



# MITIGATING STRATEGIES OF THREATS TO QUANTITY SURVEYING PROFESSION IN THE NIGERIAN CONSTRUCTION INDUSTRY

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## ABSTRACT

Quantity surveying (QS) profession had faced numerous challenges in recent decades than when it was first introduced in developing countries. In addition, opportunities via technology advancement to the profession were also perceived as threats. This, therefore, inform the need to investigate the possible mitigating strategies to the threats confronting the profession in the Nigerian construction industry as an attempt to proffer solutions. Therefore, opinions of quantity surveyors in construction firms, consulting firms and government establishments of Lagos State, Nigeria were collected through a survey. The mitigating strategies garnered from extant literature were used to elicit the opinions of the respondents. One hundred and twelve (112) copies of questionnaires were administered, while the retrieved copies were used to analyse with both descriptive and inferential statistics. Mean score and Standard Deviation (SD) were used to rank the opinions of the respondents, and factor analysis was used to group the mitigating strategies into concise form for ease of discussion. The results of the analysis show that the mitigating strategies identified in the study are significant to mitigating the threats in the QS profession. The factor analysis conducted grouped the mitigating strategies into four major groups, namely practice, knowledge, progressive learning and ethics. These groupings were discussed within the context of the study and in relation with previous researches. This study proffers possible solutions to the threats to the QS profession that had been publicised in many studies.

**Keywords:** Construction industry, Growth and Development, Mitigating Strategies, Quantity Surveying Profession, Threats.

## 1. INTRODUCTION

Quantity Surveying (QS) profession had faced some hiccups in its development despite its notable landmark in the construction industry (Smith, 2011). Wao (2015) revealed that the name “quantity surveying” emanated from the role of quantifying the amount of construction resources such as materials, labour, and equipment. The profession has different names in different countries. In the United States of America (USA), the professional practising quantity surveyors are often referred to as project engineers, cost engineers/planners or estimators while other countries referred to the professionals as building economists (Wao, 2015). In order to provide the best value to project owners, the roles of quantity surveyors

encompass the preparation of cost estimates of projects and ensuring that construction activities are executed in a manner that satisfies project owner's needs (Wao and Flood, 2016).

The pattern of practising QS in Nigeria is similar to the UK and other Commonwealth countries (Dada and Jagboro, 2012). In 1969, a group of trained and qualified Nigerians, who had been practising in the UK returned to Nigeria and perceived the urgent need to develop the profession. Therefore, a parallel body to the Royal Institution of Chartered Surveyors (RICS) of the UK called the Nigerian Institute of Quantity Surveyors (NIQS) was founded (NIQS, 2004). As of 2001, the services required of the QS profession were cost-planning, site-planning, procurement advice, life-cycle costing, arbitration and technical auditing, which was termed as high-fee generating services (Boon, 2001). The above-named services are also similar to the submission of Onwusoye (2013). Other QS services advocated in later years include risk management, Value Management (VM); legal and environmental services (Cartlidge, 2006). For instance, Oke and Aigbavboa (2017) revealed that since the introduction of VM into Nigeria in the 1990s, the application of VM on construction projects in the Nigerian construction industry remain minimal (Oke and Ogunsemi, 2013). Considering the year of VM introduction into the Nigerian construction industry, Ojo and Ogunsemi (2019) opined that VM ought to have been fully embraced into the Nigerian construction process. This shows the drag in the level of improving the services and skills of quantity surveyors in Nigeria.

