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Barriers constraining management innovation (MI) adoption in the Ghanaian construction consulting sector

A case study

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Abstract

Purpose – The purpose of this paper is to critically examine and report upon the barriers that constrain MI within the Ghanaian construction consulting sector. Globalization and the shift towards knowledge-based economies have encouraged organizations to adopt management innovation (MI) as a means of increasing market share and creating competitive leverage. Organizations within developing countries, such as Ghana, have followed this global trend, but barriers continue to affect MI adoption.

Design/methodology/approach – The research is positioned within a mixed methods "deductive" methodological tradition and is undertaken via a three-stage iterative approach. First, the research synthesizes relevant literature to identify 14 potential barriers to MI adoption. Second, using convenient and snowball sampling techniques, structured survey questionnaires were distributed to 70 consulting firms within the Kumasi metropolis; a high 78.5 per cent response rate was returned. Third, data were analyzed using descriptive statistics and principal component (factor) analysis to determine underlying barriers that restrict MI adoption.

Findings – The barriers to MI adoption are contained within four inextricably linked factor groups: organizational structural influences, flow of information, institutional constraints and costs of innovations. The findings demonstrate that innovation thrives in an organizational environment that nurtures creativity, staff development, moderate risk taking and idea generation and management – albeit, the external economic environment must also be conducive to facilitating innovation within companies and organizations.

Practical implications – Innovation within construction companies is a prerequisite requirement for a dynamic and competitive economy because it nurtures self-regulating "free market" behavior, which creates considerable benefit to an economy. Such an attribute is particularly attractive for the developing country of Ghana, which has historically suffered from recurrent social, political and economic pressures. Hence, the research findings will be of practical interest to policymakers, academics and industrialists who have a vested interest in improving the performance of the Ghanaian economy. It will also be of interest to others within developing countries who are experiencing similar issues.

Originality/value – This research work builds upon the work of previous scholars in this field and investigates the barriers to implementing MI in Ghana. The paper's findings will be useful to

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organizations and government policymakers who seek to increase business performance within a free market and profitability in an ever increasingly competitive world.

Keywords Factor analysis, Ghanaian consulting industry, Management innovation

Paper type Research paper

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Introduction

Sustainable competitive advantage is inextricably linked to a firm's ability to successfully create, manage and exploit appropriate technological innovation when commercial opportunities arise (Barrett and Sexton, 2006). Jatuliavičienė *et al.* (2007) and Hindle (2009) expanded this assertion and emphasized that innovation is a systemic driver of business development. Hindle (2009) explained innovation as an inventive process, while Okpara (2007) emphasized that innovation processes ideas and knowledge into new economic value. Livingstone (2000) conceptualized innovation as the process which transforms ideas into tangible outcomes or products which have economic and/or organizational "value creating" outcomes (Hitt *et al.*, 1997; Li and Atuahene-Gima, 2001; Tidd *et al.*, 2001). However, innovation creation can emerge as a strategic response to environmental or economic challenges and/or future commercial opportunities. In either scenario, a transformational process philosophy provides the keystone governing many influential theories of innovation (Rogers, 1995; Rothwell, 1992; Dodgson and Bessant 1996; Sundbo, 1998; Dodgson, 2000; Hindle, 2009).

Essentially, innovation encapsulates discoveries, inventions and processes by which new products, systems or processes are created (Williams, 1999; Gloet and Terziovski, 2004). It unleashes human ingenuity, increases enterprise and competitiveness and generates sustainable income that when reinvested, can engender both social and economic gains (Hindle, 2009). The latter attribute is of particular relevance to developing countries such as Ghana which strive to implement radical, political reforms to improve the efficiency, effectiveness, transparency and accountability of government and its interactions with both public and private sector organizations (Khalil and Olafsen, 2010). However, most technological innovations occur when organizations seek to augment their marketplace competitiveness and can be classified under two generic dichotomous groupings: product innovation and/or process innovation (Gopal, 2007). Rogers (1995) explained and conceptualized innovation by the six-stage innovation model (STIM), which distils the iterative innovation process into six core activities: discovery, research, development, commercialization, diffusion and consequence. The discovery stage focuses on generating new ideas to identify opportunity (Roberts, 1988). The research and development stages then clarify research and evaluate the opportunities identified and further advance the development of these. The commercialization phase stimulates commercial activities to exploit innovation and ensure diffusion of the new product, process or service into the marketplace. Finally, the consequence stage measures the success or otherwise of the process (Shaw *et al.*, 2005).

