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Critical success factors for Ghanaian contractors

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Abstract

Purpose – The purpose of this paper is to explore the development of a set of critical success factors (CSFs) for Ghanaian contractors. The factors collectively define a set of best practices which Ghanaian contractors should focus on improving if they are to attain internationally competitive performance.
Design/methodology/approach – A systematic review of previous research, literature on existing programmes, models and frameworks commonly used for improving performance was undertaken to identify the most important success factors. The identified factors were scored and ranked with 16 of the most frequently occurring success factors selected. A questionnaire-based survey of Ghanaian contractors explored their perceptions of the most important success factors. Using factor analysis, the most important success factors were extracted.
Findings – Eight CSFs were identified for Ghanaian contractors. These were: quality and zero defects culture, organisational design, work culture and work environment, client satisfaction, strategy, leadership, measurement, analysis of information and knowledge management and implementation of lean principles.
Practical implications – The CSFs developed provides a ready set of criteria which can be used by contractors with little or no experience of benchmarking to compare their performance in best practices or to implement improvement programmes.
Originality/value – The first formal set of CSFs for Ghanaian contractors is presented. Not much research work has been done on organisational CSFs that are focused by this research.

Keywords Performance, Critical success factors, Benchmarking, Ghana, Contractors
Paper type Research paper

1. Introduction

The performance of Ghanaian contractors is a major cause of concern amongst client groups and other stakeholders in the Ghanaian construction industry. Many Ghanaian contractors fail to meet performance targets (Ahadzie, 2007) and are generally blamed when projects go wrong. They are also criticised for having limited knowledge in the application of requisite management techniques. In many Ghanaian contractors, the management of the firms' resources – labour, finances, materials, plant and equipment in Ghanaian construction firms is carried out haphazardly and therefore does not promote growth (Vulink, 2004).

The industry in Ghana generally has serious image problems owing to widespread perceptions of corruption in the award of construction projects. Financing for construction is difficult to arrange and where available, interest rates tend to be very high. Financing difficulties lead to a high frequency of abandoned projects and others discontinued due to non-performance of contractors. The costs of re-engaging new contractor rework and making good defects is high and the additional time required for these can be substantial. Project delays lead to escalating costs owing to high inflationary trends. The effects of these and many other problems which affect Ghanaian contractors is that it is difficult to attract investment into Ghanaian construction firms (Ghana Stock Exchange, 2012). There are currently no listed construction companies in the Ghana stock exchange and there are no Ghanaian

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construction firms in the Ghana Club 100 list of prestigious companies which demonstrate excellence in performance (GIPC, 2012). Learning from the successful practices and the experiences of others will enhance performance levels (Hinton *et al.*, 2001) in Ghanaian contractors. Practices are characteristics which describe internal and external business behaviour and tend to lead to the creation of a performance gap. They may be related to: processes, organisational structures, management systems, human factors and strategic approaches (Zairi, 1994).

Despite significant progress in performance improvement in the construction industries of many developing countries, the same cannot be said of the industry in Ghana (Ofori *et al.*, 2012). Dadzie *et al.* (2012), the Ghanaian construction industry suffers project failures, long delays, excessive project variations, poor health and safety practices and large cost overruns. The Ghanaian construction industry derives its practice from the British construction industry (Ahadzie, 2007) and it would have been expected that best practices, such as success factors used in the British industry could be used in Ghana, yet owing to the socio-political and cultural differences make it necessary to develop unique solutions adapted to the Ghanaian context.

Management entities are generally inundated with lots of data hence the need for selectivity as a tool to guide the management process. The challenge is to identify the practices most important for business success and should be the focus of Ghanaian contractors seeking to improve their performance. What should be the starting point amongst the competing priorities of all the areas which require management attention? What are the critical success factors (CSFs) for Ghanaian contractors seeking performance improvement? This paper explores the development of a set of CSFs for Ghanaian contractors. This defines a set of best practices which Ghanaian contractors should focus on improving if they are to attain internationally competitive performance (Bond, 1999).

2. Existing success factors from literature

CFSs are performance variables which help to filter out extraneous data coming through to management (Bond, 1999). They are enablers which when put into practice will enhance the prospects for learning from best-practice organisations (Deros *et al.*, 2006). With the attainment of excellence in CSFs linked to performance excellence, CSFs are very useful for managers and decision makers (Kasul and Motwani, 1994).

There are many frameworks, models for improving business performance. Some of the most popular models, frameworks for improving performance and literature on performance improvement are now reviewed starting with construction industry CSFs to identify the most popular factors used in these and in literature. The success factors used in these models and frameworks are discussed and the most popular success factors identified.

2.1 Existing construction industry CSFs

Rockart (1982) was the first to propose the approach of determining CSFs as an established method which can be used for undertaking organisational analysis. CSFs can be defined as the factors which managers need to monitor closely in order to ensure the successful delivery of projects and provide a means of identifying the essential elements which need to be addressed in order for organisations to implement change more effectively. They represent a set of very important issues which organisations have to focus their limited resources on in the pursuit of success (Rockart, 1982). They are the inputs into the management system of an organisation which directly results in the success of projects (Koutsikouri *et al.*, 2008).

Identifying the key factors responsible for the success of construction projects enables limited resources to be allocated appropriately to projects (Chua *et al.*, 1999) demonstrating how significant CSFs are to project success. CSFs differ from one country to another and change in response to changes in policy and industry changes (Yong and Mustafa, 2013). Despite extensive studies undertaken on CSFs, very little has been done within the local (country level) context. Much of the existing work is very general and in the few examples done within specific country contexts, these were largely context-specific making it difficult to apply them in other countries (Yong and Mustafa, 2013). This supports the argument for developing specific CSFs for specific countries when required.

