Analysis of the South African construction industry business environment

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Abstract

Purpose – The study aims to identify and examine the construction organisational environments and its dimensions that have an impact on the performance of contracting companies in South Africa.

Design/methodology/approach – The study reports the result of quantitative research that obtained data from 72 construction organisations registered with the South African construction industry development board via a questionnaire survey. Descriptive statistics, non-parametric and exploratory principal component analysis were used to summarise forms of correlations among observed variables and to reduce a large number of observed variables to a smaller number of factors that provide an operational definition for the underlying dimension.

Findings – This study identified six exogenous and three endogenous environmental factors that have a varying degree of impact on construction organisation performance. Four dimensions of the environment were also examined, and environmental complexity has the highest variance explained which implies that the complexity of the construction business environment significantly influences the performance of construction firms.

Research limitations/implications – This paper studies the environment of the South African construction industry using cross-sectional data in exploratory research. A confirmatory study should be conducted using a longitudinal panel design with a larger sample in similar future research.

Practical implications – The study offers practical implications to construction organisation owners operating in the South African construction industry to understand the need to acquire market and environmental data and process them in a way that will reduce its uncertainty when making strategic decisions.

Originality/value – This study contributes to the current discourse on organisations' business environments to better understand their influences on organisational performance.

Keywords South Africa, Business environment, Construction industry, Construction organisation

Paper type Research paper

1. Introduction

The strategies adopted by any organisation are determined generally by its organisational environment and any organisation that is able to achieve strategic alignment between the

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planning process and environmental influences are likely to achieve superior performance (Sener, 2012; Lababidi *et al.*, 2020). This is why researchers and practitioners have devoted much attention to the study of the relationship between an organisation and its environment in strategic management (Lababidi *et al.*, 2020). The business environment may be divided into a task or immediate environment and the remote or general environment (Yap *et al.*, 2011; Jung *et al.*, 2020). According to Yap *et al.* (2011), the task environment comprises industry-specific factors and includes all organisations that the one under consideration must interrelate or network with to ensure survival and grasp growth opportunities. The remote environment comprises of external factors that impact on all organisations operating in the environment; it includes the state of the economy, advancement in technology, political instability, regulatory frameworks, demographic structure and socio-cultural settings (Kotler and Armstrong, 2013).

Nadkarni and Barr (2008) viewed the task environment as being closer to the organisation as it is industry-specific. They argued that this closeness makes it easier for organisations to obtain relevant information about the threats that inhibit their businesses as well as the opportunities that present themselves and thus to understand the timing of growth. Priem *et al.* (2002) contended that the task environment is complex, and because of its rapid changes, it expresses the essence of an organisation better than does the general environment. Yap *et al.* (2011) agreed with this view and drew evidence in support of the argument that the task environment is connected to a higher degree of strategic indecision which may directly influence the organisation. The task environment was thus considered to be more significant for competitive strategy, particularly in setting organisational objectives and their achievement (Yap *et al.*, 2011).

However, Priem *et al.* (2002) asserted that the threats and opportunities presented by the general environment appear to be more conceptual than the task environment and that the effectiveness of growth is complex to assess. Pati *et al.* (2017) built on this assertion and concluded that an organisation's external environment is a source of opportunities and challenges because they are beyond the control of organisations, hitherto they are pervasive, exerting substantial impact on their performance. These assertions gave support to Oyewobi (2014) findings that the organisation's general environment exhibits an indirect influence on organisational performance and is related to business strategy. Therefore, there is the need to carefully analyse the operating environment both internal and external because it is considered as a vital element in effective business decisions making process. However, early researchers have classified the operating environment into different dimensions that describe the characteristics of the environment (Meinhardt *et al.*, 2018). These environmental dimensions have been reported to have numerous theoretical and empirical contributions that suggest they bring opportunities and challenges to organisations (Pati *et al.*, 2017). This study explores these issues in the context of the construction industry, in an attempt to find out what differentiates the construction business environment from that of other industries.

However, South Africa's construction business environment that is designed in line with the UK practices in terms of structure is believed to have a well-controlled and improved competition system orchestrated by the Competition Commission (Gasa, 2012). In spite of the similarities, studies such as Lansley (1987) and Shirazi *et al.* (1996) that profiled business environments in the UK have shown that factors influencing the industry environment are country-specific.

Therefore, this study intends to answer the following questions:

Q1. What environmental variables and dimensions affect the performance of construction organisations?

Q2. Can these variables and dimensions be clustered into components?

Q3. Can the relationship among these components be evaluated to enhance the understanding of the construction industry environment?

The focus of this paper is on the South Africa construction industry. However, it is believed that the findings may apply to all developing or emerging countries, as they experience comparable problems in terms of the unstable business environment, weak institutions, financial instability and a bias towards policies engendering industry development (Puffer *et al.*, 2010; Pati *et al.*, 2017). The next section of the paper presents the literature review, which assesses the nature of the construction industry environment, measures of the environment and dimensions of the environment. After that, the research methods are outlined, followed by the data analysis and discussion of findings and conclusions and recommendations sections.

2. Literature review

This section reviews the literature on the business environment.

2.1 Construction business environment

The construction industry is one of the most dynamic and complex industrial environments (Oyewobi *et al.*, 2017). As in all other industries, construction organisations operate in business environments where careful attention is required by managers to identify those environmental forces that should form the basis of their strategies (Sener, 2012; Oyewobi *et al.*, 2016). In a related development, Oyewobi (2014) posited that business organisations do not exist in a vacuum; instead, they interact with the environment, and it is the environment that gives organisations their means of survival. Oyewobi (2014) reported that the construction business environment as the interaction between an organisation's internal and external environment, which consist of pertinent physical and social factors both within and outside the organisation's boundaries; and the influence of decisions by individuals and units of activity. The construction organisation is project-based, and as such, researchers conceptualised the construction business environment like a construction *project* business environment, which is typified as having a fragmented nature in terms of operations and where stakeholders' relationships are highly adversarial because of the complexities and absence of real cooperation (Cicmil and Marshall, 2005). Xue *et al.* (2010) highlighted that previous studies on the business environment in the construction industry that focused mainly on construction project or stage are changing because of trends of globalisation of the construction market and micro-changes in organisation management. Chen (2003) stated that although the complete explanation of the external environment is usually prohibitive, but the need to explore the influence of the environment on the organisation is widely received among researchers.