Within the extant literature, technological innovations are well understood, but new knowledge pertaining to management innovation (MI) remains scant and largely incomplete, despite the latter fuelling the former throughout the STIM process (Birkinshaw

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et al., 2008). Birkinshaw *et al.* (2008) explained that MI encapsulates the invention and implementation of new, or state-of-the-art, management practices, processes, structures or techniques and is designed to further organizational goals; where change represents an unprecedented departure from the traditional *modus operandi* (Van de Ven and Poole, 1995; Hargrave and Van de Ven, 2006; Hamel, 2006; Birkinshaw *et al.*, 2008). Moreover, MI has the inherent latent potential to increase an organisation's productivity and competitiveness when seeking to differentiate itself from competitors (Gruber and Niles, 1972; Hamel, 2006; Birkinshaw and Mol, 2009).

Despite a surge of innovation research, a pilot study conducted by the research team identified that many construction consultants in Ghana lack a precise process for continuous MI and an understanding of the barriers that constrain it, where understanding is arguably the first step towards overcoming such barriers. Yet, MI offers an opportunity to enhance organizational economic performance and in so doing, stimulate radical social, economic and political reforms. This research, therefore, aims to critically examine and report upon the barriers that constrain MI within the Ghanaian construction consulting sector. The specific objectives were to:

- uncover the underlying constructs of the constraining barriers that potentially impede MI adoption;
- engender wider political, industrial and academic debate; and
- provide direction for future new research that can further enhance or explain the findings emanating from this work.

The role of MI: supply and demand for consulting services

Global economic pressures and rising operational costs have motivated industrialists to use forensic consultancy services to improve performance of internal services and augment their financial position. Consultancy services are typically used to impartially assess an organization's internal control mechanisms and to evaluate and recommend the most pragmatic, economic and logical organizational configuration (Anderson, 2003). Globalization has created an unprecedented corporate revolution – markets are more complex, and rapidly evolving technological advances have amplified demand for specialist consulting services (Amorim and Kipping, 1999). This demand may be further exacerbated by a global recession, which can increase demand for stock market consultants internationally (Tordoir, 1995; McLarty and Robinson, 1998; Amorim and Kipping, 1999). Cynics such as Amorim and Kipping (1999) hypothesized that this response was artificially orchestrated by speculation that in turn created uncertainty about established structures, management systems and corporate cultures. Consequently, management hired additional consultants to further intensify demand (Abrahamson, 1996; Clark and Salaman, 1996, 1998). Kipping (1999) proposed an antithesis and doubted that demand for consultants was solely attributable to their self-promotion of services with clients – rather, consultants have capitalized upon their enhanced reputation via successful improvement delivery.

Consulting services are likened to tangible goods in a competitive market, characterized by "heterogeneity"; that is, a wide range of services available are largely perishable over time, though the service in entirety has an intangible attribute (Amorim and Kipping, 1999; Gallouj, 1997; Williamson, 1975, 1986). Two other factors affecting the supply and demand for consulting services are:

(1) political, economic and social changes (especially during the periods of economic recovery), political upheavals and labour conflicts (Amorim and Kipping, 1999); and

(2) cultural and language barriers, particularly in situations where market entrants are ill-informed or not well acquainted with these (Amorim and Kipping, 1999).

The economic cycle is also a driver for the demand for consulting services and is inextricably linked to pricing fluctuations (Richter, 2004).

Drivers and barriers of MI in the construction consulting sector

The propensity to innovate is influenced by various internal and external factors – so called drivers of innovation (Dickson, 1992; Lawson and Samson, 2001). Contextual factors, for example, are shaped by regional, national and international policies; the prevailing business climate; and inter- and intra-firm conditions (Day and Wensle, 1988; Baier and Krüth, 2012). The contextual character of innovation has engendered a widespread debate on the external and internal factors which enable enterprises to develop innovative solutions to existing problems (Dickson, 1992; Lawson and Samson, 2001; Baier and Krüth, 2012). O'Mahoney (2011) identified and examined several of these factors including access to internal/external research, levels of management autonomy, the quality and training of recruits, innovation in objectives/appraisals, work with knowledge partners (for example, universities) and IT infrastructural systems to share knowledge. Some of the critical enablers of consultancy innovations can be categorised in terms of creativity and ideas management – where creativity operates along a continuum and can arise via either:

- an assembling of small ideas implemented that cumulatively prompt continuous improvement; or
- a radical idea that transforms business strategy or creates new businesses (Mansfield and Wagner, 1975).