Omran *et al.* (2012) uses a quantitative approach to identify different categories of CSFs most important to all the different phases of construction. Ten categories of success factors which affect the outcomes of construction projects most are identified. These are ranked using a relative importance (RI) index and classified into CSFs relating to: project management, procurement, client, contractor, design team, project manager, work environment, materials, labour and productivity and external factors.

Koutsikouri *et al.* (2008) explored CSFs in interdisciplinary design projects from the perspective of project stakeholders using semi-structured interviews and a facilitated workshop. In totoal 31 primary CSFs were grouped into four interdependent group factors – design team factors, management factors, project enablers and competencies and resources factors. There is a lack of consensus amongst researchers and authors as to the factors which affect project success the most. Three factors are cited mostly in literature as being the most significant for project success as follows: senior management support, clear and achievable objectives and an efficient plan (Koutsikouri *et al.*, 2008).

Chua *et al.* (1999) established the key success factors responsible for construction project success based on the different project objectives cost, time and quality. The analytical hierarchy process was used to determine the RI of construction CSFs and to develop a hierarchical model to represent construction process success. In total, 67 success factors were considered which were further broken down into four main aspects of projects, namely: project characteristics, project participants, contractual arrangements and interactive processes. Chua *et al.* (1999) identified 67 CSFs which could address project performance, schedule performance, budget performance, quality performance of overall project performance. However the 67 factors present significant difficulties for managers with little experience of CSFs in deciding where to start from and which CSFs to focus on.

Saqib *et al.* (2008) uses a similar approach to Chua *et al.* (1999) to develop a set of CSFs for the Pakistani construction industry. The Pakistani construction industry CSFs are grouped into seven categories as follows: project management factors, procurement-related factors, design team-related factors, business and work environment-related factors, client-related factors, contractor-related factors and project manager-related factors. In all, 77 success factors were identified broadly categorised into the seven groups listed above. Using a questionnaire-based survey, views were solicited as to the most important of the identified factors (Saqib *et al.*, 2008). The top five categories were identified as follows: contractor-related factors, project manager-related factors, procurement-related factors, design team-related factors; and project management-related factors. From the list of 77 factors, the study went on to identify the ten most important factors as follows: decision making effectiveness, project managers experience, contractor's cash flow, timely decisions by owner or his

representatives, site management, supervision, planning effort, prior project management experience and client's ability to make decisions.

Yong and Mustafa (2013) explored the significance of the respective CSFs developed by different researchers and proposed a consolidated framework of CSFs. The framework groups the CSFs into five main categories reflecting factors which relate to the project, procurement, project planning and management, project stakeholders and the external environment. From an initial list of 75 construction industry CSFs, Yong and Mustafa (2013) developed a final list of 16 CSFs grouped into the five categories. The top five factors were identified following a ranking exercise based on a survey of contractors and consultants as: contractor competence and experience, project financing, team leader competence, project consultant competence, site management and supervision.

All the existing CSFs relating to the construction industry reviewed relate to projects. Abraham (2003) contrasts the trend where high performance in the construction industry tends to be limited to project success with other industries where good management practices at the corporate level are emphasised as a key element of success. Abraham (2003) proposes a shift in emphasis from project success to organisational success advocating that a CSFs approach be adopted which focuses on organisation CSFs as against project CSFs.

Donkor (2011) explored the determinants of business failure in small and medium scale building contractors in Ghana. The determinants of success were identified as: financial management ability, marketing ability, management experience and expertise, creativity, good relationships with clients and suppliers, access to finance, project planning and management skills, availability of resources, business skills, business location and the employment of suitably qualified personnel with the requisite experience (Donkor, 2011).

2.2 Success factors used in existing popular performance models and frameworks

2.2.1 The European foundation for quality management (EFQM) Excellence Model. The EFQM Excellence Model is a flexible framework used for assessing organisations for the European Quality Award. It is a non-prescriptive model widely used in Europe as the organisational framework and the basis for many national and regional Quality Awards. The EFQM Excellence Model is a diagnostic tool which can help user organisations to develop and implement improvement plans (Quality Scotland, 2008). The EFQM Model is based on nine criteria sub-divided into enablers and results criteria, respectively. The EFQM enablers are what an organisation does and the results are what it achieves. Of the nine criteria, the first five – leadership, people, policy, partnerships and resources and processes – are the "enablers" whilst people results, customer results, society results and key performance results are described as the "results" criteria (Quality Scotland, 2008).

2.2.2 Construction excellence model. Bassioni *et al.* (2008) developed a model for construction excellence which like the EFQM Excellence Model divides the success criteria into two – the enablers and the results criteria. The enablers include leadership, suppliers, customer and stakeholder focus, physical resources, strategic management, intellectual capital, information and analysis, risk management, people, work culture, partnership and process management. The results criteria include internal stakeholders, project and external stakeholders, and organisational business results. In addition to the EFQM Excellence Model criteria, Bassioni *et al.* (2008) introduces

additional criteria such as work culture, strategic management, suppliers, risk management, customer and stakeholder focus which play a critical role in business success (National Institute of Standards and Technology (NIST), 2008).

2.2.3 The Xerox benchmarking model. To catch up with competition, Xerox learnt extensively from the work of W.E. Deming, P. Crosby, the Japanese Quality Award framework (the Deming Prize) and the Malcolm Baldridge National Quality Award (MBNQA). Through benchmarking and other self-assessment programmes, Xerox became very successful and was recognised for its leadership through quality programme (Dahlgaard-Park and Dahlgaard, 2007). Xerox, the foremost entity to implement a benchmarking programme (Camp, 1989), defined excellence as being certified with high scores in six enabler criteria: management leadership, human resource management, business process management, customer and market focus, information utilisation, quality tools and business results (Dahlgaard-Park and Dahlgaard, 2007).