The QS profession had faced a lot of challenges that threaten its existence, growth and success over the years (Frei, 2010). Considering the revolution in QS primitive services, Olatunji et al. (2010) revealed in their study in particular that, the advent of Building Information Modeling (BIM) could be viewed as a threat to the traditional services of quantity surveyors and other construction-related disciplines. Meanwhile, the adoption of BIM should only redefine services of professionals (not only quantity surveyors) in the built environment and not serve as a threat (Chiu and Lai, 2016). On the part of Kadiri and Ayodele (2013), the threats to the QS profession hinge on the incursion of other professionals into the services rendered by quantity surveyors. Also, the shortfall in the quality of QS education with seasoned teaching of the profession's software at tertiary levels is also identified as threats to the sustainability of QS profession (Oyediran and Odusami, 2005; Ojo et al., 2019). This made Mogbo (1998) suggested overhauling of QS curriculum in the tertiary institutions to meet the requirement in the built industry. Frei and Mbachu (2009) also stated that for QS to remain relevant in this world of continual change, urgent and far-reaching strategic transformation is required.

Ogunsina et al. (2018) listed numerous challenges confronting the Nigerian QS profession. Without scanning and discerning future directions and actively preparing for any impending changes, the QS profession stands at risk of receiving changes as threats rather than opportunities (Porth, 2003; Mbachu and Nkado, 2006). Port (2003) further explained that it is expedient for quantity surveyors to zoom into the perceived opportunities in the construction industry to minimise the imminent threats. Previous researches had investigated the threats to the QS profession in Nigeria, but little attention has been given to empirically proffer means of mitigating the threats. This study, therefore, filled the gap by assessing the mitigating strategies to the threats to the QS profession.

## **2. PREVIOUS STUDIES**

QS is an indispensable profession in the actualisation of construction projects. The profession had received wide acceptance in the developed countries but with misconceptions in some developing countries. The profession has been misinterpreted with land surveying and estate surveying (Ogunsemi, 2015). To clear the air on the misconception on what QS is, Ogunsemi

(2015) defined QS as a profession concerned with financial probity and achieving value for money in the conceptualisation, planning and execution of construction projects.

Frei (2010) and Kadiri and Ayodele (2013) reported that the QS profession had been confronted with many challenges recently. Wao (2005) also stated that the profession had faced numerous challenges in its development compared to when it first came into existence. Ogunsina et al. (2018) assessed the factors confronting the practice of QS profession in Nigeria. Olatunji et al. (2010) also revealed the fear of QS profession extinction in the face of technology. Therefore, it becomes necessary to investigate the mitigating strategies to the threats to the practice of the QS profession in developing countries.

Traditionally, when the designs of the proposed project are almost completed, quantity surveyors are summoned for the preparation of bills of quantities and other documentation for procurement purpose (Matipa et al., 2008). Estimations were also conceptual and based on limited project information, laborious and time-consuming. But, the advent of technology lessened the burden a lot (Cartlidge, 2006), and thus helped in achieving the client's objective with a greater level of accuracy (Doyle and Hughes, 2000). Automation of bills of quantities with QS Software reduces error and misunderstandings that evolves with design changes (Ashcraft, 2007), and speed up the time for generating construction quantities and other documents (Ashworth and Hogg, 2007). The advent of Building Information Modelling (BIM) also proffered solutions to major drawbacks in the built environment (Hasan and Rasheed, 2019; Usman et al., 2019) and also for her professionals. The need to accustom with technology advancement is a step to mitigating issues confronting QS profession. To be effective in providing professional services, QS firms should also adapt to offer emerging, innovative value-added services (Ojo, 2018). The profession must restructure traditional practices to involve technological advances that are better aligned to ameliorate the new challenges. Thus, successful change management will be critical to enable practices to adapt to the new socio-cultural, political, legal and environmental exposure, as preparations are made to take practices offshore.

The required change in the QS profession may be unattainable without the provision of adequate training and lifelong learning practice. Training and education give knowledge which makes an employee have awareness of innovations in construction practice (Hillary, 2004). According to Oke and Aigbavboa (2017), training is an essential element for the development of construction professionals necessary for improving the awareness and application of innovative methodologies. This is also corroborated by Olawumi et al. (2016) that training and education are essential drivers for addressing skill shortfalls in the construction industry. In a study by Owolana and Booth (2016), it was revealed that such training that portrays lifelong learning practices is rare in the construction industry of many developing countries. Thus, the need for QS firms and other construction-related organisations to invest in training and education of staff becomes very important.