2.2 Measuring the business environments

Sharfman and Dean (1991) contended that a lack of widely accepted single measures or single constructs of the organisational environment makes it challenging to have comprehensive literature on the impact of the environment on the organisation performance. However, the theoretical perspectives to understanding the impact of the environment on organisation have been advanced by previous researchers: these include the decision/task

uncertainty (Bradley *et al.*, 2011) the environmental circumstance and the perceived instability (Posen and Levinthal, 2012); and the environment as a source of resources (Jung *et al.*, 2020). It appears that few researchers have been able to combine some of these conflicting views (Dess and Beard, 1984; Miller, 1987). In spite of the lack of consensus on a single measure of environment, organisational researchers have considered the environment as an important source of organisational exigencies (Thompson, 1967; Jung *et al.*, 2020).

According to Chen (2003), the understanding of the environmental effects on organisation performance can be considered from two streams of approaches. The first stream considers the influence of uncertainty on organisational structures, whereas the second approach uses dimensions to describe the importance of environmental forces for the organisation. The other debate found in the literature on the environment focussed on whether the organisational environment should be considered as objective reality or conceptual event (Chen, 2003). The observed measures are founded on survey items which allow researchers to exemplify the organisation's environment from the perspective of organisation members, whereas objective measures are based on archival data obtained at the industry level (Dess and Beard, 1984; Dickson and Weaver, 1997; Duncan, 1972).

2.3 Dimensions of the business environment

The dimensions of the business environment, according to Meinhardt *et al.* (2018) and Jung *et al.* (2020) reflect a history of productive research on environmental forces and theory which lay the foundation for further research. In this study, these dimensions: munificence, dynamism, complexity and competitive intensity are adopted to form the basis for the measures of the environment. The study identifies the forces in the organisation's business environment and examines how these environments, together with the effect of environmental dimensions, can influence organisational performance. Tung (1979) defined environmental dimensions as the attributes of the environment confronting the central unit. Environmental dimensions shape business environments and are considered to be vital characteristics of the business environment concerning strategic decision-making (Chi *et al.*, 2009). Sharfman and Dean (1991) categorised the different dimensions of the environment under three main headings of complexity, dynamism/stability and resource availability, as shown in Table 1.

A plethora of authors (for example, Dess and Beard, 1984; Miller, 1987; Goll and Rasheed, 1997; Baum and Wally, 2003; Nandakumar, 2008) mainly from the mainstream strategic management field have classified latent environmental variables that jointly shape the business environment in a variety of ways. It can be seen from Table 1 that the top three dimensions cited are complexity, dynamism and munificence. These dimensions were adopted to ascertain the level at which the environmental factors hinder the understanding of the environment, the degree of predictability of the environment and the extent to which the available resources in the environment can support the growth of organisations relative to the number of competitors. However, the competitive intensity did not surface on the list of measures of the environment but was introduced as a result of the characteristics and the competitive nature of the construction industry. These dimensions are considered as some of the factors contributing to environmental challenges which provide many of the constraints, uncertainties, and contingencies for organisation transacting in the business environment (Dess and Beard, 1984) and they are discussed below.

2.3.1 Munificence. It refers to the presence of a multitude of resources and opportunities that prevail in the environment in which organisations work, as well as the competition for those opportunities and resources amongst organisations. Sougata (2004) listed environmental factors as market strength and legislative intensity. Rosenbusch *et al.* (2013)

Previous research works on the environment	Complexity	Dynamism/stability	Resources availability
March and Simon (1958)			Munificence
Emery and Trist (1993)	Complexity routinely	Instability	
Thompson (1967)	Heterogeneity	Dynamism	
Child (1972)	Complexity	Variability	Illiberality
Mintzberg (1979)	Complexity diversity	Stability	Hostility
Aldrich (1979)	Concentration heterogeneity	Stability turbulence	Capacity consensus
Tung (1979)	Complexity routinely	Instability	
Dess and Beard (1984)	Complexity	Dynamism	Munificence
Miller (1987)	Heterogeneity	Dynamism	Hostility
Ward *et al.* (1995)		Dynamism	Munificence
Goll and Rasheed (1997)		Dynamism	Munificence
Nandakumar (2008)	Heterogeneity	Dynamism	Hostility

Source: Adapted from Sharfman and Dean (1991)

Table 1. Conceptualisation of the environment

asserted that environmental munificence represents the extent to which a firm's task environment supports growth through the existence of opportunities and the abundance of external resources. According to Jung *et al.* (2020), munificence suggests that organisations have sufficient access to critical external resources. However, Oyewobi (2014) reported that the munificence element is one of the market environment's most important endogenous variables regarding the organisational decision-making process, arguing that low munificence indicates resource scarcity, whereas high munificence suggests an abundance of resources. Meanwhile, Jung *et al.* (2020) argued that environmental munificence increases the stability of organisations and reduces the need for alignment.

2.3.2 Dynamism. It alludes to the business environment's uncertainties. Chi *et al.* (2009), Kabadayi *et al.* (2007) and Nandakumar *et al.* (2010) viewed environmental dynamism as the speed or rate of growth in a market, as well as consistency or volatility in the corporate environment, arising from the behaviour of industry competitors or consumers, including technological advances and aggregate demand changes. Shirazi *et al.* (1996) argued that business conditions in construction vary from easy to complex. They argued that several factors, such as unforeseen events could cause variability in the business environment. Shirazi *et al.* (1996) stated that the following factors are the probable cause of environmental dynamism or volatility. These are modifications and change orders imposed by the company, constraints of staff and shifts in project goals. These can be considered as factors that affect the environment of the project. Building business dynamism can be affected from a wider perspective by volatile factors such as national income, production growth, price indices, inflation, unemployment rates, incomplete information and policy changes (Shirazi *et al.*, 1996).