2.2.4 MBNQA. The MBNQA, also known as The Baldridge Award is the national programme for recognising and promoting excellence in business in the USA. It provides criteria which enable organisations to measure their performance and to target improvements in their performance. The Baldridge Award criteria for determining excellence are: leadership, strategic planning, customer and market focus, measurement, analysis and knowledge management, workforce focus, process management and results (NIST, 2008).

2.2.5 Deming Prize. The Sub-committee of Implementation Award for the Deming Prize (1992) identified 10 success criteria which are assessed for the award of the Deming Prize. These are: policy, organisational management, education and dissemination, collection, dissemination and use of information on quality, analysis and standardisation. The rest are: control, quality assurance, results and planning for the future. These are the success factors on which excellence is assessed for the award of the Deming Prize.

2.2.6 Benchmarking framework for automotive small and medium-scale enterprise (SMEs). Deros *et al.* (2006) reviewed major benchmarking frameworks including the frameworks by Lee (2002), Fong *et al.* (2001), Davies and Kochhar (2002), Medori and Steeple (2000) and Crow (1999). Other benchmarking frameworks reviewed in Deros *et al.* (2006) include the Malaysian Benchmarking Service, NPC (1999) Framework, the Voss *et al.* (1994) Framework, the Zairi (1994) and Spendolini (1992) frameworks. The Deros *et al.* (2006) review leads to the development of a benchmarking framework for the automotive SME sector which identifies the following CSFs: top management leadership, resources management, business results, systems and processes, creativity and innovation, human resource management, policy and strategic planning. The rest of the CSFs identified by Deros *et al.* (2006) are customer satisfaction, employee satisfaction, organisational culture and work environment.

2.2.7 High-performance organisations (HPOs). De Waal (2007) explores the concept of HPOs and defines a HPO as an organisation that achieves financial results better than those of its peer group over a longer period of time by adapting well to changes, reacting quickly and managing for the long term. Organisations achieve high performance by setting up an integrated and aligned management structure, continuously improving their core capabilities and by treating the employees as its main asset. There are eight factors which influence employee behaviour and in turn lead to high-performance in organisations as follows: external environment, organisational design, strategy, process management, technology, leadership, individual roles and organisational culture (De Waal, 2007).

2.2.8 The Egan report. The Construction Task Force (1998) identified five drivers of change responsible for sustained and significant improvements in the manufacturing and service industries. These drivers of change are:

(1) committed leadership;

(2) a focus on the customer;

(3) integrating the process and the team around the product;

(4) a quality-driven agenda; and

(5) commitment to people.

These drivers of change provide a model for dramatic improvements and business success with a recommendation the construction industry learns from the experience of the automobile industry for high levels of improvement (The Construction Task Force, 1998).

2.2.9 Toyota excellence. Toyota is the most successful car manufacturer in the world (Dahlgaard-Park and Dahlgaard, 2007) – one of the largest industrial companies in the world and has been acknowledged as one of the100 best managed companies in the world (Fang and Kleiner, 2003). The key processes identified as being responsible for excellence at Toyota Motor Manufacturing in the USA are: the implementation of Japanese values and philosophy, The Toyota Production System, corporate structure, the hiring process, teams, open communications, non-monetary awards and pay/bonus system. These factors collectively contribute to Toyota's success and leadership and can be applied to other organisations for improvement (Fang and Kleiner, 2003).

Like Fang and Kleiner (2003), Liker (2004) explores the *Toyota Way*. In total, 14 management principles are identified as being the source of Toyota's success. These are: long-term philosophy, process flow, pull systems, level-out workload, stop when there is a quality problem, standardise, visual controls, reliable technology, grow leaders who live the philosophy, respect, develop and challenge your people and teams and respect. The rest of the management principles are: challenge and help suppliers, continual organisational learning though Kaizen, hands-on experience and consensus decision making. These represent the foundations on which the success of Toyota over the years has been built (Liker, 2004).

Dahlgaard-Park and Dahlgaard (2007) integrated the 14 principles which make up the *Toyota Way* into the 4 Ps Model of the Toyota Production System: problem solving, people and partners, process and philosophy. The 4 Ps Model of the Toyota Production System has some similarities with Peters and Austin (1985)'s four CSFs: people, care of customers, constant innovation and leadership which hold together the first three factors using management by walk-about philosophy at all levels of the organisation.

2.2.10 Lean production and total quality management (TQM). Koskela (1992) identified 11 experience-based techniques for problem solving as the key principles for a new production philosophy. The philosophy applies lean principles to eliminate waste and deliver increased value to customers and has the following principles: reduce the share of non-value-adding activities, increase output value through systematic consideration of customer requirements, reduce variability and reduce cycle time. Others are: simplify by minimising the number of steps, parts and linkages, increase output flexibility, increase process transparency and focus control on the complete process. The rest are; build continuous improvement into the process, balance flow improvement with conversion improvement and benchmark. The new production

philosophy (lean) provides an alternative means of improving the performance of organisations than other established approaches to improving performance such as TQM (Koskela, 1992).

TQM involves meeting customer requirements at minimum cost and is a prerequisite for continuing success. Five components of TQM can be identified as follows: understanding customers, understanding the business, quality management systems, continuous quality improvement and quality tools (Munro-Faure and Munro-Faure, 1992). Each of the five components has associated sub-criteria as shown in Table I.

Harris and McCaffer (2001) identified 12 steps for improving quality as follows: implementation, training, teamwork and control. Others are capability, systems, design and planning. The rest are measurements, organisation, commitment and policy and understanding. Petersen (1999), however alludes to 14 steps of quality improvement. These are: management commitment, quality improvement team, measurement, cost of quality, quality awareness, corrective action, zero defects (ZD) planning, employee education, ZD day, goal setting, error-cause removal, recognition, quality councils and do it over again.