Most of the times, construction professionals have been labelled with a lack of continuous improvement culture which reflects in their resistance to change (Ojo, 2018). According to Palmer (2012), resistance to change at organisational level explains the negative attitude of employees, which is always evident in the implementation of innovative methodologies. This affirms various assertions on the rigidity of construction professionals to primitive or traditional construction practices. For instance, the study of Oyediran (2005) opined that the QS profession appears to be one of the few professions that have inadequately utilise and implement technological advancement to its practices in totality. Thus, investment in training of quantity surveyors on the use of technological tools and software in the QS profession becomes imperative. This will improve the competitive advantage of the profession in the global construction market (Chukwunonso et al., 2012).

Diversification is the bedrock of all-time relevance. Smith (2004) noted that diversification in the services provided by quantity surveyors would sustain long term relevance in the built environment and also meets the dynamic client's need. Smyth (2000)

submitted that QS firms that spread its service tentacle into project management, construction management, risk management and civil engineering works would remain relevant in the global competitive construction market. In light of this, QS practitioners are such that should embrace change, familiarise with innovative practices and carve out territories for specialisation and diversification. Ganiyu et al. (2012) stated that diversification always has a positive and negative effect on professionals. Therefore, the available medium of diversification can be publicised to quantity surveyors via chapters' monthly meetings, seminars and workshop organised by the institute. For instance, Continuing Professional Development (CPD) is a requirement for members of most professional associations, rather than relying solely on their employers; practitioners need to also take responsibility for their own professional development to enhance lifelong learning and relevance. Therefore, professional institutes must ensure that the activities that culminates into the allotted CPD are such that identified the essential skill shortfall and emerging areas of practice in the profession (Schostak et al., 2010). This will encourage organisations to invest in the development of their staff, and each staff could also spare percentage of the meagre salaries for self-development.

The level of awareness of QS Profession is relatively low as compared with other built environment profession (Olatunde and Okorie, 2016). In order to address the low level of public awareness of the profession, personal marketing and penetration of QS services to the private sector rather than relying on government patronage alone was encouraged by Kadiri and Ayodele (2013). Public enlightenment of the profession through broadcast and telecast will also make the general public differentiate the service of quantity surveyors to the profession with surveyors as suffixes. Upholding ethical behaviours of QS practitioners is a significant step to the sustainability of the QS profession (Adeniyi et al., 2018). For instance, continual rise in prices of construction materials has also put significant financial pressures on construction project developer. This propelled construction project developers to search for the lowest possible price for all services, in which construction is included. It is important that the QS institute monitor the fees being charged by quantity surveyors as against the recommended fee scales and set disciplinary measures for practitioners that violate the laid down rules. To this end, Harun and Abdullah (2006) recommend uniform professional service fee for each QS service to serve as a control measure. If the fee scales are controlled in this way, the profession can be appropriately compensated for services rendered and therefore maintain its profitability. This may also have the effect of providing QS firms with the capacity to pay its employees better salaries (Nnadi et al., 2016). The summary of mitigating strategies to threats to the QS profession sourced from extant literature is captured in Table 1.

**Table 1:** Summary of Mitigating Strategies to Threats to QS Profession

Mitigating Strategies	Sources
Need for QS to get accustomed with BIM	Olatunji et al. (2010); Usman et al. (2019) Boon (2009).
Acquiring knowledge pertinent to emerging service areas	Cartlidge (2006); Ojo (2018); Ojo and Ogunsemi (2019)
Diversification of scope and service	Smith (2004); Smyth (2000); Ganiyu et al. (2012)
Creating awareness of the profession	Olatunde and Okorie (2016); Kadiri and Ayodele (2013)
Provision of training to address identified skill shortfalls	Oke and Aigbavboa (2017); Olawumi et al. (2016); Hillary (2004)
Flexibility to adapt and respond to identified changes in the construction industry	Ojo (2018); Palmer (2012).
Research, innovation and integral involvement with technological advancement	Ojo et al. (2019); Oyediran (2005); Chukwunonso et al. (2012).

