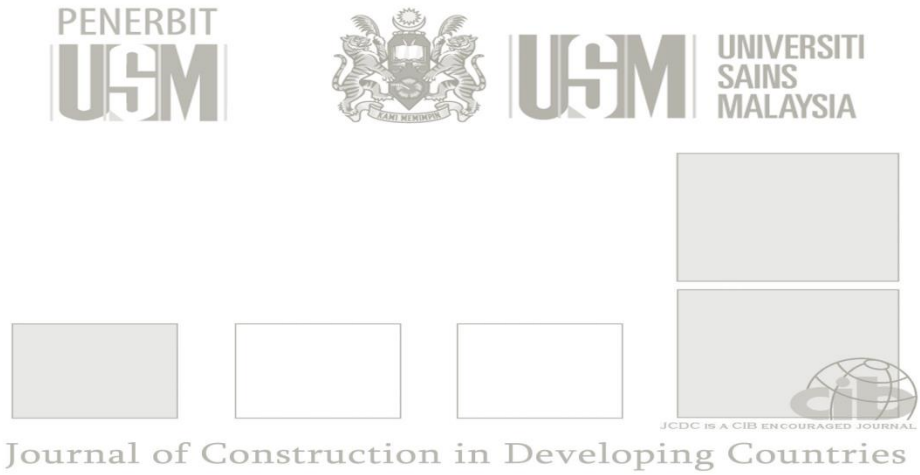

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Factors affecting the competence of quantity surveying professionals in Zimbabwe

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ABSTRACT

The increased complexity of construction projects necessitates the need for quantity surveying professionals to achieve and maintain the highest levels of competency. However, various factors have inhibited their expected professional practice aptitude. Hence, this study reports on the factors affecting their competency. A questionnaire-based descriptive survey strategy was undertaken to collect quantitative data from both consultants' and contractors' quantity surveyors on the factors affecting their competence. Factor analysis revealed four significant components that include inadequate project and professional practice, inadequate academic and technological advances, inadequate organizational structure and teamwork, and unclear individual career development goals. In addition, an assessment of statistically significant differences in ranking by consultants and contractors quantity surveyors was undertaken. Contractors' quantity surveyors considered inadequate polytechnic education and training, inconsistent project implementation strategies, and unclear organization development goals as impacting most negatively on the competence of quantity surveying professionals. These findings reveal a need to establish collaboration between higher education institutions and professional bodies for the development and implementation of relevant strategic plans for resolving these inadequacies. Also, organizational development goals and project implementation strategies are more relevant and important for contractors as opposed to consultants' firms. The withdrawal of primary data from quantity surveying professionals only was a limitation; however, the factors primarily affect quantity surveyors and their insights are vital.

Keywords: Competence, Construction, Quantity surveyor, Developing countries

INTRODUCTION

Construction projects are becoming increasingly more sophisticated and clients expect value for money (Yap *et al*., 2021). One of the professions that is critical to successful construction project delivery is that of quantity surveying (Adesi *et al*., 2018). However, a significant case has been made for competency inadequacies of quantity surveying professionals in construction industries globally (Dada, 2017; Adesi *et al*., 2018; Shayan *et al*., 2019; Chamikira *et al*. 2020; Moyo *et al*. 2021). Further, numerous studies have acknowledged that the role of the quantity surveyor has evolved and continues to evolve (Crafford and Smallwood, 2007; Dada and Jagboro, 2012; Dada, 2017; Akinola, 2019; Shayan *et al*., 2019). Despite competence being one of the most significant factors ensuring the success of a construction project, insufficient emphasis has been placed on it (Yong and Mustaffa, 2012). In

addition, the lack of practice-informed research for construction professionals, including quantity surveyors, exacerbates the determination of context-specific resolutions. Moreover, the lack of empirically revealed strategies for improving the competence of quantity surveying professionals compounds the challenge. In Zimbabwe, continuous professional development programmes, curricula re-designs, and designation-specific interventions were recommended for addressing the inculcation of expected competencies (Moyo *et al*., 2021). However, these interventions can only be effective if the factors affecting the competence of quantity surveying professionals are identified (Dada and Musa, 2016).