2.3.3 Complexity. Several authors, including Aldrich (1979) and Nandakumar (2008), referred to environmental complexity as heterogeneity, describing whether the components in the business environment are similar or different. Environmental complexity depends on the level of uncertainty in the role of the strategist and the need to concentrate on whether there are several, few in number, similar or different environmental factors included in the strategic decision-making process (Shirazi *et al.*, 1996). Shirazi *et al.* (1996) measured the complexity factor within the construction industry sector by the number of subcontractors to be organised and the scope of the activities involved. Others include the extent to which the clients or their representatives are involved, including the requirement for input to

control and schedule the task. Some of these considerations are based on the environment of the company. Kabadayi *et al.* (2007) considered that environmental complexity depicts the number and diversity of rivals, suppliers, buyers, customers, subcontractors, consultants, financiers, marketing intermediaries, civil society organisations, government agencies as well as other environmental conditions that should be considered by decision-makers in implementing their strategies.

2.3.4 Competitive intensity. Competitive intensity is the degree to which an organisation operates in markets that, because of a large number of obviously competing organisations, limit its potential growth opportunities (Auh and Menguc, 2005). In other words, the extent to which threats and animosity faced by organisations arising from the environment influence regulatory and market forces is regarded as competitive strength (Chi *et al.*, 2009; Nandakumar *et al.*, 2010). Shirazi *et al.* (1996) emphasised that environmental hostility has an impact on organisational structure via work expectations and reaction rates to issues. This is because organisations need to respond quickly to environments with higher competition. Strong competition leads inevitably to hostility, and in business, the environment can result in an adversarial relationship among parties. A hostile business environment prefers a hierarchical system of management and direct oversight for tight coordination of operations and subordinate control.

3. Research methods

The study adopted a quantitative research approach that involves a questionnaire survey of a sample of construction firms that were active and duly listed on the Construction Industry Development Board (cidb) Register of Contractors (RoC) as at April 2013 and were in business for over five years.

3.1 Sampling technique and sampling size

Because of a large number of contractors registered with the cidb and the nature of the research questions, not all organisations were considered relevant to the study. The study focused on contractors who were listed in Grades 7, 8 and 9 of the cidb RoC. This choice was based on Construction Industry Development Board (2012) assertion that organisations in those categories adopted a proactive strategic approach and have in place the technology and financial strength for competitive advantage. The sample was further limited by selecting only those contractors in the above grades who were based in Gauteng, Kwazulu Natal and Western Cape Provinces of South Africa. These Provinces were considered because of the high concentration of construction organisations and also because approximately 70% of all projects commissioned by the public sector from 2008 to 2013 were executed in those provinces (Statistics South Africa, 2011, 2012).

It would have been impossible to obtain data from all organisations included in the study population because of time and cost constraints, as well as the geographical dispersion of the organisations. Hence, sampling was used to have a size that will be representative of the population being studied. The sampling frame for this research was the contractors listed in Grades 7, 8 and 9 on the cidb RoC for both civil engineering and general building contracts operating in the three provinces shown in Table 2.

To ascertain a suitable number of participants to select for the survey from the sampling frame, the iterative formula used by Ankrah (2007) was adopted:

$$ss = \frac{z^2 p(\grave{1} - p)}{c^2}$$

where

ss = sample size;
z = standardised variable;
p = percentage picking a choice expressed as a decimal;
c = confidence interval expressed as a decimal.

To obtain a sample size with a given degree of accuracy, the worst-case percentage picking choice of 50% was assumed as stated in Ankrah (2007); 95% confidence level was also assumed as in other studies with a significance level of $\alpha = 0.05$; $z = 1.96$ at 95% confidence level; and a confidence interval (c) of $\pm 10\%$ was taken:

$$ss = \frac{1.96^2 \times 0.5(1 - 0.5)}{0.1^2}$$

$$ss = 96.04$$

The preliminary sample size required for the quantitative questionnaire survey was, therefore, 96 construction organisations, being the figure required, according to Ankrah (2007) to generate a new sample size:

$$New\ ss = \frac{ss}{1 + \left[{}^{(ss-1)}/_{pop}\right]}$$

where pop = population.

$$\text{Therefore } New\ ss = \frac{96.04}{1 + \left[{}^{(96.04-1)}/_{577}\right]}$$

New ss = 82.46, adopted value = 83.

From the above calculation, the sample size for this study was estimated to be 83 construction organisations. Ankrah (2007) noted that the construction industry is a difficult environment to obtain a high level of responses, most notably when a questionnaire survey is involved. As a result of this, Idrus and Newman (2002) considered any questionnaire

Province	Grade	Civil engineering	General building	Total
Gauteng	7	120	89	209
	8	50	44	94
	9	33	23	56
Kwazulu Natal	7	35	55	90
	8	22	13	35
	9	4	1	5
Western Cape	7	25	28	53
	8	11	10	21
	9	7	7	14
Total		307	270	577

Source: cidb (April 2013; available at https://registers.cidb.org.za/PublicContractors/)

Table 2.
List of contractors on the cidb register

survey response in the range of 20%–30% to be adequate for research in the construction industry. Therefore, in considering non-response, the highest boundary was taken (30%) to adjust for the survey sample.

$$Survey\ sample\ size = {}^{New\,ss}/_{0.3} = 277\ \text{Construction organisations}$$

Therefore, based on this calculation, 277 construction organisations from the cidb database were randomly selected. Table 3 shows the sample size surveyed from each contractors' grade and province.

3.2 Survey instrument

The questionnaire was structured to probe the characteristics of the organisations, and how the environment influences the organisations' performance.

The first section elicited data on demographics while the second section centred on organisations' business environment within the South African construction industry. The environmental variables were divided into exogenous and endogenous factors (adapted from Ibrahim *et al.*, 2006), involving both relationships with stakeholders and macroeconomic variables. This part of the questionnaire also comprised of scales used to measure environmental constructs that might affect performance, namely, munificence, complexity, competitive intensity and dynamism. Munificence and dynamism of the environment were estimated using four items, whereas environmental complexity and competitive intensity were estimated with three and six items, respectively. The respondents were requested to rate the changes in their business environment in the past five years and indicate the influence of the variables over the same period.