International knowledge and ties	Goodman and Schaps (2008); Rahman et al. (2014)
Increased continuing programme development by the professional body	Schostak et al. (2010).
Conversant in construction cost management	Ashworth and Hogg (2007); Cartledge (2006);
Uniformity in the professional service fee	Nnadi et al. (2016); Harun and Abdullah (2006)
Trustworthy and credibility	Adeniyi et al. (2018)

### 3. RESEARCH METHODOLOGY

Survey research design was adopted for this study to seek the opinions of quantity surveyors and to also achieve large population-based data collection from the target respondents. The opinions of the quantity surveyors in construction firms, consulting firms and government establishments in Lagos State, Nigeria were solicited and used to achieve the aim of this study. The choice of Lagos State was based on the premise that the state remains the nerve of commercial activities in Nigeria (Fagbenle et al., 2011). Oke and Ogunsemi (2013) also described Lagos State as the seat of many construction professionals. As at the time of conducting this survey, the population of quantity surveyors in Lagos State was above 4,372 (NIQS Lagos State Chapter, 2018). Applying Yemane's formula as described in Olatunji et al. (2014) at a 10% margin of error, the sample size for this study was 98 (see eq. 1). This adopted margin error falls within an acceptable confidence level with which sample size could be determined (Sarmah and Hazarika, 2012).

$$n = \frac{N}{1+N(e)^2} \quad (\text{eq. 1})$$

Where n = sample size, N = Total population, e = level of precision (margin of error) at 10%

In order to achieve sufficient responses from the survey, copies of questionnaires beyond the sample size were administered. The questionnaires captured questions to elicit background information of the respondents and agreement with the mitigating strategies to threats to QS profession on a 5-point Likert scale with 1 = strongly disagree and 5 = strongly agree. One hundred and twelve (112) copies of questionnaires were successfully administered with convenience sampling technique. Convenience sampling technique was adopted due to limited time and other resources available to conduct the research. Sixty-six (66) copies of the questionnaires were filled, returned and found fit for analysis. The retrieved questionnaires represent 59% of the total questionnaires administered. The response rate is relatively low but not unusual in construction-related research (Arain and Pheng, 2005). Percentile was used to analyse the background information of the respondents, mean item score, and Standard Deviation (SD) were used to analyse the mitigating strategies to the threats to the QS profession. Factor analysis was further conducted to group the mitigating strategies to manageable forms for ease of discussion.

### 4. FINDINGS AND DISCUSSION

#### 4.1 Background information

From the data retrieved, 29(43.9%) of the respondents works in construction firms, 20(30.3%) works in consulting firms while 17(25.8%) works in government establishments such as the ministry of works. The respondents with OND, HND and PGD/BSc certificates were 6.1%, 33.3% and 60.6% respectively. The respondents with 1-5 years work experience in the construction industry were 25(37.9%), 13 (19.7%) of the respondents had 6-10 years work experience, 8(12.1%) had 11-15 years work experience, 14(21.2%) had 16-20 years work experience while 6(9.1%) had above 20 years working experience in the construction



industry. In the assessment of professional body membership status, 50% of the respondents were probationers, 38.1% were corporate members, and 15.2% were technicians while 2 (3%) were fellow members of the NIQS. The background information shows that the categories of the respondents were qualified academically and professionally to give valid information necessary to achieve the study aim.