Therefore, this study aims to determine the factors that affect the competence of quantity surveying professionals in Zimbabwe. De Silva (2014), Perera, *et al*. (2017) and Yogeshwaran *et al*. (2018) revealed a mismatch between the competencies of quantity surveying graduates and the expectations of the construction industry. However, while the authors generally advocate for greater collaboration between higher education institutions and the construction industry in terms of developing and delivering programmes, a more integrated approach to deriving resolutions is pertinent. Therefore, determining the factors that affect the competence of quantity surveying professionals would go a long way in revealing remedies. Also, an assessment of statistically significant differences between the insights of consultants' and contractors' quantity surveyors was undertaken. Similar to a study by Dada and Jagboro (2018) and Yap *et al*. (2021), only the views of quantity surveyors (working for contractors, consultants, and client organizations, amongst others) were solicited as they are best positioned to reveal the factors that affect their competence within their profession. Further, statistically significant differences due to designations were revealed in the insights of consultants' and contractors' quantity surveyors on their expected competencies (Moyo *et al*., 2021), therefore a potential variance in insights between the two designations is expected. Bowen *et al*. (2008) also only considered salaried and employers' registered quantity surveyors to report on significant differences in job satisfaction aspects.

The next section of the article presents the factors affecting the competence of quantity surveyors. Thereafter, the method utilized to resolve the research questions is elucidated, the findings delineated and the implications stated. Lastly, the conclusions, recommendations from the study, and limitations of the study are presented.

Factors affecting the competence of quantity surveyors

Adesi *et al*. (2018) define competence as a human characteristic that includes knowledge, skills, and special attributes for success in a particular profession. Competence-based measures are pertinent to the validation of performance (Dada and Jagboro, 2018). The factors affecting competence are aspects within the training of quantity surveying professionals that have a considerable effect on how the professionals express themselves concerning knowledge, skills, and attributes. Since quantity surveying professionals are critical for the financial and contractual management of construction projects (Shayan *et al*., 2019), an interrogation of factors affecting their competence was pertinent to addressing shortcomings in construction project delivery. While some factors emanated from empirical studies, others were inferred from recommendations from studies on the expected competencies of quantity surveyors. Table 1 shows factors that have been mined from previous studies.

Table I: Factors affecting the competence of quantity surveyors from previous studies

Code	Factors	Sources
FC1	Lack of adequate experience	De Silva (2014), Dada and Musa (2016), Wanda *et al*., (2016)
FC2	Lack of relevant continuous professional development programmes	Crafford and Smallwood (2007), Dada and Musa (2016), Wanda *et al*., (2016), Dada and Jagboro, (2018), Shayan *et al*., (2019), Moyo *et al*., (2021), Yap *et al*., (2021)
FC3	Limited exposure	Shafie *et al*., (2014), Dada and Musa (2016), Wanda *et al*., (2016)
FC4	Inadequate university undergraduate education and training	Crafford and Smallwood (2007), Hassan *et al* (2011), Shafie *et al*., (2014), Olanrewaju and Anahve (2015), Dada and Musa (2016), Wanda *et al*., (2016), Dada (2017), Perera *et al*., (2017), Dada and Jagboro, (2018), Yogeshwaran *et al*., (2018), Moyo *et al*., (2021), Yap *et al*., (2021),
FC5	Lack of apprenticeships on-the-job job training (acquisition of specific skills)	De Silva (2014), Olanrewaju and Anahve (2015), Dada and Musa (2016), Dada and Jagboro, (2018), Yap *et al*., (2021)
FC6	Inadequately prepared for advances in information and communication technology	Hassan *et al* (2011), Shafie *et al*., (2014), Dada and Musa (2016), Yap *et al*., (2021)
FC7	Unclear individual career development goals	Bowen *et al*., (2008), Dada and Musa (2016), Shayan *et al*., (2019)
FC8	Inadequate polytechnic education and training	Crafford and Smallwood (2007), Hassan *et al* (2011), Shafie *et al*., (2014), Olanrewaju and Anahve (2015), Dada and Musa (2016), Wanda *et al*., (2016), Dada (2017), Perera *et al*., (2017), Dada and Jagboro, (2018), Yogeshwaran *et al*., (2018), Moyo *et al*., (2021), Yap *et al*., (2021)
FC9	Lack of adequate research and development	Chynoweth (2013), Dada and Musa (2016), Wanda *et al*., (2016), Moyo *et al*., (2021)
FC10	Lack of teamwork and development	Bowen *et al*., (2008), Yong and Mustaffa (2012), Dada and Musa (2016), Dada (2017)
FC11	Inadequate organization set up/structure	Bowen *et al*., (2008), Dada and Musa (2016), Shayan *et al*., (2019)
FC12	Variable project implementation strategies	Dada and Jagboro, (2018), Shayan *et al*., (2019)
FC13	Unclear organization development goals	Bowen *et al*., (2008), Shayan *et al*., (2019)

