involves, not only the business owner, but also the associated stakeholders, including client, suppliers and financiers – the so-called 'learning circle' (Gibb, 1997).

A national study conducted by the CIDB revealed that in 2009 there were 18 contractor development programmes (CDPs) involving some 1300 contractors (construction industry development board (cidb), 2009). Existing programmes vary from one another to a lesser or greater extent, and are typically characterised by the following features:

- **Procurement-driven support measures:** Most of the skills development programmes in South Africa are driven by public sector clients (e.g. government departments, municipalities and state-owned enterprises) through the procurement process. The key objective of a number of demand side measures is to create an enabling environment that supports small and medium size enterprises. The support measures may include quicker payment schedules, simplified bidding documents and relaxation of bonds and guarantees.
- **Theoretical training:** A number of skills development programmes include theoretical training as a strong component of the programme. The objective of such training is to provide a good grounding of the construction and building theory from entrepreneurial, managerial and technical perspectives.
- **Work (practical) Training:** The theoretical training is backed by a practical on-the-project experience where the entrepreneur and the organisation's senior staff are mentored by an experienced mentor. Mentorship is a point where theory and practice come together to create true learning, knowledge and lasting skills.
- **Monitoring and evaluation:** The cidb guidelines (construction industry development board (cidb), 2009) for skills development put emphasis on the need to monitor and evaluate the skills development frameworks in order to ensure high quality of training and mentorship. The monitoring and evaluation process thus facilitates assessment of the quality of skills being acquired by the entrepreneur, top management, and staff and provides a feedback mechanism for improving the training programmes.
- **Minimum risk for contractors:** It is important for the enterprise to risk something into the programme in order to solicit their commitment. Most programmes are criticised for absorbing full costs of the programmes resulting in enterprises failing to appreciate the importance of such opportunities as they contribute nothing for their development. Too often the skills development programmes have been criticised as job creation schemes that perpetuate entitlement to work dependency rather than creating sustainable skills desperately needed by the sector.

Frameworks for skills development in the construction and building sector

Since 1994 the construction and building sector has elevated skills developed by implementing numerous skills development frameworks targeted at improving the capacity of both the entrepreneurs and workers. Training of professionals, such as architects and engineers, adopts a different framework for skills development, which ranges from degree and diploma studies at educational institutions. There are also continuing professional development (CPD) courses offered to supplement their career development on a long-term basis. The summary of literature covered here focuses on skills

development frameworks designed for small and medium sized contractors at both entrepreneurial/managerial level and employee level. In small contractors there is, however, a thin line between the entrepreneurial/managerial tasks and technical tasks since the entrepreneur and top management staff tends to get involved at many levels of the business operations. This means that skills development interventions should embrace a holistic, cross-cutting approach for the small enterprise.

Table 1 summarises the types of categories of skills development frameworks identified within the South African building sector.

Table 1: Summary of skills development frameworks in the SA construction sector

Source: Compiled by author

Framework category / type	Description	Key features	Key stakeholders	Comment
A) Procurement driven enterprise development programmes	A group of suppliers/ contractors are trained within a skills training programme thorough theoretical and practical training	<ul style="list-style-type: none"> • Entrepreneurial skills • Business management skills • Training • Mentorship • Formalised monitoring • Formalised evaluation 	<ul style="list-style-type: none"> • Small/medium enterprise • Public sector government departments, • Municipalities • SOEs • CETA 	Examples of programme: EPWP's Vuk'uphile Learnership Programme driven by the Department of Public Works; or Eskom Construction Academy
B) Procurement-driven employee skills development programmes	A group of employees are selected into a skills training programme thorough theoretical and practical training	<ul style="list-style-type: none"> • Trade skills • Training • Mentorship 	<ul style="list-style-type: none"> • Employees • Public sector government departments, • Municipalities • SOEs • Universities • Colleges • CETA 	Examples: Certificate in Occupational Health & Safety; Certificate in Bricklaying; Certificate in Plumbing
C) University / college training programmes	High level academic training of students for a year and above. Programme lead to professional registration	<ul style="list-style-type: none"> • Theory-intensive courses • Practical experience for some qualifications • Little or no practical training for other qualifications 	<ul style="list-style-type: none"> • Student • Universities • Colleges 	Examples: Degree/Diploma in Quantity Surveying, or Construction Management, or Architectural Studies
D) Skills transfer from large, established enterprises to small, emerging enterprises	Main contractor and sub-contractor work together with the intention of transferring critical skills to those with capacity problems	<ul style="list-style-type: none"> • Project-based mentorship 	<ul style="list-style-type: none"> • Large, established enterprise • Small/medium enterprise 	Example: KwaZulu Natal's eThekweni Large Contractor Model