2.2.11 Six Sigma. Six Sigma is a comprehensive system for achieving, sustaining and maximising business success. The *Six Sigma Roadmap* for launching improvements in organisations has five steps which make up the "core competencies" for twenty-first century organisations. The core competencies for twenty-first century organisations are: identify core processes and key customers, define customer requirements, measure current performance, prioritise, analyse and implement improvements, expand and integration of the Six Sigma system (Pande *et al.*, 2003). Some of the benefits attributed by Pande *et al.* (2003) for the implementation of Six Sigma are: cost reduction, productivity improvement, market share growth, customer retention, cycle time reduction, defection reduction, and culture change and product/service development.

2.2.12 CSFs for world-class manufacturing (WCM). Schonberger (1986) proposes 16 principles for WCM as follows:

(1) team with customers; organise by customer/product family;

(2) capture/use customer, competitive, best-practice information;

(3) initiate continual, rapid improvement in what all customers want;

(4) involve workforce in change and strategic planning;

(5) cut to the few best components, operations, suppliers;

Understanding customers	Understanding the business	Continuous quality improvement	Quality management systems	Quality tools
External	Functional analysis	Management commitment	BS 5750	Statistical process control
		Employee involvement	ISO9000	Quality function deployment
Internal	Quality costs	Education	AQAP	Benchmarking
		Teamwork		Problem solving
		Measurement		
		Error prevention		

Source: Munro-Faure and Munro-Faure (1992)

Table I.
Components of total quality management

(6) cut total cycle time and distance, changeover times;
(7) operate close to customers' rate of use or demand;
(8) train everybody continually for their new roles;
(9) expand variety of rewards, recognition and pay;
(10) reduce variation and mishaps continually;
(11) record and own process data at workplace by frontline teams;
(12) control root causes to cut internal transactions and reporting;
(13) align performance metrics with universal customer wants;
(14) improve current capacity before new equipment and automation;
(15) seek simple, movable, scalable, low-cost, focused equipment; and
(16) promote/market/sell every improvement.

These principles seen as both characteristic of very successful organisations and predictors of future success have been modified by Kasul and Motwani (1994) into 18 factors as follows:

(1) getting to know the customer;
(2) decreasing work in process;
(3) cutting flow time;
(4) reducing set-up and changeover time;
(5) shortening flow distance and space;
(6) increasing the make/deliver frequency for each required item;
(7) reducing the number of suppliers to a few good ones and cutting the number of parts;
(8) make it easy to manufacture product without error;
(9) arranging the factory layout to reduce search time;
(10) cross-training for mastery of more than one job;
(11) recording and retaining production;
(12) quality and problem data at the workplace;
(13) make line people attempt problems before staff experts;
(14) maintain/improve existing workforce and machines before thinking about new equipment;
(15) use simple, movable and cheap equipment;
(16) have plural rather than singular workstations;
(17) machines and lines for each producer; and
(18) automate incrementally when product variability cannot otherwise be reduced.

The 18 principles from Kasul and Motwani (1994) can be categorised into four groups: quality, cost, and time and customer service. Using a combination of brainstorming

with manufacturing professionals, content validity analysis of literature, Kasul and Motwani (1994) developed a final set of eight factors described as the most "important aspects of WCM practice". These are: quality, lead time, customer service, management commitment, value-added emphasis, material policy, facility control and equipment/technology.

A new paradigm for successful organisations with strong linkages between total quality, learning and world-class organisations has been identified. World-class organisations are described as incorporating both total quality and learning organisation characteristics and able to excel in most of the important dimensions of both total quality and learning organisations. There are no universal criteria for total quality organisations, however ten characteristics can be identified which are common to most total quality enterprises as follows: customer-driven, leadership commitment, full participation of all employees, reward system, reduced cycle time and error prevention. The rest are: management by facts, long-range outlook, partnership development and public responsibility (Hodgetts and Luthans, 1994). There are six characteristics of learning organisations: a desire to learn, knowledge transfer, technology, external environment, shared vision and systems thinking. The characteristics of world-class organisations show most of the features of total quality and learning organisations, respectively. Hodgetts and Luthans (1994) found six pillars of world-class organisations: customer-based focus, continuous improvement, fluid and flexible or virtual organisations, creative human resource management, egalitarian climate and technological support.

Christopher and Thor (2001) suggested 15 strategies for achieving world-class quality as follows: vision, outcomes, customer value, goals, measures, empowerment, teamwork, continuous improvement, innovation, excellence, learning and knowledge, systems, recognition and celebration, sharing and change. The Christopher and Thor (2001) strategies and sub-criteria for enabling world-class performance are shown in Table II.

Dahlgaard-Park and Dahlgaard (2007) reviews well known excellence frameworks and models spanning a 25-year period. In Dahlgaard-Park and Dahlgaard (2007), McKinsey's 7-S framework is described as "success criteria for excellence" with the respective factors categorised into hardware and software factors. The hardware factors are: structure and strategy whilst the software factors are: systems, shared values, skills, staff and style.

Gilgeous and Gilgeous (1999) developed a practical framework to support the implementation of manufacturing excellence across all industries. Seven companies nominated for the Confederation of British Industries and the Department of Trade and Industries in the UK's best factory award were studied as part of a pilot study. In total, 12 key factors which were common to all the companies studied were identified. These are: human factors, survival bid, and re-organisation of existing sites, customer focus, quality standard, investment in new technology and a focus on core competencies. The rest are benchmarking, the integration of design and manufacture, increased communication, strategic planning and collaboration with other companies. The 12 key factors are further re-coded into eight factors common to all seven companies studied. These are: innovation and change, empowerment, learning organisation characteristics, customer focus and commitment, commitment to quality, first-rate management team/belief in organisation, technology and information systems and the establishment of win-win relationships with suppliers. The eight factors were incorporated into the