Crafford and Smallwood (2007) recommended interventions in curricula design, assessment of professional competency, and continuous professional development to resolve the competence deficiencies within the South African construction industry. Bowen *et al*. (2008) focused on organizational and team development structures that contribute to the competence of quantity surveyors. The nexus between competence, motivation, and job satisfaction was considered, concerning both salaried and employer quantity surveyors. Greater empowerment of employees was identified as being essential. On the other hand, Hassan *et al*. (2011) are in favour of incorporating advanced information technology in the training of quantity surveyors to enable them to respond to the developments in the construction industry.

Yong and Mustaffa (2012) mentioned team development through closer relationships between project professional participants as being paramount to achieving construction project success in Malaysia. Da Silva (2014) suggested the adoption of experiential learning as a remedy to reducing the gap between academic and practical training. This would mean exposing chartered surveyors more to on-the-job training and various experiential requirements as a fundamental part of their training. According to Shafie *et al*. (2014), employers suggested higher educational institutions and quantity surveying professionals should collaborate in improving quantity surveyors'competencies in soft skills by enhancing their exposure through increasing presentations through communication and information technology. Despite this, little has been achieved in this regard. Olanrewaju and

Anahve (2015) suggested that quantity surveyors acquire and enhance their procurement of building services engineering skills, not only through higher and tertiary education but also through on-the-job training for the provision of a holistic service. The aspects of exposure and on-the-job training seem pertinent to the development of the quantity surveying professional. However, the nature of the construction industry in which this can achieve positive results should also be under consideration. With developing countries lagging behind in terms of technological advances, these aspects require deeper interrogation.

Dada and Musa (2016) investigated a significant number of factors that affected the competence of quantity surveying professionals. These factors were initially derived from a pilot study. Despite the few number of factors under study, factor analysis generated three components, namely organization structure and team development, industrial exposure, and the route of educational training. However, statistically significant differences due to insights of the various respondent groups were not assessed. Further, the inclusion of respondents such as medical doctors and lawyers likely lessens the validity of the results as they are less knowledgeable concerning the competence requirements of quantity surveyors. Wanda *et al*. (2016) alluded to the need of developing essential interventions through higher education and professional skills training while Perera *et al*. (2017) recommend curricula re-alignment as a way of dealing with the competence tensions between academia and the construction industry. Such re-alignment should consider contextual industry expectations through greater intensities of cooperation between the two sectors.

Dada (2017) identified the need for higher education institutions and professional bodies to work together to enhance the competence of quantity surveying professionals through curricula re-design and continuing professional development programmes. Further, enhancing teamwork and development through improving communication skills was considered paramount. Related to this, Yogeshwaran *et al*. (2018) reported on the need to design tertiary programmes that are acceptable to the construction industry in terms of addressing the expected competencies of quantity surveying graduates in developing countries. Shayan *et al*. (2019) contended that there is a need for the individual quantity surveyor and quantity surveying companies to make adjustments for the incorporation of future competencies in line with global trends. Yap *et al*. (2021) considered internships, curricula design and continuing professional development as strategies to bridge the gap between the current and expected competencies of quantity surveyors.

All the highlighted factors in the previous studies are pertinent towards the development of effective quantity surveying professionals. Factor analysis seemingly reduces the number of factors and enables the determination of effective and coordinated strategies to resolve the challenges. Further, the generation of significant differences from the various respondents also enables the determination of targeted interventions. The next section explains the approach for this study.

RESEARCH METHOD

This study is part of broader research on quantity surveyors' competence challenges, hence the methodology is similar to the one published in other journals. A questionnaire-based descriptive survey strategy was undertaken to collect quantitative data from both consultants' and contractors' quantity surveyors on the factors affecting their competence. The need to exercise objectivity and collect

information from a large population (Leedy and Ormrod, 2016) supports this approach. Also, as supported by Dada and Jagboro (2018) and Yap *et al*. (2021, this positivist philosophy entails the use of numbers through scientific methods to contribute to acceptable knowledge (Saunders *et al*., 2016).