Successful organizations often encourage creativity along this continuum and ensure that it transcends all levels of an organizational hierarchy (Martins and Terblanche, 2003). The creativity process requires divergent thinking and is often knowledge-driven (how do we apply new knowledge?) or vision-driven (what new knowledge do we need?) (Newell and Shaw, 1972; Sefertzi, 2000; Lawson and Samson, 2001). Conversely, obstacles to this process represent a significant barrier to MI implementation.

Lawson and Samson (2001) suggested that within industry, there is a tendency to incorporate additional layers of mechanistic and institutionalizing bureaucracy, which inadvertently create a major impediment to innovation development; a view that has been supported by both Freel (2000) and Assink (2006) (refer to Table I). These barriers to innovation may be overcome by creating a high-performing business environment that is conducive to facilitating innovation by focusing on improving culture and climate (McAdam *et al.*, 2004), the management of assets and capabilities, structure and controls (Loewe and Dominiquini, 2006) and new product and process development (Knox, 2002). Salavou *et al.* (2004) contend that strategy-driven (e.g. market orientation) and competition-related (e.g. industry concentration) characteristics of SME's, in particular, impact upon a company's ability to be innovative. In addition, a lack of market information on opportunities arising will prevent companies from capitalizing

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Table I.
Definition of variables (Constraints of MI)

Variables	Constraints of management innovations in the Ghanaian consulting industry	References
1. High cost	A lack of financing sources has a significantly negative impact upon the ability of a firm to adopt or support innovation growth	Abadi Ghadim *et al.* (2005), Madrid-Guijarro *et al.* (2009)
2. Weak company culture set-up	An organization's culture, that restricts new ideas and creative contributions from its staff, often fails to invent or innovate in the marketplace	Kriegesmann *et al.* (2005), McAdam *et al.* (2004)
3. Weak company leadership	Weak management support and leadership creates an innovation choke point that hinders idea generation and development	Loewe and Dominiquini (2006), Kriegesmann *et al.* (2005), McAdam *et al.* (2004)
4. High economic risk	Macro-economic factors can prevent innovation in firms, particularly those who are unwilling to take calculated risks	Abadi Ghadim *et al.* (2005), Ram (1989)
5. Organizational rigidities	Organizational inertia and structured routines often limit the ability of firms to identify new opportunities and adapt to environmental changes as they arise	Loewe and Dominiquini (2006)
6. Lack of information about technology	A firm's inability to access information concerning new technological developments will adversely hinder innovation activities	Veugelers and Cassiman (1999), O'Mahoney (2011)
7. Lack of information on the market	Lack of information about market opportunities prevents companies capitalizing upon them and growing their market share	Lee *et al.* (2010), Cassiman and Veugelers (2006), Ottum and Moore (2003)
8. Lack of skilled personnel	Inadequate employee skills, qualifications, commitment and effort will significantly reduce innovation in firms	Bresnahan *et al.* (2002), Hadjimanolis (1999), Loewe and Dominiquini (2006), O'Mahoney (2011)
9. Lack of client responsiveness	An unreceptive market to new products significantly restrains the innovative abilities of a firm and its prosperity	Ivory (2005), Kulatunga *et al.* (2011)
10. Inappropriate government regulations	Government interferences and excessive regulations restrain a firm's innovation potential and nurtures insecurity regards taking risks/ adopting innovation	Hadjimanolis (1999), Hadfield (2008)

(*continued*)

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Table I.

Variables	Constraints of management innovations in the Ghanaian consulting industry	References
11. Taxation of new products, processes and services	Excessive taxation of new services, which are undergoing the transition to full commercialization, acts as a barrier innovation	Zhu *et al.* (2012)
12. Lack of time to innovate	Restrictions on time to innovate will negatively impact its formulation, development, verification and implementation	Taminiau *et al.* (2009);
13. Low demand for innovative services	Low market demand for innovative services and methods stifles the development of new services or methods	Hipp and Grupp (2005)
14. Bureaucracy	Excessive red tape and routine creates inertia and inefficiency–the irony of excessive bureaucracy is that it can over-conform to its own rules and procedures, thereby treating individuals as numbers and generating unnecessary red tape	Freel (2000), Assink (2006)

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upon them (Lee *et al.*, 2010; Cassiman and Veugelers, 2006; Ottum and Moore, 2003). Other researchers suggest that in addition to the aforementioned factors, additional factors that enable a company to innovate may include:

- knowledge currency and open-mindedness (Hernández-Mogollon *et al.*, 2010);
- leadership practices/behaviours that facilitate and encourage employees to be innovative (De Jong and Hartog, 2007);
- management processes, people and skills, and culture and values (Loewe and Dominiquini, 2006); and
- employee rewards (financial and non-financial) for contributing towards innovations (Adegoke, 2007).