E) Programmes and courses designed to provide information or awareness on green building	The programme introduces small entrepreneurs into the green building sector and provides skills through a series of training modules	<ul style="list-style-type: none"> • Entrepreneurs in construction sector • ILO-accredited trainers 	<ul style="list-style-type: none"> • Small/ medium enterprise • International Labour Organisation (ILO) 	Example: Start and Improve Your Green Construction Business (SIYGCB)
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Despite a number of contractor development programmes implemented in the construction sector in South Africa, Qongqo et al (Qongqo & Mphahlele, 2014) note that the impact of CDPs in terms of growth of contractors (as measured by upgrading to higher grades) is not significant. To improve this situation they recommend that the National Contractor Development Programmes (NCDP) Guidelines be fully adopted by CDPs (Qongqo & Mphahlele, 2014; NCDP, 2011). With improved compliance to the NCDP Guidelines it is foreseen that a significant potential exists for CDPs in the future (Qongqo & Mphahlele, 2014).

Skills development frameworks in the green building sector

The construction and building sector in South Africa is recognised as one where a high level of green economy awareness has been created (International Labour Organisation (ILO), 2010). The sector has a potential to spread green practices over a broad area of the sector as opposed to just influencing limited individual projects. Thus, knowledge pertaining to green building in this sector is seen to be growing (International Labour Organisation (ILO), 2010).

Category E in Table 1 describes arguably the only training programme relevant to green building skills framework among many conventional frameworks. The content of 'Start and Improve Your Green Construction Business (SIYGCB)' training programme is tailored specifically to address green/sustainability issues that should be tackled by small construction contractors (International Labour Organisation (ILO), 2013b).

The objectives of the SIYGCB programme are to:

- enable local training providers to effectively and independently implement business start-ups and improvement training and related activities;
- enable potential and existing small businesses, both women and men, through the programme to start viable businesses and to create employment for others in the process;
- respond to business challenges in the construction and building environment with a view to environmental sustainability and green building best practice.

The paucity of skills development frameworks for green contractors in South Africa remains a concern that should be addressed in order to transit towards a thriving green building sector.

Green building projects have profound unique features when compared to conventional construction projects and these differences have implications for the skills development frameworks. In the main these differences relate to a contractual relationship between the Certificate Holder of the building system and the Licensee. The addition of the Agrément certificate into construction processes means the Certificate Holder will be involved in both the design and construction stages of the project. The implications of such additional role player in contractual arrangements need to be carefully considered. If the Certificate Holder is appointed as the main contractor the relationships are similar to those of conventional contract arrangement with the difference being that the Certificate Holder will now be responsible for aspects of the design. However, if the Licensee is appointed as a contractor then the contractual relationships will be such that the Contractor has a contract with the client, but the Certificate Holder is not absolved from liabilities attached to the certificate, such as system performance and quality

assurance aspects. The training programme needs to clarify these relationships carefully among the role-players.

Proposed framework for skills development in green building

Figure 1 illustrates the many components of the proposed skills development framework for a green contractor. The framework can be adapted to any green enterprise outside the construction and building sectors.