Sampling

All the eighty-three (83) construction companies resident in Harare and Bulawayo and listed in the list of companies of the Construction Industry Federation of Zimbabwe (CIFOZ) were included in the contractors' quantity surveyor selection. According to the CIFOZ list, more than 90% of the construction companies in Zimbabwe are found in the selected geographical areas. All eight (8) CIFOZ categories (A-H) were approached for participation in the study where category A companies are the most organisationally and technically competent, as well as being financially stable. The survey managed to collate data from all eight (8) contractor categories represented in the study area with 48.6% of the contractors being in category A. This is the highest category and as such, a high representation confirms the validity of the study. Consultant quantity surveyors in all the twenty-two (22) quantity surveying firms in Zimbabwe were also selected for participation in the study.

Instrument design

An online questionnaire that comprised two sections was utilised. Demographic information on the age, gender, designation, educational level and experience of the respondents constituted the first section. The second section required the respondents to rate the importance of the factors affecting the competence of quantity surveying professionals where 1 - not important, 2 - of little importance, 3 - somewhat important, 4 - important and 5 - very important.

Data analysis

The collected quantitative data were processed and analysed using the Statistical Package for Social Science (SPSS) version 24, with 95% confidence in the results (Field, 2014). The questionnaire's reliability to provide stable and consistent results (Taherdoost, 2016) was confirmed by a Cronbach alpha reliability test which showed a very good reliability of 0.844. Factor analysis is a multivariate analysis technique that reduces the number of variables into interrelated factors or components (Yong and Pearce, 2013) and this was used to reveal significant challenges being faced by quantity surveying professions in Zimbabwe. The Kaiser-Meyer-Olkin (KMO) test, with a measure of 0.700, was utilized to measure the sampling adequacy for conducting factor analysis with validity of > 0.5 being acceptable (Ather and Balasundaram, 2009). Also, Bartlett's test for sphericity, which measured the multivariate normality of the set of distributions, with a value of 0.000 being < 0.05, indicated appropriately multivariate normal and acceptable data for factor analysis (Benson and Nasser, 1998). Significant components, with eigenvalues ≥ 1, were extracted using the principal component analysis with varimax rotation (Kaiser, 1958). Eigenvalues measure the variance in all variables attributable to that component or factor (Ather and Balasundaram, 2009). Varimax rotation maximizes variance for each factor by enhancing the high loadings and reducing the low loadings (Benson and Nasser, 1998). Acceptable loadings ≥ 0.4 were considered stable for utilisation (Guadagnoli and Velicer, 1988). The descriptive categories of components' titles were derived

from the constituents' variables (Lu *et al*., 2017; Asiedu and Ameyaw, 2021; Yap *et al*., 2021) as opposed to utilization of the variable with the highest factor model (Ather and Balasundaram, 2009).

The relative importance index (RII) assessed importance with 'not important' < 0.2; 0.2<, 'of little importance' ≤ 0.4, 0.4< 'somewhat important', ≤ 0.6; 0.6< 'important' ≤ 0.8, and 0.8< 'very important' ≤ 1 (Famiyeh *et al*., 2017). From this evaluation scale, importance was regarded from RII > 0.6. The Shapiro-Wilk test (sig. value of 0.000 which is less than 0.05) for normality for samples more than 50 indicated that the data were not normally distributed (Ghasemi and Zahediasl, 2012). Thus non-parametric tests for testing significant differences due to demographic variables were utilized. Specifically, the Mann-Whitney U test which compares the central tendency of two independent samples for the designation demographic variable was employed (Blumberg, Cooper and Schindler, 2008). The statistical significance level for all tests is based on a standard value of $p < 0.05$.

RESULTS AND DISCUSSION

This section reports on the profile of respondents as well as results of the importance of expected competencies and factor analysis.

Profile of respondents

The response rate was a collective 48.6%, represented by 51 respondents (14 out of 22 consultants' quantity surveyors and 37 out of 83 contractors' quantity surveyors) from a population size of 105. This was satisfactory as it complies with Baruch's (1999) suggested response rate of 60% with a standard deviation of 20% as a standard norm for populations of professionals. The profile of respondents as shown in Table 2 shows a male-dominated construction industry, as indicated by Magwaro-Ndiweni (2016). As a representative of the population sizes, contractors' quantity surveyors (72%) were the most represented designation with a lower percentage for consultants' quantity surveyors (28%). All the educational levels were proportionally represented, thereby adding to the validity of the study. Generally, all work experience categories were sufficiently represented and that is relevant towards ascertaining the inclusivity of this study. In addition, all the demographic variables under consideration were well-constituted and this supported competent statistical analysis.