#### 4.2 Mitigating Strategies to Threats in Quantity Surveying Profession

Table 2 shows the scoring of the mitigating strategies to the threats to the QS profession. "Creating awareness of the profession" was scored as the highest mitigating strategies with a mean score of 4.62, "Increased continuous programme development" and "Need for QS to get accustomed to BIM" was ranked second and third with a mean score of 4.50 and 4.42 respectively. "Trustworthiness and credibility" was ranked fourth with a mean score of 4.39 while the least scored militating strategies to threats of QS profession was "Uniformity in professional service fee" with a mean score of 3.00. It was submitted that  $MS \geq 3.00$  is a useful threshold to identify the significant item on a 5-point rating scale (Harada et al., 2015). Therefore, all the mitigating strategies in this study were considered 'significant' to mitigate the threats to the QS profession. Also, 11(91.6%) of the SD of the mitigating strategies were below 1.000. This implies that the variability of the dataset is very little (Oke and Aghimien 2018); it also implies that there was consistency in the opinions of the respondents on the mitigating strategies.

**Table 2:** Mitigating Strategies of Threats to Quantity Surveying Profession

Mitigating Strategies	Mean	SD	Rank
Creating awareness of the profession	4.62	0.674	1
Increased continuing programme development by the professional body	4.50	0.588	2
Need for QS to get accustomed to BIM	4.42	0.703	3
Trustworthy and credibility	4.39	0.605	4
Conversant in construction cost management	4.36	0.545	5
Provision of training to address identified skill shortfalls	4.32	0.469	6
International knowledge and ties	4.30	0.525	7
Acquiring knowledge pertinent to emerging service areas	4.26	0.615	8
Research, innovation and integral involvement with technological developments.	4.26	0.615	8
Flexibility to adapt and respond to identified changes in the construction industry.	4.17	0.692	10
Diversification of scope of service	4.17	0.904	11
Uniformity in the professional service fee	3.00	1.370	12

##### 4.2.1 Factor Analysis

Factor analysis of the mitigating strategies to the threats to the QS profession was also conducted. The choice of factor analysis was to group the 12 mitigating strategies into concise form for ease of discussion. This method of analysis was also adopted by Babatunde et al. (2018) to group 8 factors in a study to facilitate easy discussion. This analysis was employed to explore and detect underlying relationships among the variables and describe them in fewer but in a more concise and comprehensive form.

Shen and Liu (2003) showed that conducting an adequacy test of the dataset is the first step in conducting factor analysis. For sampling adequacy, the Kaiser-Mayer-Olkin (KMO) was employed, as shown in Table 3. The KMO of 0.715 at a significant level of 0.000 was obtained, and this shows that Bartlett's Test of Sphericity for correlation adequacy between the variables was highly significant. The KMO explained that 71.5% of the data gathered were adequate and it explains the suitability of the collected data. It measures the sampling adequacy for each variable considered and the complete model for the mitigating strategies

to the threats to the QS profession. Having performed the analysis, the p-value obtained, that is  $< 0.05$  implies that the data is suitable for factor analysis at a degree of freedom of 66 and an approximate chi-square of 189.993. For this data, Bartlett's test is highly significant ( p-value = 0.000), suggesting that the correlation is an identity matrix. This implies that all the item listed have significant correlation at the 5% level, and therefore exploratory factor analysis is appropriate.

**Table 3:** KMO and Bartlett's Test of Mitigating Strategies

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.715
Bartlett's Test of Sphericity	Approx. Chi-Square	186.993
	Df	66
	Sig.	.000

Table 4 shows the result of the initial and final rotated matrix of the 12 factors that made up the mitigating strategies to the threats in the QS profession. Since one of the goals of factor analysis is to obtain factors that help explain this correlation, the variables must be related to each other for the factor model to be appropriate. If the correlation between the variables is small, it is unlikely that they share common factors. The initial and the rotated matrix results are shown in Table 4. The second, third and the fourth column are the initial matrices, and the next three columns on the right are rotated matrix only where eigenvalue is greater than 1.0. The total variance explained by each factor is listed in the second column labelled total/initial eigenvalue. The next column contains the percentage of the total variance attributed to each factor. The factors are arranged in descending order of variance explained. About 62% of the total variance is attributable to the first four items while the remaining eight items together account for only 38% of the variance.