Strategy	Sub-criteria
Vision	
Outcomes	
Customer value	The manufacturing enterprise wheel
	Re-engineering to a customer focus
	Internal customers
Goals	Vision, outcome, goals
	Setting goals
	Goals and measures
Measures	Examples of families of measures
	Using an objectives matrix
Empowerment	
Teamwork	Temporary teams
	Permanent teams
	Self-managed teams
Continuous improvement	Continuously improved processes
	Elimination of waste
Innovation	
Excellence	Benchmarking
	Strategic benchmarking
	Business process benchmarking
	Goal setting
Learning and knowledge	
Systems	Systems thinking and systems models
	A model focusing on customers
Recognition and celebration	Learning
	Education and training
	Knowledge
Sharing	
Change	

Source: Christopher and Thor (2001)

Table II.
Strategies for achieving world-class quality

manufacturing excellence framework. The most important of the eight factors in rank order are: customer focus and commitment, commitment to quality, first rate management team/belief in the organisation and empowerment (Gilgeous and Gilgeous, 2001).

The seminal work, Hayes and Wheelwright (1984) first used the term "WCM". The term is used to refer to as a set of practices which yield superior performance when used. Six practices of WCM are identified as follows: workforce skills and capabilities, management technical competence, competing through quality, workforce participation, rebuilding manufacturing engineering and incremental improvement approaches (Flynn *et al.*, 1999).

3. Methods

Following a systematic review of primary and secondary literature on performance and performance improvement, the most important factors/CSFs responsible for excellence in organisations were identified. Previous research, literature on existing programmes, models and frameworks commonly used for improving performance were reviewed. The review was extended beyond the construction industry to include a multi-sector review of best practice across a broad range of disciplines. The comparison highlighted the most popular success factors commonly used by practitioners, researchers

and authors. To develop the most important success factors, the respective factors identified from literature and in the various models, frameworks and programmes for improving performance were scored and ranked. Only the factors which appeared at least five times in the literature reviewed were considered. This ensured that only the most popular factors were included. Amongst those considered, some were combined where they shared similar characteristics. Arising from the ranking and scoring of success factors, 16 of the most frequently occurring success factors were selected. These factors were used to develop the research instrument for a questionnaire-based survey of Ghanaian contractors to explore their perceptions of the most important success factors relative to the Ghanaian construction industry. The first part of the questionnaire was used to collect information about the respondents and their projects. In the second part, respondents were asked to show how relevant each of the 16 most popular CSFs were to them and to the success of their projects, on a Likert Scale of 1-5, with "1" representing "not relevant" and 5 "highly relevant". Data collected from the survey were analysed statistically using SPSS tools factor analysis to extract the most important success factors relative to the Ghanaian contractors.

3.1 Sampling

A survey of the largest contractor group, D1K1 contractors was conducted. The survey was conducted in the Kumasi and Accra, the largest cities where a majority of the contractors in this category are based. According to the Ministry of Works and Housing which keeps a register of all Ghanaian contractors in the respective classes, there were 139 D1K1 contractors in Kumasi and Accra at the end of 2010. Thus the population size, N for D1K1 contractors is 139. Using a confidence level of 95 per cent, the sample size, n was calculated using the Israel (2009) formula as follows:

$$n = \frac{N}{1+N(e)^2},$$

given $N = 139$ and $e = 0.05$ for confidence level of 95 per cent:

$$\begin{aligned} n &= 139/1+(139)(0.05)^2 \\ &= 139/1.3475 \\ &= 103.153, \text{ approximated to } 103 \end{aligned}$$

To compensate for non-responses and non-returns, an additional 30 per cent was added to the n value calculated, i.e. 30 per cent of $103 = 30.9$ approximates to 31 questionnaires added for non-responses. Adding 31-103 gives 134, therefore a total of 134 questionnaires were distributed of which 79 were returned. For the sample size of 103, this constitutes a return of 76.699, i.e. approximately 77 per cent returns rate of the questionnaires.

4. Results and analysis

4.1 Scoring and ranking of CSFs

The final list of CSFs in rank order representing the 16 most commonly occurring success factors derived from literature (Table III) are as follows:

(1) leadership and vision;

(2) lean principles/continuous improvement;

Most commonly occurring factors (critical success factors, CSFs), frequency and ranks				
Critical success factors (CSFs)	Frequency	Rank	CSFs in rank order	Rank
Leadership and vision	24	1	Leadership and vision	1
Customer focus	14	6	Lean principles/continuous improvement	2
Strategy	11	9	People/HRM	2
Measurement/information and analysis/knowledge management	15	5	Management of processes	4
Partnerships and management of suppliers	13	7	Measurement/information and analysis/knowledge management	5
People/HRM	20	2	Customer focus	6
Management of resources	5	16	Partnerships and management of suppliers	7
Technology	8	10	Quality/zero defects	8
Results	8	10	Strategy	9
Work culture and environment	7	12	Technology	10
Management of processes	16	4	Results	10
Innovation and creativity	6	14	Organisational design	12
Teamwork	6	14	Work culture and environment	12
Quality/zero defects	12	8	Innovation and creativity	14
Organisational design	7	12	Teamwork	14
Lean principles/continuous improvement	20	2	Management of resources	16

Table III.
Scoring and ranking of CSFs

(3) people/HRM;

(4) management of processes;

(5) measurement/information and analysis/knowledge management;

(6) customer focus;

(7) partnerships and management of suppliers;

(8) quality/ZD;

(9) strategy;

(10) technology;

(11) results;

(12) organisational design;

(13) work culture and environment;

(14) innovation and creativity;

(15) teamwork; and

(16) management of resources.

4.2 Factor analysis of CSFs

4.2.1 Evaluation of reliability and validity measuring instrument. Reliability and validity are important considerations in the evaluation of the characteristics of a questionnaire and can be used to confirm the abstract constructs in models and frameworks in developing a measuring instrument in quality management research (Bassioni *et al.*, 2008).