Table 2: Demographics of respondents

Description	Total	Proportion %
Gender		
Male	44	86
Female	7	14
Designation		
Contractor's Quantity surveyor	37	72
Consultant's Quantity surveyor	14	28
Educational Level		
Diploma	17	33
Degree	19	37
MSc	15	30
Experience		

0 – 5 Years	19	37
6-10 Years	15	30
11-15 Years	9	18
Above 15 Years	8	15

Factors affecting the competence of quantity surveying professionals

From the factor analysis, four (4) components were revealed with an eigenvalue of ≥ 1, which explained 68.994% of the total variance with factor loadings ranging from 0.892 to 0.532. The constituent factors as shown in Table 3 in each component contributed to the title of the group of competencies (Ather and Balasundaram, 2009). Each group of competencies is discussed as follows.

Table 3: Factor analysis results

Factors	**Component**			
	1	**2**	**3**	**4**
Inadequate organization, project, and professional practice aspects				
FC13 Unclear organization development goals	0.814			
FC1 Lack of adequate experience	0.794			
FC8 Inadequate polytechnic education and training	0.691			
FC12 Inconsistent project implementation strategies	0.670			
FC3 Limited exposure	0.560			
FC5 Lack of on-the- job training structures (acquisition of specific skills)	0.558			
FC2 Lack of relevant continuous professional development programmes	0.532			
Inadequate academic and technological advances				
FC4 Inadequate university undergraduate education and training		0.798		
FC6 Inadequately prepared for advances in information and communication technology		0.721		
FC9 Lack of adequate research and development		0.634		
Inadequate organizational structure and teamwork				
FC11 Inadequate organization set up/structure			0.892	
FC10 Lack of teamwork and development			0.844	
Unclear individual career development goals				
FC7 Unclear individual career development goals				0.794
Eigenvalue	4.793	1.792	1.244	1.140
The Proportion of variance (%)	36.871	13.783	9.569	8.770
Cumulative variance (%)	36.871	50.655	60.224	68.994
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 8 iterations.				

Component 1- Inadequate organization, project, and professional practice aspects

The first component was named 'Inadequate organization, project and professional practice aspects' and accounts for 4.793 eigenvalues and a variance of 36.871%. The factors included in this component are 'Unclear organization development goals' (sig.=0.814), 'Lack of adequate experience' (sig.=0.794), 'Inadequate polytechnic education and training' (sig.=0.691), 'Inconsistent project implementation strategies' (sig.=0.670), 'Limited exposure' (sig.=0.560), 'Lack of on-the-job training structures' (acquisition of specific skill) (sig.=0.558), and 'Lack of relevant continuous professional development programmes' (sig.=0.532). The factors in this component consist of issues related to the organization, the projects, and

professional practice. Both the consultancy and contractors' firms need to have clear developmental goals as these help significantly in mapping the professional needs (Shayan *et al*., 2019). Changing developmental goals due to prevailing economic conditions has a detrimental effect on the training of quantity surveying professionals. Further, the organization's strategy should be long-term and allow for the nurturing and longevity of employment contracts. This means the provision of favourable employment conditions is paramount. Failure to achieve this leads to a high turnover of professionals, inevitably affecting their competence and the overall performance of the organization. Related to this, professionals have an opportunity to be exposed to high levels of proficiency of senior and experienced professionals regarding what is expected of them (Dada and Musa, 2016). This translates to relevant on-the-job training for quantity surveying professionals and potentially responds to the shortcomings in polytechnic education and training in the study area. Despite this, there is a need to align polytechnic education and training to the current needs of the construction industry in Zimbabwe. Standardisation of polytechnic training in accordance with regional and international quantity surveying organisations is also important if competency objectives are to be met.