**Table 4:** Correlation matrix

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.538	29.484	29.484	3.538	29.484	29.484
2	1.511	12.593	42.077	1.511	12.593	42.077
3	1.302	10.854	52.930	1.302	10.854	52.930
4	1.157	9.642	62.572	1.157	9.6420	62.572

Table 5 shows the framework with four components that may be used to adequately represent the mitigating strategies to threats to QS profession. The factor grouping based on the Varimax rotation and the loading of each factor exceeds 0.300. The factor loading of 0.3 is considered satisfactory for statistical interpretation (Kline, 2002). Most of the factor loadings are close to 1, which is suitable for interpretation of factors as submitted by Brown (2009). The factor loading of the variables ranges from 0.387 to 0.870, which satisfactorily meet the obligations for statistical interpretation.

**Table 5:** Rotated component matrix

Mitigating Strategies	Components			
	1	2	3	4
Need for QS to get accustomed to BIM	0.773			
Acquiring knowledge pertinent to emerging service areas	0.747			
Diversification of scope of service	0.579			
Creating awareness of the profession	0.572			
Provision of training to address identified skill shortfalls		0.783		
Flexibility to adapt and respond to identified changes in the construction industry.		0.746		
Research, innovation and integral involvement with technological developments.		0.596		
International knowledge and ties			0.87	
Increased continuing programme development by the professional body			0.689	
Conversant in construction cost management			0.62	
Uniformity in professional service fee				0.753
Trustworthy and credibility				0.387

Before the interpretation of the four extracted components, it will be essential to name those components. The naming is based on the judgments of the researchers. This was based on the assertion of Henson and Roberts (2006) that there is no specific scientific procedure to be followed in naming the groupings of factors in a factor analysis study. Therefore, the following were thought to be appropriate in the naming of the factors as indicated in Table 5: (i) Practices; (ii) knowledge; (iii) Progressive learning; and (iv) Ethics.

#### 4.2.2 Components Interpretation

“Practices”, being the first component, explained that the factor accounted for 29.48% of the total variance. The items under this component are: Need for QS to get accustomed to BIM (sig. = 0.773), Acquiring knowledge pertinent to emerging service areas (sig. = 0.747), Diversification of scope of service (sig. = 0.579) and Creating awareness of the profession (sig. = 0.572). The finding of this study shows that the need to create awareness of the QS profession is necessary. This is in agreement with the study of Kadiri and Ayodele (2013), which proves that a lot of people are yet to know about the profession and hence suggests aggressive publicity of the profession. Also, the need for QS to get accustomed to BIM was also captured in this component. This is in consonance with the submission of Boon (2009) that reveals knowledge of BIM and other innovative methodologies as the language of the future and of the built environment professionals. In the same vein, acquiring knowledge pertinent to emerging service areas and international knowledge and ties are other mitigating means, this section agrees with the findings of Dixon (1998) and Goodman and Schaps (2008) that state the need for practices to internationalise and reap the benefits of emerging markets by being flexible and open to knowledge. Frei and Mbachu (2009) also submitted that diversification into management-oriented services would help in mitigating the threats to the QS profession.

The second principal factor termed “Knowledge” accounted for 12.59% of the total variance and it contains three (3) items which are: Provision of training to address identified skill shortfalls (sig. = 0.783), Flexibility to adapt and respond to identified changes in the construction industry (sig. = 0.746), Research, innovation and integral involvement with technological developments (sig. = 0.596). These factors reinforced the group of factors under “Practice”. The place of improvement on knowledge cannot be overemphasised in the face of technology and dynamic requirements of construction clients. This implies that knowledge transfer and knowledge management play a significant role in the sustainability of the QS profession in the present age.