Perhaps one of the most important factors relates to risk taking – within an organization, total absolution of mistakes cannot be permitted, but leeway to make legitimate mistakes (and to learn from these) improves both the employees' and the company's longer-term performance, as well as encourages innovative practices (Kriegesmann *et al.*, 2005). In total, the culmination of literature synthesis identified 14 constraints to MI (refer to Table I).

Research methods and approach

This research is positioned within the mixed methods "deductive" methodological tradition which incorporates the practices and norms of a natural science model. Specifically, a joint quantitative/qualitative approach involved a literature review to generate a pilot study and field study questionnaires that sought to investigate the factors constraining MI within the Ghanaian construction consultancy industry. The justification for adopting a mixed methods approach is that it gathers factual data and opinion and that enables the relationships between theory and facts to be observed, recorded and consequently measured (Ahadzie, 2007; Bryman, 2004; Oppenheim 1992). To achieve the research aim and objectives, a questionnaire was developed based upon a comprehensive literature review. The questionnaire used largely closed-ended questions and corresponding Likert items on a scale of 1-5 which sought to gather respondent opinions and perceptions. Likert item ratings were adopted because the data were primarily ordinal, where 1 = not high, 2 = less high, 3 = averagely high, 4 = high and 5 = very high. Questions posed specifically targeted issues concerning the barriers constraining MI adoption. Prior to the main survey administration, a pilot study was conducted to test the validity of the questions to be posed by asking a random selection of five professionals within the target sample whether they considered the questions to be clear and measure what they purported to measure.

The sample population consisted of quantity surveyors (QS) registered with the Ghana Institution of Surveyors (GhIS) with a minimum consultancy experience of five years or more. The GhIS is an umbrella professional institution with the mandate of regulating, licensing and supervising practicing quantity surveying professionals in Ghana. The total population of active QS in Ghana at the time of the survey was 226 including 30 fellows, 176 associate members and 26 technician members (GhIS, 2014). Years of experience were essential to this study because according to Rodriguez-Rodriguez (2008), the incubation period for business survival is greater than five years, at which point the likelihood of business collapse is reduced significantly.

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Additional selection criteria sought to ensure that participants had been involved in consulting practice and were registered as professional quantity surveyors within the Kumasi metropolis. Kumasi is the second largest city in Ghana and houses a number of consulting firms. This approach ensured that participants had tacit, subject-specific knowledge relevant to the research objectives. Snowball sampling was used to identify respondents with "rich" relevant information and knowledge that was relevant to the study. The researchers contacted the most accessible consultants operating in Kumasi, and following questionnaire administration, the respondents directed the researcher to other consultants within the geographically defined catchment area. This process continued until a representative sample size of 70 respondents was obtained, representing 31 per cent of the total population. This response rate is comparable to that registered in the studies by Wahab (1996) and Easterly (1999), which had response rates of 22.8 and 37 per cent, respectively. The exact number of practicing QS within Kumasi could not, however, be determined because the GhIS database does not contain relevant information that would facilitate geographical stratifications.

The quantitative data were analysed using the Statistical Packages for Social Sciences (SPSS version 16) for descriptive statistics and factor analysis. Factor analysis was used to condense the large number of variables involved into a more easily understood framework without loss of information (DeCoster, 1998), analyze existing interrelationships among variables identified in the literature and explain these variables in terms of their common underlying factors (Field, 2005; Mulaik, 2009).

Description of data analysis

The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO-test) was used to confirm the adequacy of the sample size. Child (2006) recommends that a KMO-test value must be greater than 0.5 for the sample size to be sufficient, and with a value of 0.64, this requirement was confirmed. Prior to conducting factor analysis, the inter-correlation between variables was examined using a correlation matrix to check for extreme multicollinearity and singularity, the presence of which would cause difficulties in determining the unique contribution of the variables to a factor (Mulaik, 2009). In SPSS, the intercorrelation is checked by using the KMO-test and Bartlett's test of sphericity, while multicollinearity is detected via the determinant of the correlation matrix. Bartlett's test was highly significant ($p < 0.001$), whilst the determinant of the correlation matrix for the constraints of MI was less than 0.00001 (6.17E-005). These statistics suggest that factor analysis should yield distinct and reliable results and that some relationships between variables exist (Field, 2005). However, no two variables correlated very highly; the highest value of R was 0.703 (see Table II). According to Field (2005), factor analysis can cope with mild multicollinearity, and hence, the data were found to be appropriate for further analysis (see Table II).