In terms of project-related aspects, the project implementation strategies (Dada and Jagboro, 2018) need to be consistent for the different types of projects undertaken by the consultants and contractors firms. This ensures that quantity surveying professionals develop adequate competencies associated with the specific types of projects, can work independently and effect relevant improvement strategies. The lack of variable types of projects within the Zimbabwean construction industry is obviously a limitation; however, intensive implementation of project-related aspects is achievable. The resolution of relevant continuous professional development programmes is important as it deals with professionals' aligning to the changing needs of clients as and when such changes are required. This is the prerogative of the professional body; collaboration with educational institutions culminates in the development and implementation of relevant continuous professional development programmes. There is a need for the existent professional body in Zimbabwe to be more visible and effective in delivering its mandate. Furthermore, where experts cannot be found in the construction industry, collaboration with other external bodies is pertinent.

Component 2 - Inadequate academic and technological advances

The second component was named 'Inadequate academic and technological advances' and accounts for 1.792 eigenvalues and a variance of 13.783%. The factors included in this component are 'Inadequate university undergraduate education and training' (sig.=0.798), 'Inadequately prepared for advances in information and communication technology' (sig.=0.721), and 'Lack of adequate research and development' (sig.=0.634). This component consists of factors that deal with academic and technological advances. Improvements in university undergraduate education and training have been one of the most common recommendations (Crafford and Smallwood, 2007; Hassan *et al*, 2011; Shafie *et al*., 2014; Olanrewaju and Anahve, 2015; Dada and Musa, 2016; Wanda *et al*., 2016; Dada, 2017; Perera *et al*., 2017; Dada and Jagboro, 2018; Yogeshwaran *et al*., 2018). Having course or module instructors from the construction industry would go a long way in bridging the competency gap. However, the curriculum re-design should suit the needs of the specific study areas since construction industries are at varying levels of development. A nexus between the construction industry and academia

needs to be established in Zimbabwe. There is also a great need for continuous collaboration and forecasting of future needs within the industry as well as planning for this. This can be achieved by the promulgation of a robust research and development unit (Moyo *et al*., 2021), either as a separate entity that drives the construction industry or within universities. In addition, such an initiative must be supported by the intended beneficiaries (built environment organizations, clients, and other relevant stakeholders) and be constituted by competent researchers. Advances in information and communication technology (Yap *et al*., 2021) cannot be ignored. The complexity of projects and the sophisticated needs of clients require quantity surveying professionals to be abreast of such advances. The current traditional approaches in the Zimbabwean construction industry regarding measurement, estimating and communication are time-consuming, laborious and costly. Therefore, dealing with this aspect at the construction industry policy level may have the most impact. Also, professional bodies can implement requirements that will enable professionals to acquire the relevant information and communication technology skills. Interventions such as partnerships with international firms and incentives for incorporating such advances may also be implemented.

Component 3 - Inadequate organizational structure and teamwork

The third component was named 'Inadequate organizational structure and teamwork' and accounts for 1.244 eigenvalues and a variance of 9.569%. The factors included in this component are 'Inadequate organization set up/structure' (sig.=0.892), and 'Lack of teamwork and development' (sig.=0.844). This component consists of organizational structure and teamwork factors. The importance of adequate organizational structures (Bowen *et al*., 2008) cannot be overemphasized as it allows professionals to work and plan within the mission, vision, and core values of the firms. The scarcity of construction projects in the study area possibly contributes to the lack of adequate organisational structure. This is due to organizations' having short lives as they diversify or exit and re-enter the industry at various economic intervals. Also, the managerial or leadership competencies of the quantity surveying professionals in Zimbabwe need to be developed further to improve the organizational set-up of quantity surveying firms. Inevitably, once this has been aligned, the professionals can exert themselves competently and in a unified direction. Such structures also aid the gradual and effective progression of quantity surveying professionals. Teamwork and development are beneficial (Bowen *et al*., 2008; Yong and Mustaffa, 2012) within the organization or with other construction professionals in the execution of construction projects. While teamwork may exist across the different construction professionals, quantity surveying firms rarely enter into partnerships or joint ventures in the Zimbabwean construction industry. This is owing to the highly competitive environment that exists and possible trust issues. However, teamwork and development enhance confidence and motivate the quantity surveying professionals to grow in their profession. Hence, these two factors create a conducive environment for quantity surveying professionals to develop and impact professionally.