4.2.2 Reliability. Reliability indicates whether a particular technique applied to the same object will yield the same result each time. It is the quality of measurement method which determines whether the same data would have been collected each time if the phenomenon is repeated (Babbie, 2007). It provides an assessment of the degree of consistency between multiple measures of a variable (Hair *et al.*, 2006). Reliability can be established in three ways – the test-retest method, the split-half method and using established measures (Babbie, 2007). The test-retest method may be used in addition to the use of Cronbach α as a means for establishing reliability (Hair *et al.*, 2006). Bassioni *et al.* (2008) uses Cronbach α as a measure of internal consistency and reliability. The use of Cronbach α using SPSS provides a simplified approach to determining the reliability of the measuring instrument and is the approach adopted in this study. The generally agreed lower limit for Cronbach's α is 0.70 which may decrease to 0.60 in exploratory research. In general, reliability increases with an increase in the number of items (Hair *et al.*, 2006). The α coefficient for the 16 CSFs is 0.893 (Table IV), suggesting that the items have relatively high internal consistency. Generally a reliability coefficient of 0.70 or higher is considered "acceptable" in most social science research situations.

4.2.3 Validity. Validity gives an indication of the certainty of the instrument in actually measuring the concepts it is intended to measure (Bassioni *et al.*, 2008). It is used to refer to the extent to which an empirical measure adequately reflects the real meaning of a concept under consideration. The ultimate validity of a measure is difficult to prove but relative validity can be determined using the measures: face validity, content validity, criterion validity, and content validity, construct validity, internal validity and external validation (Babbie, 2007).

Bassioni *et al.* (2008) demonstrates content validity of the instrument used in two ways. First, the "analysis of the target domain" was achieved through the literature review conducted and the theoretical development of the model based on well-established models. The second approach to content validity was achieved through "expert judgement" was based on the empirical evaluation of expert interviews and case studies and the evaluation of the questionnaire in a pilot study. In this study, content validity has been established through the literature review a theoretical development of a benchmarking framework based on existing research and established models. The factor analysis of CSFs supports the findings from literature. Five of the eight CSFs found to be most relevant to Ghanaian contractors from the factor analysis appear in the top eight of the 16 CSFs identified from literature.

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (MSA) shows the appropriateness of using factor analysis. The overall MSA value should be above 0.5 for factor analysis to be appropriate. The KMO MSA of 0.799 (Table V) shows that factor analysis is a suitable method for the purposes of this survey. Again the observed significance level for the Bartlett's test of sphericity is 0.0000. This is small enough to reject the null hypothesis that the variables in a population correlation matrix are uncorrelated. It is concluded that the strength of the relationship among variables is strong. It is therefore appropriate to proceed with factor analysis for the data.

Table IV. Reliability statistics for 16 CSFs

Cronbach's α	No of items
0.893	16

The latent root (eigenvalues) approach to selection of factors recommends the selection of four factors whose eigenvalues are more than 1. Although it is suggested in the literature reviewed that CSFs may generally be between 4 and 8, four CSFs were considered to be inadequate within the context of the reviewed literature. This confirms the assertion that the eigenvalues approach is recommended where the number of variables to be reduced was between 20 and 50 and that for variables less than 20, there was a tendency for this approach to extract too few factors (Hair *et al.*, 2006). The scree plot approach is therefore used.

The scree plot identifies the optimum number of factors that can be extracted before the unique variance begins to dominate the common variance structure. It is derived by plotting the latent roots against the number of factors in their order of extraction. The point at which the curve first begins to straighten out is considered to be the maximum number of factors to extract. From the scree plot, the first nine factors would qualify because beyond nine factors, a large population of unique variance would be included. Using the scree plot test provides five more factors than if the latent root criterion approach had been used. The scree plot approach recommends a possible nine factors suitable for the purposes of the analysis.

At the point where the curve in Figure 1 appears to go parallel to the component axis, the curve suggests that nine factors should be extracted. This falls outside the four to eight factor range target set from the literature review for this study but also the factor loading for the ninth factor – 0.534 is deemed too small as against the generally recommended minimum of 0.7 and thus the ninth factor should be dropped.

SPSS is used and instructed to extract eight factors. Table VI shows the eight factors extracted and their eigenvalues. Two of the eight factors have their eigenvalues less than 0.7 which is perceived by some to be a general guide of what is acceptable. However they are both greater than 0.4, below which factor loadings are regarded too low and should be discarded.

Table V.
KMO and Bartlett's test

Determination of appropriateness of factor analysis for this study		
Kaiser-Meyer-Olkin measure of sampling adequacy		0.799
Bartlett's test of sphericity	Approx. χ^2	584.867
	df	120
	Sig.	0.000