Having tested the survey instrument's reliability, sample size adequacy and population matrix, the data set was subjected to factor analysis using principal component analysis (PCA) with varimax rotation. Prior to PCA, the communalities involved were first established to determine that the level of variance in the variables had been accounted for by the extracted factors. The average of the communalities of the variables after extractions was above 0.60 (refer to Table III). Communalities show how much of the variance among variables is accounted for by the extracted factors and is useful in deciding those to finally extract (Field, 2005).

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1.000													
2	0.320	1.000												
3	0.255	0.690	1.000											
4	0.339	0.328	0.524	1.000										
5	0.159	0.123	0.227	0.703	1.000									
6	0.176	0.173	0.330	0.419	0.551	1.000								
7	0.234	0.221	0.329	0.533	0.431	0.595	1.000							
8	0.074	0.389	0.505	0.404	0.215	0.388	0.582	1.000						
9	−0.103	0.460	0.301	0.133	0.065	0.236	0.384	0.553	1.000					
10	0.232	0.598	0.352	0.390	0.400	0.346	0.513	0.546	0.481	1.000				
11	0.185	0.618	0.279	0.425	0.198	0.300	0.528	0.378	0.464	0.655	1.000			
12	−0.065	0.321	0.240	0.424	0.153	0.060	0.498	0.323	0.536	0.440	0.695	1.000		
13	−0.013	0.208	0.290	0.475	0.221	0.395	0.611	0.606	0.497	0.612	0.533	0.516	1.000	
14	0.292	0.316	0.091	0.382	0.210	0.247	0.428	0.357	0.292	0.610	0.586	0.416	0.493	1.000

Table II.
Correlation matrix

Note: Determinant = 2.72E-005

Variables	Initial	Extraction
1. High cost	1.000	0.727
2. Weak company culture set-up	1.000	0.899
3. Weak company leadership	1.000	0.860
4. High economic risk	1.000	0.718
5. Organisation rigidities	1.000	0.719
6. Lack of information about technology	1.000	0.662
7. Lack of information about market	1.000	0.716
8. Lack of skilled personnel	1.000	0.683
9. Lack of client responsiveness	1.000	0.727
10. Inappropriate government regulations	1.000	0.697
11. Taxation	1.000	0.791
12. Lack of time to innovate	1.000	0.652
13. Low demand for innovative services	1.000	0.726
14. Bureaucracy	1.000	0.734

Table III.
Communalities

Note: Extraction method: principal component analysis

The analysis then sought to determine the underlying constructs to be extracted (as shown in Table IV). Both the Guttman-Kaiser rule and the Cattell scree test were used to determine the number of factors to be extracted. Applying these criteria suggested that four components should be extracted given eigenvalues greater than 1.0 (as shown in Table IV and Figure 1). In descending order, the first, second, third and fourth components accounted for 42.76, 12.44, 10.043 and 8.394 per cent of the total variance, respectively. Cumulatively, the four extracted components explained 73.645 per cent of the variation in the data set, and satisfies the cumulative proportion of variance criterion, which says that the extracted components should together explain at least 50 per cent of the variation (Mulaik, 2009).

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Component	Total	% variance	Cumulative %	Extraction sums of squared loadings Total	% variance	Cumulative %	Rotation sums of squared loadings Total	% variance	Cumulative %
1	5.987	42.762	42.762	5.987	42.762	42.762	3.751	26.796	26.796
2	1.742	12.446	55.208	1.742	12.446	55.208	2.878	20.558	47.354
3	1.406	10.043	65.251	1.406	10.043	65.251	2.286	16.331	63.685
4	1.175	8.394	73.645	1.175	8.394	73.645	1.394	9.960	73.645
5	0.865	6.178	79.822						
6	0.670	4.787	84.610						
7	0.575	4.106	88.716						
8	0.435	3.105	91.821						
9	0.347	2.481	94.303						
10	0.313	2.236	96.538						
11	0.228	1.626	98.164						
12	0.147	1.052	99.216						
13	0.060	0.427	99.644						
14	0.050	0.356	100.000						