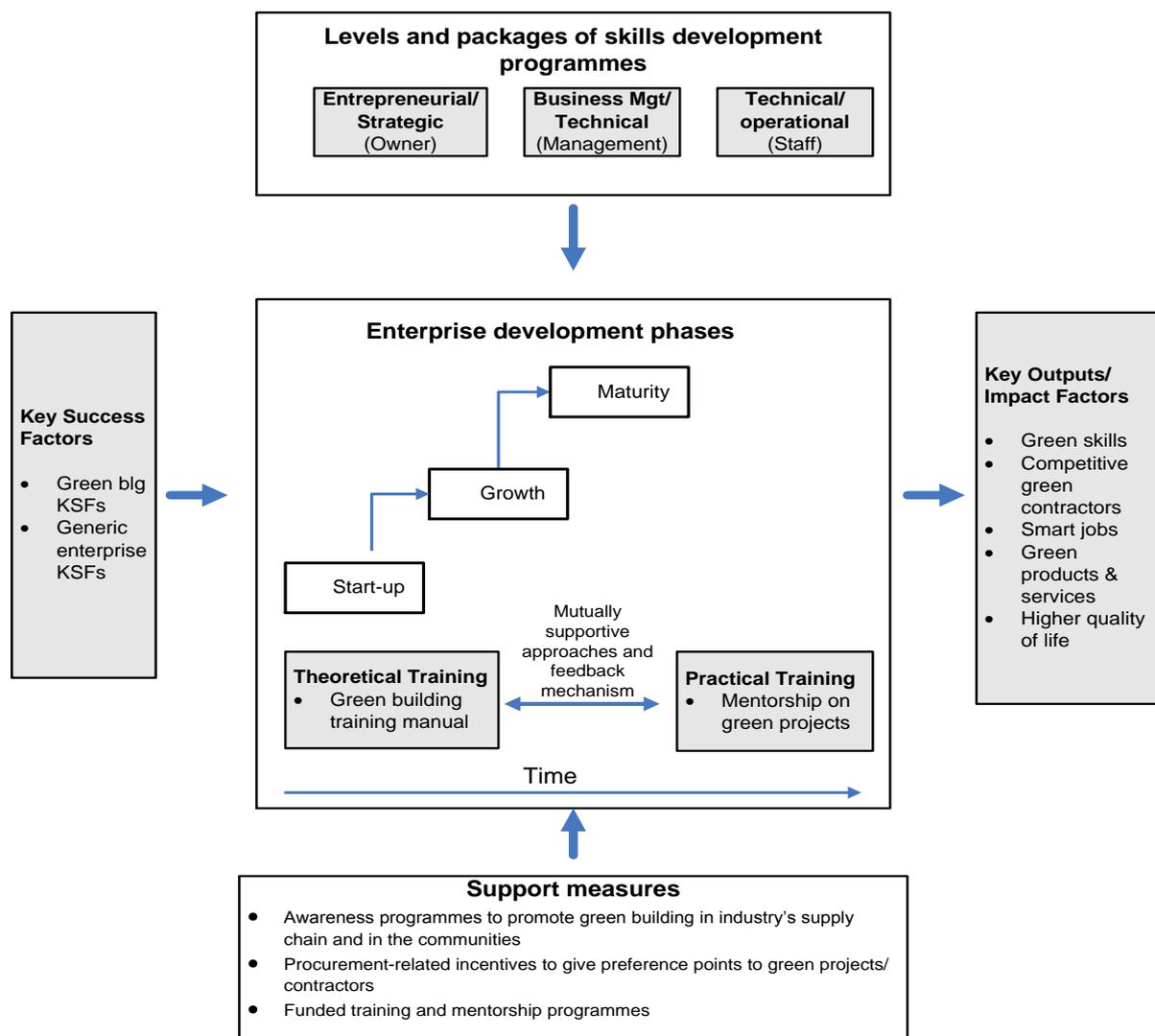


Figure 1: Proposed skills development framework

Development priority on key success factors

The starting point of the proposed skills development framework for small green contractors is to understand the key success factors that should be mastered by a green contractor. Given the survivalist environment in which small contractors play, it is critical for the framework to prioritise marketing skills that will make them attractive to clients and partners in the green supply chain. The securing of profitable projects on a continuous basis should be of uppermost importance for a contractor to earn revenues. The structure of the green building sector, more so than the conventional building sector, tends to nurture very close relationships among the supply chain stakeholders, such as the building system owner, building designer, manufacturer and contractor (Dlungwana, 2014). Thus, when crafting a marketing strategy the small contractor should give a serious consideration to the key success factors, such as partnerships building, bidding strategy and competitive strategy. Other key success factors include cost and financial management, risk management, project management and quality management.

The training of green contractors should prioritise the above factors while continuing to take care of other generic business aspects, such as good human resource management, innovation and communication strategy.

Skills training and mentorship

Once the priority development areas have been outlined, the focus should be on structuring a skills development programme for the small contractor that addresses the key success factors through training and mentoring. Training should comprise a strong theoretical component which introduces the green building concepts, principles and practices. The training should be underpinned by the use of user-friendly training manuals and other relevant tools. The theoretical training should be backed by a well-structured mentorship based practical training that is linked to green projects. As advocated by Gibb (1996), learning should not only be theoretical in such a way that is distanced from the context. Learning should be experienced-based in order to be more meaningful to the learner. The proposed framework for skills development should be underpinned by a strong practical learning supported by trained and experienced mentors.

The content of the training programme should be carefully selected to address green building aspects as they pertain to small contractors in the sector. Since the green building is a new field of practice, training programmes put emphasis on communicating new concepts, business strategies and practices effectively to the learners.

Alignment of training to enterprise development phases