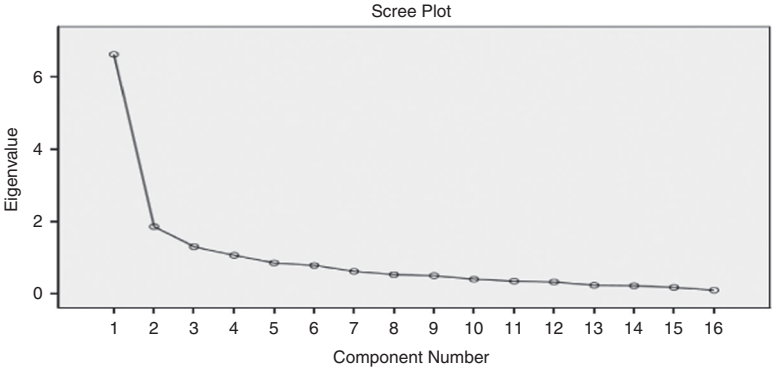

Figure 1.
Scree plot for CSFs

Table VI. Total variance explained for CSFs

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	6.625	41.403	41.403	6.625	41.403	41.403	2.514	15.715	15.715
2	1.856	11.598	53.002	1.856	11.598	53.002	2.202	13.760	29.474
3	1.305	8.158	61.159	1.305	8.158	61.159	2.125	13.279	42.754
4	1.069	6.678	67.838	1.069	6.678	67.838	1.961	12.253	55.007
5	0.858	5.365	73.203	0.858	5.365	73.203	1.683	10.520	65.527
6	0.791	4.944	78.147	0.791	4.944	78.147	1.327	8.294	73.821
7	0.625	3.904	82.051	0.625	3.904	82.051	1.110	6.939	80.760
8	0.534	3.339	85.389	0.534	3.339	85.389	0.741	4.629	85.389
9	0.503	3.145	88.534						
10	0.406	2.538	91.072						
11	0.353	2.205	93.277						
12	0.330	2.062	95.339						
13	0.239	1.494	96.832						
14	0.226	1.415	98.247						
15	0.179	1.120	99.367						
16	0.101	0.633	100.000						

Note: Extraction method: principal component analysis

Table VII shows the communalities for the respective variables. The high communality values show that a large amount of variance in the respective variables has been extracted by the factor solutions. All of the communalities are sufficiently high to proceed with the rotation of the factor matrix.

The component matrix shown in Table VIII shows the results of the factor loadings for the extracted factors. The rotated component matrix in Table IX shows a better structure for the extracted factors arising from a second rotation of the component matrix in Table IX. From the initial rotation, each of the variables had a significant factor loading on only one factor except for "Promotion of Teamwork" which had a factor loading of 0.571 on factor 1 and a loading of 0.570 in factor 2. It was decided that this variable should be deleted to eliminate the cross-loading. The varimax-rotated matrix with the deleted variable "Promoting Teamwork" is shown in Table IX. From Table IX, the extracted factors are the respective factors with the highest factor loadings under the respective components in the rotated component matrix.

From the original list of 16 factors, the eight variables extracted from the factor analysis are: quality and ZD culture, organisational design, work culture and work environment, client satisfaction, strategy, leadership, measurement, analysis of information and knowledge management and implementation of lean principles.

5. Discussion

The existing construction CSFs reviewed relate to construction projects and do not focus on organisational performance. Many of these CSFs are generic and do not reflect the local context. Those which consider the local context are mainly very specific to the countries in which they are developed with little applicability to other countries. Thus justifies the need for a suite of CSFs dedicated to Ghanaian contractors.

CSFs as used refer to a set of organisational best practices which when implemented will lead to organisational success. This paper explores the development of a set of factors which can be used by Ghanaian contractors to improve their performance. Organisational practices associated with performance excellence and best-in-class

	Initial	Extraction
Effectiveness of leadership and vision	1.000	0.848
Implementation of lean principles	1.000	0.868
Motivation and involvement of people	1.000	0.798
Effectiveness of management processes	1.000	0.805
Measurement, analysis and management	1.000	0.855
A focus on customer/clients satisfaction	1.000	0.915
Effective partnerships with suppliers	1.000	0.885
Quality/zero defects culture	1.000	0.961
Effective strategy	1.000	0.815
Technology	1.000	0.910
A focus on results	1.000	0.787
Organisational design	1.000	0.902
Developing a work culture and environment	1.000	0.846
Promotion and the integration of innovation and creativity	1.000	0.772
Promoting teamwork	1.000	0.833
Management of resources	1.000	0.863

Note: Extraction method: principal component analysis

Table VII.
Communalities

	Component							
	1	2	3	4	5	6	7	8
Effectiveness of leadership and vision	0.531	0.195	0.480	−0.477	0.111	0.217	−0.101	−0.004
Implementation of lean principles	0.626	−0.476	0.273	0.120	0.018	0.170	0.207	−0.299
Motivation and involvement of people	0.567	−0.429	0.028	−0.218	0.090	0.485	−0.032	0.018
Effectiveness of management processes	0.654	−0.320	0.105	−0.319	0.087	−0.313	−0.170	0.167
Measurement, analysis and management	0.771	−0.100	0.203	−0.115	−0.107	−0.271	−0.098	−0.319
A focus on customer/clients satisfaction	0.450	0.693	−0.047	−0.185	0.375	0.045	0.220	−0.073
Effective partnerships with suppliers	0.733	0.239	−0.099	−0.172	0.160	−0.350	0.321	−0.015
Quality/zero defects culture	0.113	−0.025	0.592	0.630	0.411	−0.153	−0.089	−0.015
Effective strategy	0.637	−0.391	0.180	0.094	−0.204	−0.114	0.209	0.343
Technology	0.689	−0.256	−0.395	0.239	0.103	0.189	0.331	−0.026
A focus on results	0.749	−0.027	−0.425	0.132	0.051	−0.109	−0.110	−0.035
Organisational design	0.656	−0.004	−0.378	0.134	0.386	0.087	−0.375	0.115
Developing a work culture and environment	0.555	0.502	−0.012	0.244	−0.385	0.115	−0.110	−0.229
Promotion and the integration of innovation and creativity	0.828	0.065	−0.023	0.067	−0.149	0.090	−0.214	−0.025
Promoting teamwork	0.836	0.087	−0.041	0.039	−0.305	−0.146	−0.042	0.090
Management of resources	0.540	0.523	0.267	0.191	−0.127	0.225	0.083	0.339

Notes: Extraction method: principal component analysis. [a]Eight components extracted

Table VIII. Component matrix[a] for CSFs

organisations were identified from a detailed literature study. Covering a wide range of industry sectors, the practices identified from literature were scored and ranked to identify the more popular factors. The CSFs developed integrate the success criteria used by the most popular national and international quality awards such as the EFQM, MBNQA, the Deming Prize as well as the main criteria set out in literature on WCM.