Note: Extraction method: principal component analysis

Table IV.
Total variance explained

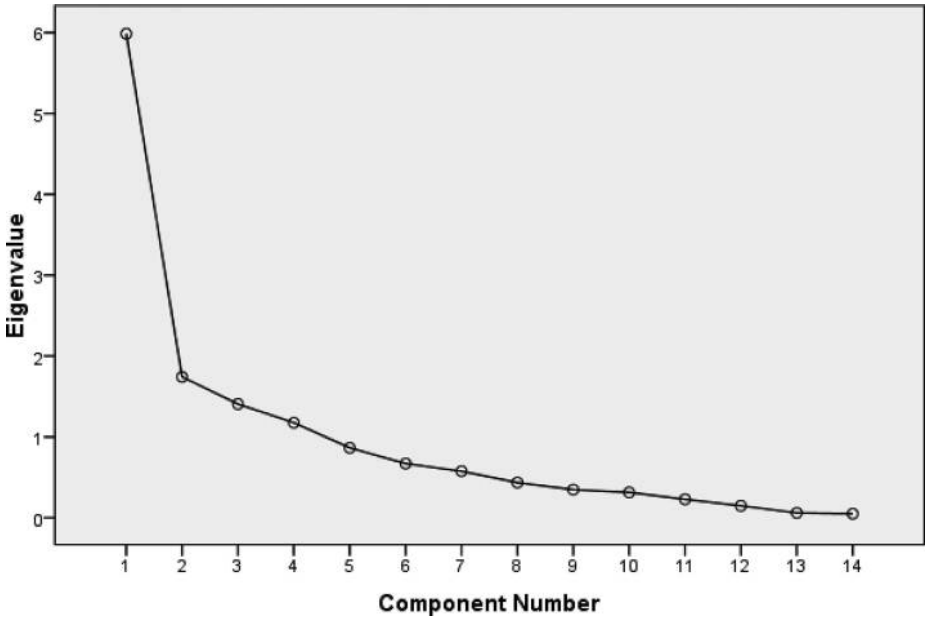

Figure 1.
Scree Plot

The rotated component matrix suggested four principal components similar to that of the component matrix shown in Table V. Rotation suggests the behaviour of the variables under extreme conditions and maximizes the loading of each variable (Norusis, 2000). Accordingly, various authors (Ahadzie, 2007; Field, 2005; Mulaik, 2009;

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Variables	Components 1	2	3	4
1. High cost	0.281	0.471	0.505	0.413
2. Weak company culture set-up	0.629	−0.133	0.691	−0.089
3. Weak company leadership	0.582	0.185	0.507	−0.480
4. High economic risk	0.700	0.474	−0.038	0.049
5. Organisation rigidities	0.493	0.636	−0.268	0.001
6. Lack of information about technology	0.562	0.471	−0.271	−0.226
7. Lack of information about market	0.771	0.150	−0.314	−0.015
8. Lack of skilled personnel	0.717	−0.095	−0.052	−0.396
9. Lack of client responsiveness	0.610	−0.509	−0.027	−0.308
10. Inappropriate government regulations	0.809	−0.112	0.078	0.158
11. Taxation	0.778	−0.281	0.092	0.314
12. Lack of time to innovate	0.646	−0.432	−0.149	0.163
13. Low demand for innovative services	0.747	−0.193	−0.357	−0.051
14. Bureaucracy	0.640	−0.110	−0.057	0.555

Table V.
Component matrix

Notes: Extraction method: principal component analysis; four components extracted

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Norusis, 2000; Gorsuch, 2013) maintain that rotated factor solutions are the best factor output solutions for interpreting the results of PCA. Varimax (orthogonal) rotations were selected as suitable from their counterpart oblimin (oblique) rotations; as the conventional rule states, there was no established theoretical grounds which suggest that the factors might correlate.

A complex structure is said to be present when a variable has a factor or component loading greater than 0.50 on more than one component; where loadings express the influence of each original variable within the component (Norusis, 2000). After checking for a complex structure in the variables, the factor loadings are again examined, but this time to check for components that have only one variable loading on them. Table VI indicates that the four components had more than one variable loading on them. What remains is the interpretation of the underlying dimension or construct of the four principal components extracted. Based on critical examination of the inherent relationships among the variables under each component, and with certain degree of complexity, the following interpretations were deduced to represent the underlying dimensions of the components.