Component 4 - Unclear individual career development goals

The fourth component was named 'Unclear individual career development goals' and accounts for 1.140 eigenvalues and a variance of 8.770%. The factor included in this component is 'Unclear individual career development goals' (sig,=0.794). The

issue of having clear individual career development goals is important (Dada and Musa, 2016) as it enhances the competency of quantity surveying professionals. Quantity surveying graduates have an opportunity to select various career development goals after graduation. This can also affect quantity surveying professionals at different levels of their career development and even encourage career path deviations. The slumps in the construction industry encourage the movement of quantity surveying professionals across different roles as they endeavour to survive in the industry. This is exacerbated by a lack of career development advisory roles from within the professional body in Zimbabwe. Such a scenario makes it difficult for quantity surveyors to progress and develop in specific roles, thereby, affecting their competence. Although the factors militating against individual career development are numerous, the relevant stakeholders should fulfil their role in reducing their effect. The professional body should also play its part in its career advisory capacity and allow for registration under various designations (Moyo *et al.*, 2021). Innovation and clear organizational structures are essential if consultancy and contractors' firms are to support their professionals' individual career development goals.

Significant differences due to designation

Respondents contributed their insights on the factors affecting the competence of quantity surveying professionals as shown in Table 4.

Table 4: Ranking of factors affecting the competence of Quantity surveying professionals

Code	Factors	Overall		Consultants' Quantity Surveyor		Contractors' Quantity Surveyor		Mann Whitney results
		RII	Rank	RII	Rank	RII	Rank	Sig.
FC3	Limited exposure	0.843	1	0.854	1	0.814	5	0.501
FC5	Lack of on-the-job training structures (acquisition of specific skills)	0.816	2	0.805	2	0.843	4	0.683
FC6	Inadequately prepared for advances in information and communication technology	0.788	3	0.762	5	0.857	2	0.082
FC9	Lack of adequate research and development	0.788	3	0.789	3	0.786	7	0.537
FC1	Lack of adequate experience	0.784	5	0.778	4	0.800	6	0.677
FC2	Lack of relevant continuous professional development programmes	0.745	6	0.741	9	0.757	8	0.809
FC10	Lack of teamwork and development	0.745	6	0.757	7	0.714	11	0.629
FC11	Inadequate organization set up/structure	0.745	6	0.746	8	0.743	9	1.000
FC7	Unclear individual career development goals	0.737	9	0.762	5	0.671	13	0.339
FC13	Unclear organization development goals	0.737	9	0.686	10	0.871	1	0.003*
FC12	Inconsistent project implementation strategies	0.729	11	0.681	11	0.857	2	0.002*

FC4	Inadequate university undergraduate education and training	0.647	12	0.616	12	0.729	10	0.064
FC8	Inadequate polytechnic education and training	0.612	13	0.573	13	0.714	11	0.028*

According to the RII evaluation scale, under the overall ranking and that of contractors' quantity surveyors, all thirteen (13) factors were considered important with RII > 0.6 (Perera *et al*., 2007). However, consultants' quantity surveyors considered 'Inadequate polytechnic education and training' as not important with RII ≤ 0.6. This is contrary to the studies undertaken by Crafford and Smallwood (2007) in South Africa and Dada and Musa (2016) in Nigeria, in which the factor was considered important. This is potentially due to differences in the curricula of polytechnic education in developing countries. The notion is that polytechnic education and training are adequate for the needs of consultants' quantity surveyors in the study area. The top three factors affecting the competence of quantity surveying professionals include 'Limited exposure' (RII=0.843), 'Lack of on-the-job training structures (acquisition of specific skill)' (RII=0.816), 'Inadequately prepared for advances in information and communication technology' (RII=0.788), and 'Lack of adequate research and development' (RII=0.788). The issues of exposure and lack of on-the-job training structures (acquisition of specific skills) are very important as the RII ≥ 0.8. As supported by Shafie *et al*. (2014), Wanda *et al*. (2016) and Dada and Musa (2016), skills are transferred when the professionals are exposed to different types of projects and different professional teams. However, owing to the potential scarcity of construction projects in Zimbabwe, the necessary exposure required by quantity surveyors is either limited or inadequate. In addition, the complexity of projects (Yap *et al*., 2021) exacerbates the demise of quantity surveying professionals. The factors of 'Inadequately prepared for advances in information and communication technology' and 'Lack of adequate research and development' were considered very important, thereby supporting the findings of Hassan *et al*. (2011), Shafie *et al*. (2014), Chynoweth (2013) and Moyo *et al*. (2021). The advent of building information modelling as a foundation of digital transformation cannot be ignored and its lack of adoption is detrimental to the needs of construction stakeholders as alluded to by Yap *et al*. (2021). Shafie *et al*. (2014) also support adequate preparation for advances in information and communication technology to enable quantity surveying professionals to remain relevant and offer value for money to construction clients. The two factors indicate a general lack of research and development within the higher education institutions and professional bodies to enable the enhancement of quantity surveying professional competencies. As opined by Moyo *et al*. (2021), research and development are essential to improving the profession.