Choosing the organisational practices from a wide pool of factors from across a range of industries ensured that the findings are robust and have a wider applicability. Using factor analysis of the results of the survey of contractors helped to statistically select the most relevant factors for the Ghanaian contractors. Following the factor analysis, the following factors were identified as being most critical to the organisational success of Ghanaian contractors:

(1) quality and ZD culture;

(2) organisational design;

(3) work culture and work environment;

(4) client satisfaction;

(5) strategy;

(6) leadership;

(7) measurement, analysis of information and knowledge management; and

(8) implementation of lean principles.

	Components							
	1	2	3	4	5	6	7	8
Effectiveness of leadership and vision	0.002	0.144	0.190	0.259	0.249	0.806	0.075	0.017
Implementation of lean principles	0.027	0.770	0.112	0.381	−0.004	0.068	0.205	0.230
Motivation and involvement of people	0.289	0.738	−0.038	0.096	−0.055	0.405	0.077	−0.109
Effectiveness of management processes	0.348	0.168	−0.158	0.620	0.097	0.323	0.326	−0.007
Measurement, analysis and management	0.166	0.267	0.297	0.782	0.152	0.156	0.131	0.077
A focus on customer/clients satisfaction	0.171	−0.032	0.270	−0.018	0.844	0.259	−0.163	0.019
Effective partnerships with suppliers	0.232	0.124	0.132	0.430	0.741	0.030	0.241	−0.036
Quality/zero defects culture	0.012	0.040	0.036	0.043	−0.002	0.008	0.043	0.982
Effective strategy	0.153	0.307	0.117	0.287	−0.023	0.090	0.823	0.063
Technology	0.462	0.669	0.136	0.037	0.291	−0.253	0.275	−0.061
A focus on results	0.682	0.211	0.271	0.322	0.221	−0.138	0.195	−0.099
Organisational design	0.904	0.152	0.110	0.096	0.150	0.116	0.034	0.077
Developing a work culture and environment	0.154	0.041	0.884	0.174	0.162	0.011	−0.022	−0.020
Promotion and the integration of innovation and creativity	0.458	0.309	0.497	0.337	0.113	0.222	0.144	0.013
Management of resources	0.102	0.020	0.645	−0.165	0.343	0.352	0.323	0.193

Notes: Extraction method: principal component analysis; rotation method: varimax with Kaiser normalisation. [a]Rotation converged in 13 iterations

Table IX.
Rotated component matrix with "teamwork" deleted

In order to achieve performance excellence, Ghanaian contractors should aim to provide just what the client wants and avoid the need for re-work, adopt an organisational structure which enables optimum productivity, create an work environment which enhances production, aim to satisfy their clients, develop an effective strategy, ensure an effective leadership, measure performance and promote a learning culture and use Lean Principles. The final list agrees largely with many of the existing construction-related CSFs such as Donkor (2011) and Chua *et al.* (1999). The uniqueness of this study lies in the fact that these have been validated by Ghanaian contractors as being the most relevant relative to their context.

The CSFs for Ghanaian contractors proposed in this study represent a checklist for Ghanaian contractors new to benchmarking. Given that resources available to contractors for improving performance are limited, the recommendation is for Ghanaian contractors to first focus their improvement efforts on selected CSFs. For such organisations, this is a useful first step to the ultimate attainment of business excellence. The CSFs developed for Ghanaian contractors are not exclusive but represent a useful first step to benchmarking and general performance improvement by contractors with little experience in these sectors. The implementation of these factors will not automatically lead to improved performance but are a means to an end as they highlight the areas that organisations seeking to improve their performance must focus their efforts and seek to improve. The effective integration of these into the management and business practices of organisations offers opportunities to improve performance.

That this study was limited to only the largest contractors in Ghana (D1K1) should be taken into account in the application of the outcomes since different classes of contractors show different characteristics. Again whilst most of the issues that Ghanaian contractors

face are industry wide, this study surveyed only construction contractors. These limitations affect the results and must be duly acknowledged in making generalisations relating to industry performance within the Ghanaian construction industry.

5.1 Implications for Ghanaian contractors

The CSFs identified in this paper can be used as target areas for improving performance. They can be used as the criteria for:

- measuring their performance;
- benchmarking their performance against the best-in class; and
- setting targets for improving their performance.

These actions will help to identify the performance gaps and the actions required to address deficiencies in performance or fulfil the contractors' full potential. The process will also expose them to the highest standards of performance amongst global and construction industry leading firms. To improve their performance, Ghanaian contractors can choose from the list of CSFs in line with the vision set out by top management. Those new to benchmarking or those with little experience of benchmarking may start with just a few CSFs at a time. It is recommended that not more than four CSFs be selected for benchmarking at a time.

6. Conclusion

This paper explored the development of a set of factors which can help address poor and underperformance amongst Ghanaian contractors. These CSFs developed represent best practices drawn from across a range of industries.

Eight factors have been identified as the CSFs for Ghanaian contractors. These are:

(1) quality and ZD culture;

(2) organisational design;

(3) work culture and work environment;

(4) client satisfaction;

(5) strategy;

(6) leadership;

(7) measurement, analysis of information and knowledge management;

(8) implementation of lean principles.

The CSFs presented in this study show which best practices are critical to improved performance. If the wide perceptions of poor performance amongst Ghanaians can be changed, Ghanaian contractors need to demonstrate consistently improved performance on the projects they execute in these CSFs.

Future research will be required to explore empirically, the relationship between the CSFs and overall performance for correlation and causality. This will demonstrate the extent of improvements in the respective CSFs that affect overall performance. Future research can also review what constitutes superior performance in leading contractors at the global level in the CSFs and identify global best-in-class industries in the respective CSFs. This can be used to establish benchmark standards for Ghanaian contractors in the CSFs.

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