3.3 Pilot survey

Pilot testing is required to eliminate threats to the internal validity of data. A pilot test is a small-scale study to test a questionnaire, interview checklist or observation schedule. It is done to minimise the possibility of respondents having problems in answering the questions and of data recording problems, as well as to allow some assessment of the questions' validity of the data that will be collected (Saunders *et al.*, 2016). Pilot surveys also highlight any part of the questionnaire that needs clarification and refinement. For the present study, feedback on the draft questionnaire was sought by mailing the questionnaire to four researchers in the built environment within South Africa to examine the completeness of the questions. After that, 30 questionnaires were sent to contractors in South Africa, 16 of which

Table 3. Stratification of the sample

Province	Grade	Civil engineering	General building	Total
Gauteng	7	57	42	99
	8	24	21	45
	9	16	11	27
Kwazulu Natal	7	17	26	43
	8	10	10	20
	9	2	1	3
Western Cape	7	12	13	25
	8	5	4	9
	9	3	3	6
Total		146	131	277

were completed. In all cases, top management members in their respective organisations responded to the pilot survey. The responses provided by the contractors and built environment researchers and the researcher's supervisors were used in refining the questionnaire before its full-scale administration.

4. Analysis and discussion

4.1 Business environment

Perceptions of the business environment were measured by asking participants to rate the severity of the impact of several features of the business environment. These fell into two categories: exogenous factors (factors outside the boundaries of the organisation) and endogenous factors (factors within the boundaries of the organisation). From the mean scores and frequencies of responses shown in Table 4, it was found that six exogenous factors exhibited high severity indices ranging from 0.78 to 0.89, with mean values also ranging from 3.90 to 4.26. These were: corruption and lack of transparency, technological impact, the intense rivalry among organisations, political instability, fiscal policy, procurement act and legislation and interest rate instability

These perceptions are consistent with previous findings. For example, Bowen *et al.* (2012) acknowledged that bribery and unfair tendering practices pose problems in the South African construction industry. In addition to these ethical violations, well-intentioned government interventions have also created challenges in the industry. Over 30 Acts relating to the construction industry have been enacted since 1994 to counteract the inequality of the past and give preference to black-owned organisations, especially in procuring projects (Construction Industry Development Board, 2004). These have significant impacts on organisational survival and performance by providing an unlevelled playground for organisations through preferential procurement.

Table 4 also shows the endogenous factors that were perceived to have a significant impact on organisational performance. Based on the ranking of the variables by the respondents, the first six highest-ranked factors were: demand for construction (mean = 4.25, SI = 0.85); prolonged negotiation period prior to award (mean = 4.17, SI = 0.83); leadership style (mean = 4.17, SI = 0.83); management strategy (mean = 4.04, SI = 0.81); business competition law (mean = 4.00, SI = 0.80); cancellation of tenders (mean= 3.99, SI = 0.80).

4.1.1 Factor analysis of business environment factors. To further understand the environmental factors that influence the construction industry environment and to explore the structure of the data obtained, the study considered the two main methods for creating factors that characterise the structure of the variables in the analysis. These included the principal component analysis (PCA) and factor analysis (FA; Field, 2013). These two methods aim to reduce a large set of variables into a smaller set of dimensions called "factors" in FA and "components" in PCA. To determine if the data obtained were suitable for FA, two main issues are to be considered as indicated by Pallant (2010): sample size and the strength of the relationship among the variables. Although the study is only interested in providing an empirical summary of data (Tabachnick and Fidell, 2013), to enhance the understanding of the construction business environment which makes PCA most relevant, but a further examination of the strength of the interrelationships among the items showed that some of the items exhibited correlation coefficients greater than 0.3 (Tables 5 and 6). Hence, the study aligned with the recommendation of Tabachnick and Fidell (2013) which suggested that if a few correlations above 0.3 are found in a correlation matrix, FA may not be appropriate. However, the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy (MSA) and Bartlett test of sphericity were also conducted for the business environment

Coding	Variables for the business environment	Mean response	SD	SI	Rank
	A. Exogenous factors				
EX14	Corruption and lack of transparency	4.26	1.17	0.89	1
EX6	Technological impact	4.1	1.01	0.82	2
EX17	The intense rivalry between organisations	4.03	0.77	0.81	3
EX2	Political instability	4.01	1.18	0.8	4
EX3	Fiscal policy	4.01	1.07	0.8	4
EX1	Procurement act and legislation	3.9	0.99	0.78	6
EX9	Interest rate instability	3.83	1.11	0.77	7
EX13	Change in tax regulation and policy	3.85	1.03	0.77	7
EX12	Industrial and trade policy	3.69	0.87	0.74	9
EX4	Employment pattern and attitude to work	3.67	1.11	0.73	10
EX10	Exchange rate fluctuation	3.65	1.15	0.73	10
EX7	Strong political opposition/hostility	3.58	1.06	0.72	12
EX8	Inconsistencies in government policies and laws	3.55	1.38	0.71	13
EX11	Legislation change/inconsistencies	3.55	1.09	0.71	13
EX5	Health and safety issues	3.5	1.3	0.7	15
EX16	Environmental issues and legislation	3.26	1.17	0.65	16
EX15	Socio-cultural differences between main stakeholders	3.21	0.93	0.64	17
	B. Endogenous factors				
EN2	Demand for construction	4.25	0.8	0.85	1
EN3	Prolonged negotiation period prior to award	4.17	0.84	0.83	2
EN16	Leadership style	4.17	0.92	0.83	2
EN15	Management strategy	4.04	0.79	0.81	4
EN4	Business competition law	4	0.84	0.8	5
EN5	Cancellation of tenders	3.99	0.96	0.8	5
EN9	Career path for employees	3.97	1.03	0.79	7
EN14	Team spirit among employees	3.9	0.95	0.78	8
EN6	Poor financial status	3.83	1.09	0.77	9
EN7	High finance cost of projects	3.85	1.15	0.77	9
EN12	Lack of government guarantees	3.76	1.00	0.75	11
EN17	Manpower problem associated with trade unions	3.71	1.31	0.74	12
EN1	Mission and vision of the organisation	3.67	0.95	0.73	13
EN11	Compliance with cidb rules	3.61	1.11	0.72	14
EN10	High bidding costs	3.53	0.8	0.71	15
EN8	Lack of creditworthiness	3.24	1.27	0.65	16
EN13	Bankruptcy of firm'	3.18	1.28	0.64	17