Discussion of results

Component 1: Organizational structural influences

Observations on the relationship among the variables loaded onto the first component (which accounted for 42.76 per cent of the total variance), led to it being termed as organizational structural influences. This factor consists of developmental, organizational and economic structural influences. Developmental structural influences encompass governmental structures, economic structures and organizational structures which hinder the conception, development and implementation of innovations in Ghanaian construction consultancies. Organizational structural influences relate to a firm's management and organization, for instance, excessive reliance on routines and experience. Economic structural influences encompass market changes and demands

Variables	Components 1	2	3	4
1. High cost	0.089	0.186	0.212	0.800
2. Weak company culture set-up	0.378	−0.039	0.821	0.283
3. Weak company leadership	0.024	0.309	0.870	0.081
4. High economic risk	0.287	0.714	0.233	0.267
5. Organisation rigidities	0.067	0.825	−0.004	0.181
6. Lack of information about technology	0.092	0.790	0.163	−0.050
7. Lack of information about market	0.508	0.657	0.133	−0.092
8. Lack of skilled personnel	0.378	0.413	0.519	−0.317
9. Lack of client responsiveness	0.548	0.038	0.467	−0.455
10. Inappropriate government regulations	0.695	0.292	0.341	0.114
11. Taxation	0.830	0.122	0.261	0.138
12. Lack of time to innovate	0.774	0.078	0.130	−0.175
13. Low demand for innovative services	0.652	0.430	0.137	−0.312
14. Bureaucracy	0.780	0.189	−0.051	0.294

Notes: Extraction method: principal component analysis; rotation method: Varimax with Kaiser normalization; rotation converged in six iterations

Table VI.
Rotated component matrix

for innovative services. Government policy and economic vagueness encourage Ghanaian construction firms to effectively communicate to managers how significant innovation is for maintaining market competitiveness. However, any unforeseen market changes, government policies and conventions may consequently generate unresponsive markets, which negatively influence the firm's adoption of innovation strategies.

From Table VI, variables loaded onto this component with the respective eigenvalues of 0.548, 0.652, 0.695, 0.774, 0.780 and 0.830 are:

- lack of client responsiveness;
- low demand for innovative services;
- inappropriate government regulations;
- lack of time to innovate;
- bureaucracy; and
- taxation of new products, processes and services.

The lack of client responsiveness creates a low demand for innovative services, which restricts a firm's ability to release its innovative capabilities into the market place. Inappropriate government regulations highlight how Government interferences and excessive regulations restrains a firm's propensity to innovate, nurtures insecurity and increases the risks of adopting and implementing innovations. In turn, a high level of insecurity reduces the rate of invention and diffusion of innovations. The lack of time to innovate reflects commercial pressures confronting firms and an inability to formulate, develop, verify and implement innovation. A firm must be prepared to incorporate innovations within its core activities to facilitate the development of new methods and ideas with economic value and market viability. Unfortunately, a firm's activities and work load may constrain time dedicated to innovation, thereby reducing innovative

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potential. The notion of bureaucracy is often viewed as being synonymous with excessive constraints and routine, inertia and inefficiency; bureaucracy often creates over-conformance and generates excessive restrictions. In doing so, it stifles personal growth, decreases worker morale and quells ambition, which consequently affects an organization's productive capabilities (Freel, 2000) and Assink, 2006). Taxation of new products, processes and services which are undergoing the transition to full commercialization represents a significant financial barrier, particularly in developing countries (Zhu *et al.*, 2012).

Component 2: Flow of information

Flow of information accounted for 12.446 per cent of the remaining variation not explained by the first component, and encompasses the challenge of adhering to established procedures in developing and implementing innovations. Variables loaded onto this component (refer to Table VI) with respective eigenvalues of 0.657, 0.714, 0.790 and 0.825 are:

- lack of market information;
- high economic risk;
- lack of information about technology; and
- organizational rigidities.

The lack of market information relates to customer intelligence and, specifically, their requirements and preferences. Failure to adequately consider this variable will lead to one of two broad outcomes. Either the firm will produce products that are not required or fail to produce those that are. High economic risk with an eigenvalue of 0.714 is defined as an economic factor that relates to a willingness to take risks dependent upon prevailing economic conditions. The lack of information about technology with an eigenvalue of 0.790 suggests that a firm's inability to access information on technological developments in their specific fields will hinder their innovation activities. Organizational rigidities with an eigenvalue of 0.825 relate to a firm's resistance to change. Organizational inertia and rigidity may severely limit the ability of incumbent firms to identify new innovative opportunities and adapt to environmental changes as they occur. Within the context of this paper, flow of information relates to inadequate knowledge about market opportunities, customer preferences and changes in technologies and government policies. Without such knowledge, a firm cannot fully exploit the commercial opportunities presented and may lose market share or hemorrhage profitability as a consequence; eventually such a scenario may contribute to company insolvency.