The Mann-Whitney U test confirms that there is no significant difference between the collective insights of consultants' quantity surveyors and contractors' quantity surveyors on these factors, therefore, these are considered the most important factors from both the designations. However, the results of the Mann-Whitney U tests show that there was no statistically significant difference in ten (10) of the thirteen (13) factors affecting the competence of quantity surveying professionals concerning designation since their p-value was > 0.05. Despite Moyo *et al*.'s (2021) determining that the two designations had statistically significant differences regarding the expected competencies of quantity surveying professionals, they generally agree on their insights concerning the factors that affect their

competence. The individual factors, as shown in Table 5, had statistically significant differences which are analyzed as follows.

Table 5: Summary of Mann-Whitney U test results on designations

Factors	Sig.	Designation mean ranks	
		Consultant's quantity surveyor	Contractor's quantity surveyor
FC8 Inadequate polytechnic education and training	0.028	23.30	33.14
FC12 Inconsistent project implementation strategies	0.002	22.30	35.79
FC13 Unclear organization development goals	0.003	22.34	35.68

For all the factors, contractors' quantity surveyors had higher mean ranks as compared to those of consultants' quantity surveyors, as shown in Table 5. This indicates that contractors' quantity surveyors generally consider inadequate polytechnic education and training, inconsistent project implementation strategies, and unclear organization development goals as impacting negatively on the competence of quantity surveying professionals. This is most likely due to organizational development goals and project implementation strategies' aspects being more relevant and important for contractors as opposed to consultants' firms. Importantly, contractors' quantity surveyors are expected to function better when the company has clear and adequately stipulated. organizational development goals and project implementation strategies. Also, the expected competencies for contractors' quantity surveyors allocate more importance to adequate polytechnic education and training as generally supported by Dada and Musa (2016), Perera *et al*. (2017), Dada and Jagboro (2018), Yogeshwaran *et al*.(2018), and Yap *et al*. (2021). Again this supports the findings that the two designations have varying expectations (Moyo *et al*., 2021).

CONCLUSION

The increased complexity of construction projects necessitates the need to ensure built environment professionals achieve and maintain the highest levels of competency. However, this is seldom accomplished as various factors negatively affect the competency of these professionals. One of these critical professionals is a quantity surveyor, whose responsibilities include the effective cost and contractual management of construction projects. Hence, this research aimed to determine the factors that affect their competence in the Zimbabwean construction industry through factor analysis. Significant factors included inadequate project and professional practice, inadequate academic and technological advances, inadequate organizational structure and teamwork, and unclear individual career development goals. These findings were consistent with issues that affect developing countries and reveal a need to establish collaboration between higher education institutions and professional bodies for the development and implementation of relevant strategic plans for resolving these inadequacies. Construction organizations need to adjust their organizational structures and development goals to align with accepted global best practices. On the other hand, quantity surveying graduates and professionals need adequate career advice and mentorship to enable them to optimize their skills within the profession. Effective research and development can

timeously drive the resolution of the challenges affecting quantity surveying professionals and even proffer contextual innovations.

Furthermore, the research also assessed statistically significant differences due to the designations of consultants and contractors quantity surveyors. The majority of the factors had no significant differences due to these designations, except inadequate polytechnic education and training, inconsistent project implementation strategies, and unclear organization development goals which had significant variances. Contarctors'quantity surveyors considered these to be more important compared to consultants' quantity surveyors owing to these factors being more relevant to their work and needs in construction companies. The competitive nature and economic challenges of the construction industry require construction companies to be resourced with adequately trained quantity surveying technicians and for those organizations to be well organized and structured.

The withdrawal of primary data from quantity surveying professionals only was a limitation; however, the factors primarily affect quantity surveyors and their insights are vital. Further research can consider the factors affecting the competence of the other key built environment professionals to establish a holistic intervention strategy.

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