Table 4.
Frequencies of response, means and significance index for business environment

factors, as shown in Tables 7 and 8. These two tests provided the minimum standard that the data should meet to be considered adequate for analysis. The value of the KMO can vary between 0 and 1, with 0.50 suggested as a minimum (Field, 2013; Hair *et al.*, 2010). The Bartlett test indicates whether the correlation matrix is significantly different from the identity matrix (that is a matrix in which all of the diagonal elements are 1, and other elements are 0). The Bartlett test indicates the strength of the relationship among variables and the significant level of Bartlett's test is a requirement for the data to be considered suitable for analysis (Field, 2013).

Pallant (2010) asserted that after the data is appropriate for PCA, the next step is factor extraction, which is the process of identifying potential components within the data, and deciding how many of these to retain (Field, 2013). This involves determining the variables that strongly loaded on the components (indicating that such variables measure the construct). The most commonly used method of extracting the factors is the principal

Table 5. Correlations for exogenous environmental variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Procurement act and legislation	1																
2 Political instability	0.385**	1															
3 Fiscal policy	0.147	0.201	1														
4 Employment pattern and attitude to work	0.263*	0.346**	0.217	1													
5 Health and safety issues	0.593**	0.546**	0.198	0.107	1												
6 Technological impact	0.346**	0.720**	0.142	0.267*	0.542**	1											
7 Strong political opposition/ hostility	0.135	0.433**	0.491**	0.143	0.573**	0.487**	1										
8 Inconsistencies in government policies and laws	0.173	0.263*	0.262*	−0.015	0.447**	0.294*	0.632**	1									
9 Interest rate instability	0.303**	0.666**	0.405**	0.001	0.399**	0.541**	0.430**	0.381**	1								
10 Exchange rate fluctuation	−0.079	−0.027	0.496**	−0.135	0.240*	−0.08	0.422**	0.494**	0.152	1							
11 Legislation change/ inconsistencies	0.129	0.378**	0.248*	0.365**	0.359**	0.541**	0.560**	0.392**	0.182	0.134	1						
12 Industrial and trade policy	0.323**	0.739**	0.064	0.208	0.456**	0.536**	0.316**	0.368**	0.486**	−0.056	0.468**	1					
13 Change in tax regulation and policy	−0.015	0.21	−0.062	−0.278*	0.163	−0.121	0.083	0.377**	0.248*	0.382**	−0.15	0.302*	1				
14 Corruption and lack of transparency	0.128	0.059	0.355**	−0.019	−0.038	−0.127	0.12	0.261*	0.355**	0.273*	−0.146	0.136	0.452**	1			
15 Socio-cultural differences between main stakeholders	0.295*	0.151	0.195	0.447**	0.133	0.038	−0.082	−0.222	0.061	−0.272*	0.245*	0.065	−0.098	−0.164	1		
16 Environmental issues and legislation	0.022	0.525**	0.222	0.101	0.410**	0.311**	0.566**	0.585**	0.411**	0.318**	0.468**	0.551**	0.581**	0.274*	0.167	1	
17 Intense rivalry between organisations	0.059	0.294*	0.428**	0.390**	−0.042	0.16	0.136	−0.094	0.318**	0.186	0.319**	0.273*	0.094	0.478**	0.168	0.226	1

Notes: **Correlation is significant at the 0.01 level (two-tailed); *correlation is significant at the 0.05 level (two-tailed)

Table 6.
Correlations for endogenous environmental variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Mission and vision of the organisation	1																
2 Demand for construction	0.283**	1															
3 Prolonged negotiation period before award	0.102	0.091	1														
4 Business competition law	0.117	−0.135	0.232*	1													
5 Cancellation of tenders	0.105	0.399**	0.261*	0.025	1												
6 Poor financial status	0.254*	0.039	0.272**	0.265*	0.162	1											
7 High finance cost of projects	0.097	0.081	0.122	0.356**	0.194	0.197	1										
8 Lack of creditworthiness	0.173	−0.031	0.314**	0.098	0.334**	0.481**	0.369**	1									
9 Career path for employees	−0.08	−0.208*	−0.072	0.364**	−0.058	0.116	0.432**	0.065	1								
10 High bidding costs	−0.008	0.056	0.118	0.202	0.118	0.064	0.287**	0.078	0.1	1							
11 Compliance with cidb rules	0.136	0.226*	−0.213*	0.006	−0.029	−0.082	−0.031	−0.102	−0.213*	0.13	1						
12 Lack of government guarantees	0.181	0.239*	0.195	−0.018	0.455**	0.291**	−0.088	0.132	−0.043	−0.002	−0.069	1					
13 Bankruptcy of firm'	0.162	0.192	0.191	0.171	0.158	0.677**	0.049	0.391**	0.054	0.154	−0.096	0.332**	1				
14 Team spirit among employees	0.105	0.108	0.198	0.240*	0.146	−0.108	0.302**	−0.004	0.289**	0.257*	−0.034	−0.142	−0.053	1			
15 Management strategy	0.17	0.357**	0.222*	−0.033	0.204	0.117	0.02	0.063	−0.216*	0.118	0.267**	0.063	0.035	0.1561			
16 Leadership style	0.18	−0.003	0.304**	0.084	0.04	0.204	−0.108	−0.05	−0.069	0.167	0.079	0.092	0.186	0.1190.348**	1		
17 Manpower problem associated with trade unions	−0.037	−0.056	0.206*	0.304**	0.014	0.273**	0.273**	0.233*	0.097	0.230*	0.186	−0.051	0.112	−0.0340.17		0.397**	1

Notes: **Correlation is significant at the 0.01 level (two-tailed); *correlation is significant at the 0.05 level (two-tailed)