Component 3: Institutional constraints

The third component extracted which accounted for 10.043 per cent of the total variance is institutional constraints (refer to Table IV). Variables loaded onto this component (refer to Table VI) with their respective eigenvalues of 0.519, 0.821 and 0.870 are lack of skilled personnel, weak company culture set-up and weak company leadership, respectively. Lack of skilled personnel relates to inadequate employee skills, qualifications, competency, and commitment and effort required to successfully adopt innovation. Weak company culture is defined as the personal characteristics of a

particular group of people who refuse to accept new ideas and/or generate creative contributions and/or invention. Innovation paralysis within any firm is often caused by inertia, fear of change, avoidance of risk and the difficulty of constantly creating something new. Weak company leadership inhibits a firm further by stifling creativity, invention and ideas generation and development – autocratic leadership is the least conducive to generating and supporting innovation (Fu *et al.*, 2013).

A contextual explanation of institutional constraints focuses on the barriers to innovation found within the management structure and operation of a firm. Many consultancy firms believe that one of their greatest challenges to innovation adoption can be found inside their establishment and relates to institutional inertia[1]. Institutional inertia contributes to a culture that fails to acknowledge or embrace innovative new ideas and creative contributions from its staff. The extant literature demonstrates that companies have reengineered their core business processes for efficiency gains (Prasad, 1999); a similar effort is now required to reinvent core business processes for MI to accelerate the production and pay-off of radical ideas.

Component 4: Cost of innovations

The final component accounted for 8.645 per cent (see Table IV) of the remaining variation not explained by the other three components, and entails only one variable (see Table VI), namely, the high cost of innovations with an eigenvalue of 0.800. The soaring costs of innovation is one of the most important barriers to its implementation, where the total cost of innovation includes the development cost, initiation costs to raise awareness and implementation costs to commercialize the innovation for economic and competitive gains. A lack of financing sources has a profoundly negative and significant effect on innovation development. Securing timely finance within developing countries is also problematic, as organizations often work on inflexible annual budgets and financial cycles – hence, the opportunity to fully exploit the market in a timely manner is lost.

Conclusions

The rapidly changing global consultancy environment is subject to economic, technological and governmental policy fluctuations, and an increasingly aggressive competition; these stimuli have consequently forced construction consultancies to find new ways of competing effectively. MI provides an opportunity for these consultancies to offer services that generate client cost savings to secure a competitive advantage over market rivals. Companies that adopt MI are propelled into a more profitable operation, which contributes towards the development of a dynamic and competitive economy. For developing countries, such as Ghana, tangential benefits have a far greater reach because even where the original intention of a company was not philanthropic, the generation of wealth transcends society and improves a nation's standard of living. Yet despite this economic, political and societal impact potential, research into MI adoption in the Ghanaian construction consulting sector has remained scant, and, therefore, a concerted effort is required by a collaborative tripartite of government, industry and academia to invest resources to extend the boundaries of the initial research presented here. In doing so, significant improvements in practice could occur that would contribute to the wealth of the Ghanaian economy, particularly where barriers to MI adoption are reduced or eliminated.

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This paper consequently sought to explore the barriers to MI adoption in the Ghanaian construction consulting industry. Factor analysis conducted revealed that the fundamental constraining factors of MIs can be explained by four principal factors. These factors were explained in the context of:

(1) structural influences;
(2) flow of information;
(3) institutional constraints; and
(4) cost of innovations.

From a pragmatic implementation perspective, the paper provides a unique insight into the integration of MI within construction consultancy firms for government bodies, industry practitioners and researchers. Limitations of the research included an opportunistic sample design, a relatively small sample size and restricted geographical area – therefore, results should be viewed as illustrative rather than definitive. Therefore, future research work is now needed to expand the scope of the research to cover wider geographical region of Ghana and other developing countries; develop a conceptual model on MI and link such to the benefits of a firm's financial performance; and work with other higher education institutions internationally to provide business facing educational awards and courses to help industry and government overcome the barriers revealed in this paper.

Note

1. Institutional inertia in the context of this paper is the inability of management to support and encourage innovation adoption via appropriate strategic, organisational structures and operational plans.

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Further reading

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