Skills development programmes should be relevant to the development phases of the enterprise by ensure that training is packaged appropriately. The enterprise at the start-up phase should not be given high-level training that is suitable for a mature enterprise which has the management systems in place as this may cause confusion and disillusionment to the learners. Similarly, training should be packaged carefully to address the specific needs of the business owner, management and staff. Skills development programme cannot be a silver bullet that hopes to address all the challenges with one approach. There should an effort to tailor training packages accordingly.

Support measures for skills development programmes

The skills development programmes require a set of support measures from a number of green building sector stakeholders. Arguably, the most critical stakeholders are clients and consumers that procure and consume green building products and services. Some of the key support measures entail promotion of green building principles and practices through awareness and educational interventions, procurement measures aimed at promoting good industry practices and making available the resources to implement skills development programmes.

Monitoring and evaluation of outputs and impact

A major component of the skills development framework should comprise an effective system of monitoring and evaluating assessing whether training produces the intended outputs and impact. The expected range of outputs and impact include green skills for the enterprise's owner, management and staff, enhanced enterprise competitiveness in the market, smart jobs and green products and services.

Towards skills development tools

While the proposed skills development framework incorporates many best practices, it should be accepted that no single framework is suitable to resolve all the skills challenges experienced by the sector.

The sector use this generic framework to design tools tailored for enterprises at different stages of development. Such tools should be packaged to address requirements of people at different levels of the enterprise. Critically, the tools for monitoring and evaluation should be developed to assess progress made by the skills development programme.

Conclusion and future research

This chapter covered a review of literature on the subject of skills development in South Africa generally and in the local construction sector in particular. Four different types of skills development frameworks prevailing in the traditional building sector were summarised. One framework relating to the green building sector was reviewed. A generic framework for developing contractor skills within the green building sector was also proposed and described.

Future research work is needed to customise the framework for green contractors according to the particular location of the contractor in the green supply chain and according to the development phase of the enterprise. Furthermore, there is need to develop refined skills development tools to address needs of an entrepreneur (strategic level), the management (operational/ tactical level) and the staff (technical level). It is by developing green skills across the green building value chain that we can begin to unlock the real potential for the green building economy.

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