Table 7. Rotated component matrix for exogenous environmental factors

S/No	Exogenous factors	Factor loading	Eigen values	% of variance	Cumulative (%)	Communalities (*h*)
	Factor 1 – political factors					
EX2	Political instability	0.889				0.849
EX6	Technological impact	0.872				0.853
EX9	Interest rate instability	0.652				0.747
EX11	Legislation change/inconsistencies	0.578				0.818
EX12	Industrial and Trade policy	0.819	*5.505*	*32.383*	*32.383*	0.784
	Factor 2 – legislation					
EX13	Change in tax regulation and policy	0.941				0.911
EX16	Environmental issues and legislation	0.702	*2.606*	*15.332*	*47.715*	0.893
	Factor 3 – ethical factors					
EX3	Fiscal policy	0.629				0.821
EX14	Corruption and lack of transparency	0.792				0.794
EX17	The intense rivalry between organizations	0.792	*1.850*	*10.885*	*58.600*	0.84
	Factor 4 – institutional factor					
EX7	Strong political opposition/hostility	−0.864				0.822
EX8	Inconsistencies in government policies and laws	−0.763				0.758
EX10	Exchange rate fluctuation	−0.74	*1.580*	*9.293*	*67.893*	0.781
	Factor 5 – procurement issues					
EX1	Procurement act and legislation	0.865				0.846
EX5	Health and safety issues	0.663	*1.215*	*7.148*	*75.041*	0.83
	Factor 6 – socio-cultural factors					
EX4	Employment pattern and attitude to work	0.771				0.666
EX15	Socio-cultural differences between main stakeholders	0.848	*1.084*	*6.377*	*81.418*	0.827
	KMO and Bartlett's tests					
	KMO MSA		0.779			
	Bartlett's test of sphericity	Approx. chi-square	845.853			
		df	136			
		Sig.	0.000			

Table 8.
Rotated component matrix for endogenous environmental factors

Code	Endogenous environmental factors	Factor loading	Eigen values	% of variance	Cumulative %	Communalities (h)
	Factor 1 – survival threats					
EN3	Prolonged negotiation period before award	0.60				0.756
EN5	Cancellation of tenders	0.65				0.789
EN6	Poor financial status	0.783				0.845
EN8	Lack of creditworthiness	0.674				0.854
EN12	Lack of government guarantees	0.743				0.776
EN13	Bankruptcy of firm'	0.718	*3.955*	*23.263*	*23.263*	0.776
	Factor 2 – contractor development					
EN4	Business competition law	0.691				0.664
EN7	High finance cost of projects	0.703				0.863
EN9	Career path for employees	0.806				0.76
EN14	The team spirit among employees	0.68	*2.187*	*12.866*	*36.129*	0.832
	Factor 3 – business plan					
EN1	Mission and vision of the organization	0.59				0.762
EN2	Demand for construction	0.667				0.778
EN11	Compliance with cidb rules	0.619				0.743
EN15	Management strategy	0.718	*1.943*	*11.428*	*47.557*	0.696
	KMO and Bartlett's test					
	KMO MSA		0.607			
	Bartlett's test of sphericity	Approx. chi-square	491.633			
		df	136			
		Sig.	0.000			

component extraction method, using factor rotation to discriminate between factors or indicate the specific number of basic dimensions among the components. Several procedures have been identified to help in deciding how many factors to keep (Courtney, 2013; Field, 2013; Pallant (2010). The scree plot approach is commonly used; however, Stevens (2002) asserted that a scree plot is only valid with a sample of more than 200 observations. Since this study had a sample of 72, Kaiser's criterion using the Eigenvalue technique was used as well as a 0.65 threshold as proposed by Hair *et al.* (2010) for 70 observations. In this method, the significant factors are those with an Eigenvalue equal to or greater than 1. Afterward, the factor loading and the commonalities (h^2) of the determinants of the variables loaded are assessed (Field, 2013; Hair *et al.*, 2010).

To sum up, this study adopted the PCA approach using oblimin rotation to extract possible factors, and Kaiser's criterion (that is eigenvalue-greater-than-one) to determine which factors to retain for analysis. Table 7 shows that six factors having initial Eigenvalues greater than 1 were extracted from the variables used in measuring exogenous variables. Table 7 shows that the first factor is capable of explaining approximately 32% of the variation, whereas the total factors extracted combined to explain 81% of the total variance and these factors were discussed as shown below. The rotation was carried out repeatedly to eliminate complex variables and ensure that variables were loaded onto only one factor (Field, 2013).

4.1.2 Exogenous environmental factors. Based on the investigation conducted on the variables used in measuring exogenous environmental factors and the likely relationships that exist among the variables clustered on the extracted factors, the results were interpreted in the following manner. The six factors extracted were given names and the names given to these factors were derived from an in-depth examination of the variables clustered on each of the factors. According to Tabachnick and Fidell (2013), interpretation and naming of factors are dependent on the meaning of the specific combination of observed variables that correlate highly with each factor. The factors extracted are named as follows: *factor 1 – political and competitive environment; factor 2 – legislation; factor 3 – ethical and fiscal factors; factor 4 – institutional and unstable economic factor; factor 5 – procurement issues; factor 6 – socio-cultural environmental factors.* The indicators of the extracted factors are described below relative to the existing literature by providing a detailed discussion of the nature of the relationship of the clustered indicators.

4.1.2.1 Factor 1 – political and competitive environment. Five items were retained under this factor and these refer to the impact and role of the government in the country where organisation functions are capable of affecting its strategies. The South African government, just like other countries, is the largest customer of the industry with the total contribution between 40% and 50% of the entire construction expenditure (Department of Public Works, 1999). Considering the loadings and meanings of the five variables, the underlying dimension for this factor showed that the level of government involvement in the procurement of construction works and policies has significant implications for construction organisations competitive environment, hence it is named political and competitive environment.

4.1.2.2 Factor 2 – legislation. Two variables loaded highly on this factor (Table 7). The variables were relevant to the general operating and economic environment of the organisations, namely, change in tax regulation and policy, and environmental issues and legislation. Recognition and implementation of these is one of the major elements of the environmental analysis that influence the organisation business according to Cadle *et al.* (2010). Undoubtedly, construction organisations are required to comply with all legislation

in the discharge of their duties. Thus, the underlying dimension for this factor relates to the legislation from the government and its agencies.

4.1.2.3 Factor 3 – ethical and fiscal factor. In total, three variables clustered highly on this factor (Table 7). Of these, two were related to the overall ethical issues: corruption and lack of transparency and the intense rivalry among organisations. The third variable was the fiscal policy being used by the government in controlling the economy. All three variables are inter-related because the government approach to control the economy could bring about corruption and unethical behaviour. Ethical issues such as corruption and economic instability have been identified as the bane of the South African construction industry environment (Tobin, 2006; Bowen *et al.*, 2012). When there is competition among rivals in the industry, the consequential effect is zero profit. Thus, the underlying dimension for this factor revolves around ethical and fiscal issues of the environment.

4.1.2.4 Factor 4 – institutional and unstable economic factors. Three factors loaded strongly on this factor. These variables are related to inconsistency in government or institutional policies, laws or regulations which most times are restrictive and have potential effects on construction organisations especially the profitability of the industry. Also, the galloping exchange rate has influence on the purchase of construction-related materials. Hence, the underlying dimension for this factor is termed institutional and unstable economic factors.

4.1.2.5 Factor 5 – procurement issues. Two variables highly loaded on this factor. These variables are procurement act or legislation and health and safety issues. The first variable depicted the South African Government attempts to balance the pre-democratic situations in the country in the award of contract through procurement laws exhibited overbearing effects on the companies operating environment. For example, Preferential Procurement Policy Framework Act, 2000 – which provides for the creation of categories of preference in the award of contracts to enhance the development of organisations owned and managed by historically disadvantaged individuals in South Africa may have implications on their strategies and other competitors (Construction Industry Development Board, 2009).

4.1.2.6 Factor 6 – socio-cultural environmental factor. The two clustered variables considered all aspects of social and cultural values that impacted organisations' performance and strategies; these include employment patterns and attitude to work as well as the socio-cultural differences among main stakeholders. The plurality of the South African environment makes this issue more pronounced and based on this underlying element, the factor is named socio-cultural environmental factors.

4.2 Endogenous environmental factors

The endogenous environmental factors identified in the literature were reduced into the following factors using PCA (Table 8). Table 8 illustrates that three factors having initial eigenvalues greater than 1 were extracted from the variables used in measuring endogenous environmental factors. Table 8 shows that the first factor is capable of explaining approximately 23% of the variation, whereas the total factors extracted combined to explain 48% of the total variance. The extracted factors were renamed: *factor 1 – survival threats*; *factor 2 – contractor development*, *whereas factor 3 – business plan* and these are explained as illustrated below.

4.2.1 Factor 1 – survival threats. Six items were loaded on this component. These include prolonged negotiation period before award; cancellation of tenders; poor financial status; lack of creditworthiness; bankruptcy of firm and lack of government guarantees. All these are threats to organisational survival and a recipe for business failure. Hence, there is the

need for organisations to restructure and adopt various response tactics to remain in business and be competitive in the turbulent environment (Lim *et al.*, 2010).

4.2.2 Factor 2 – contractor development. Four variables clustered on this factor. They jointly explain that the essence of contractor development initiative is to improve the performance of contractors operating in the construction business environment by proffering solutions to the problems that may affect their development and performance. Some of these problems are preferential laws, poor financial status to execute or win contract or job satisfaction among organisations' employees.

4.2.3 Factor 3 – business plan. Four factors were clustered on this component, and all pointed towards an organisation having an all-inclusive long-term business plan that captures organisation's objectives, policies and actions that can bring about competitive advantage without violating the laws guiding its operation in the industry (Korkmaz and Messner, 2008). This will allow organisations to use the resources at their disposal to match their changing environment.

4.3 Environmental dimensions

Table 9 shows that the dimensions of the business environment in which South African companies operate which is highly dynamic (high uncertainties) and complex (the various components – client type, manufacturers, sub-contractors, financial companies in the business environment are different). To test the appropriateness of the data on strategies for further analysis, the KMO MSA and Bartlett test of sphericity were conducted for the three constructs as shown in Table 9. These two tests provided the minimum standard that the data should meet to be considered adequate for further analysis. The value of the KMO can vary between 0 and 1, with 0.50 suggested as a minimum (Field, 2013; Hair *et al.*, 2010). The Bartlett test indicates whether the correlation matrix is significantly different from the identity matrix (i.e. matrix in which all of the diagonal elements are 1 and other elements are 0). The Bartlett test indicates the strength of the relationship among variables and the significant level of Bartlett's test is a requirement for the data to be considered suitable for analysis (Field, 2013). Based on Hair *et al.* (2010) suggestion, one of the commonly used criteria for ascertaining the number of factors to be retained is a priori criterion and this is applied when the researcher already knows how many factors to be retained before conducting the analysis. The rationale for this criterion is that it is helpful in testing theory about the number of factors to be retained and for replication of previous studies; thus, the computer is instructed to stop when the desired number of factors is extracted.

To determine the number of factors to be extracted, the study retained the number of factors that were considered the best in explaining the underlying relationship among the variables along a dimension determined *a priori* with respect to the literature (Pallant, 2013). Hence, one factor was extracted for all the environmental dimensions. The PCA and the extracted factor accounted for total variance explained which approximately ranges from 34% to 51 % of the total cumulative variance and to retain factors that have variance explained equal to or less than 60% is not uncommon in social science research (Hair *et al.*, 2010).

The latent variables factor analysed are discussed as follows:

4.3.1 Dynamism. From the four items used in measuring dynamism, an item was excluded (Table 9). The items retained are: the marketing environment faced by our firm is rapidly changing; customers continuously have a new requirement of products and services; the industry environment that our firm operates in is fragmented and changes without stopping. All these alluded to the business environment's uncertainties which may continue unabated as a result of globalisation of the industry. This is supported by

Table 9.
Principal component matrix for environmental dimensions

MSA		Coding	Variable	Factor	Eigen value	% of variance	Cumulative %
KMO	0.63		*A. Dynamism*				
Bartlett's test of sphericity (approx. chi-square)	28.30	Dynam1	The marketing environment faced by our firm is rapidly changing	0.77			
df	6	Dynam2	Customers continuously have new requirement of products and services	0.76			
Sig.	0.00	Dynam3	The industry environment our firm operates is fragmented and changes without stop	0.63	*1.78*	*44.48*	*44.48*
			B. Competitive intensity				
KMO	0.58	Competi2	Our firm has relatively strong competitors	0.64			
Bartlett's test of sphericity (approx. chi-square)	56.44	Competi3	Our firm is in a highly competitive market	0.75			
df	15	Competi4	Price competition is a hallmark of our local market	0.62			
Sig.	0.00	Competi5	Emphasis on producing to the customers' quality requirement	0.78	*2.05*	*34.14*	*34.14*
			C. Environmental complexity				
KMO	0.51	Complex2	The degree of segmentation within major end-user markets	0.87			
Bartlett's test of sphericity (approx. chi-square)	23.72	Complex3	The complexity of effectively managing the supply chain	0.86	*1.56*	*51.93*	*51.93*
df	3						
Sig.	0.00						
KMO	0.49	Munif3	*D. Munificence*				
Bartlett's test of sphericity (approx. chi-square)	20.92	Munif4	Resources are abundant (that is, financial, supplies, human resources) in our market to companies to support growth potential.	0.79			
df	6		There is no shortage of necessary resources in our market	0.67	*1.49*	*37.16*	*37.16*
Sig.	0.03						

Meinhardt *et al.* (2018) who considered organisation business environment to be an important variable that directly influences strategies, structures, behaviour and performance that moderates several relationships and suggested that the business environment will continue to be more dynamic.

4.3.2 Competitive intensity. In total, four variables loaded highly on this factor (Table 9). Of these, three related to degree of competition among construction organisations through competitive bidding in the turbulent construction market. All four variables are inter-related, as the intensity of the competition increases, the performance of organisations is influenced. Thus, the underlying dimension for this factor is dominated by variables relating to the competition environment.

4.3.3 Complexity of business environment. Two variables loaded highly on this factor. These variables are the degree of segmentation within major end-user markets and the complexity of effectively managing the supply chain. The two variables are relevant to the degree of managing construction works by contractors and subcontractors so as to remain competitively relevant in the industry. The meaning of these variables and their loadings indicated that this factor is influenced by the variables that are related to the supply chain and construction market. This affirmed Meinhardt *et al.* (2018) as well as Kabadayi *et al.* (2007) assertion that position that complexity of the environment suggests differences in marketing and production requirements in various market segments such as the diversity of rivals, suppliers, customers as well marketing intermediaries need to be taken into consideration by decision-makers in implementing their strategies. This implies that the complexity of the construction business environment significantly influences the performance of construction firms.

4.3.4 Munificence. Four items were used in measuring munificence, but two were retained and these items explained 37% of the variance. These factors refer to the presence of a multitude of resources and opportunities that prevail in the environment in which organisations work, as well as the competition for those opportunities and resources amongst organisations (Pati *et al.*, 2017). In view of the variables that were highly loaded on this factor and the meaning, the cluster is termed munificence because it indicates the richness of the business environment.

5. Implications and limitations

The study offers practical implications to construction organisation owners operating in the South African construction industry. However, the interpretation of the findings should be done with caution, the results showed that organisations operate in a dynamic environment but where there are acts and laws that give preferential treatment to a certain category of organisations, this has to be taken into consideration by decision-makers within the organisations when formulating and implementing their policies. Furthermore, when a business environment is considered to be inconstant and complex, construction managers need to acquire market and environmental data and process them in a way that will reduce its uncertainty when making strategic decisions. Also, acquisition and implementation of information acquired intelligently are dependent on the environmental issues that are believed to be strategically important to the organisations. The study also has important implications for managers saddled with the responsibility of making a strategic decision within organisations. This is because their perception of the business environment will help ascertain which of the complex environmental issues will require greater attention and thus result in higher levels of intelligent acquisition of data. The results of the study suggest that in contrast to the general environment, the task environment is viewed as more strategically important and unpredictable.

In spite of the contributions and efforts made to profile the environment of the industry, this study has some limitations. Firstly, cross-sectional data were used in the study, which is common in business and strategic management research. It is suggested that a longitudinal panel design be used for future research. Secondly, the study was exploratory in nature and focused on the South African construction industry. It is encouraged that a confirmatory study similar to the present one be carried out in other climes with broader concepts.

6. Conclusions and recommendations

This study conceptualised the construction organisation environment as major causes of evolving challenges or situations that either give individual organisations opportunities or threats. Exogenous and endogenous environments, as identified by the findings of this study, have the potential to influence organisational efficiency. Construction companies should focus on improving the expertise of their internal mechanism to gain a competitive advantage when the overall construction industry environment is unchanging. This is because, in nature, many of the vital issues and decisions that enhance organisational growth and performance may be domestic, active and monotonous. When such an environment exists, businesses are virtually invulnerable to external environment intrusion. The environment of the industry, however, is the most dynamic and turbulent, one of the most competitive possibly. Therefore, companies need to build a business strategy that will consider environmental factors to achieve optimal performance. Choosing the right approach for a given environment allows companies to identify potential market opportunities and growing risks to improve performance. Construction businesses use different techniques in different environments to achieve superior performance.

Nevertheless, this paper did not discuss the relationship between the environment and strategy. The study concluded that a detailed understanding of the business environment, the capabilities of the organisation, customers, competitors and the marketplace would allow organisations to make strategic decisions and align their management philosophy with the achievement of organisational objectives. The results in this paper have shown that chief executives, project managers, and others with managerial responsibilities need to recognise that the business environment will inform the type of organisational decision-making processes to be adopted if they want to improve their performance.

It is critical to consider the characteristics of the market environment and then to define and implement the most effective decision-making and management styles for that environment. This can make a company to be different from its rivals. The findings of the survey showed that construction firm managers considered unethical issues in the construction business environment and lack of transparency which may explain why different strategies have been put in place for companies to survive. Government agencies at all levels are therefore required to abide by an ethical culture of transparency and accountability.

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