The third principal factor is categorised as “*Progressive learning*”, and it accounted for 10.85% of the total variance. The items in this grouping includes: i) International knowledge and ties (sig. = 0.870), ii) Increased Continuing Programme Development (CPD) by the professional body (NIQS) (sig. = 0.689), iii) Conversant in construction cost management (sig. = 0.620). Increased continuing programme development (CPD) by the professional body is viewed as another means of mitigating the threats to the QS profession in this study. As noted by Schostak et al. (2010), CPD should be increased by the professional body to address identified knowledge shortfalls. This means that CPD allotted to seminars, workshops and conferences on emerging areas in the built environment should be higher. Enforcement of participation in seminars and workshops of innovative techniques and methodologies in the built environment should be compulsory for graduate trainees in QS professions, especially applicants for corporate membership and professional examination candidates.

“*Progressive learning*” is a professional competence sustainability concept that can be dated to many decades ago (Nascimento and Valdes-Cotera, 2018). The learning pattern in this concept involves lifelong transformation with consciousness and purpose (Jarvis, 2009). For the context of this study, progressive learning entails undertaking professional competence improvement activities, training as they emerge in the global construction market of QS. Goodman and Schaps (2008) also emphasise the need for international collaboration to reap the benefits of emerging markets and open to knowledge. Collaboration among project participants had been reported as a key element for the successful contractual relationship and knowledge sharing (Rahman et al., 2014). Therefore, international collaborations of QS firms could help reduce the threats to QS services in developing countries and thus improve the relevance of the profession. Sound knowledge in construction cost management such as VM which application is relatively low in the Nigerian construction industry is also a significant step to providing qualitative services to construction clients. Summarily, collaboration and continuous learning would help in skill upgrading and update by quantity surveyors in the Nigerian construction industry.

The fourth principal factor grouping named “*Ethics*” accounted for 9.64% of the total variance, and it contains only two items which include i) Uniformity in professional service fee (sig. = 0.753) and Trustworthy and credibility (sig. = 0.387). Ethics is significant to the survival of QS profession; this is in line with the submission of Aje and Awodele (2006) that, the image of the construction industry rest on ethical conduct within the professionals. Though, it had been reported that ethics is the least considered in the construction professional practices in spite of its extreme importance (Mlinga, 2006). Ethics define the expected conduct of a professional which encompasses charges of professional fees. In addition, Harun and Abdullah (2006) suggested that the uniformity of professional fee is a significant means of mitigating the threats to the QS profession. Thus, compliance with the code of ethics of the QS profession is one of the panaceas for its relevance and sustainability in the built environment of developing countries. Therefore, compliance with code of conduct is important, as it is possible to have standards written in guiding documents of a professional institution and not being practised by the concerned professionals (Adeniyi et al., 2020).

### 4.3 The implication of the Study

This study investigated the mitigating strategies to the QS profession in a concise form. A critical look at the results of the analyses of the mitigating strategies shows the need to upgrade the educational and training arm or approach of the profession in all spheres. This, therefore, suggests the importance of collaborations between academic institutions and QS practicing organisations. According to Olawumi et al (2018), collaboration among construction stakeholders and firms is pivotal to embrace dynamism, and a viable tool to reduce resistance to change in the industry. Such collaboration could be in form of provision of technological infrastructural facilities to departments of QS in tertiary institutions to improve the teaching and learning of the students at undergraduate and postgraduate levels.

In this way, the quality of graduates in the QS profession would be fit for the global construction market.

## 5. CONCLUSIONS AND RECOMMENDATIONS

The main aim of this research work was to assess the mitigating strategies to the threats to the QS profession. A total of twelve threats were identified in the extant literature and based on the variables, questionnaires were administered to quantity surveyors working in the construction firms, consulting firms and government establishment in the study area. The mitigating strategies were analysed using both descriptive and inferential statistics. Factor analysis was used to reduce the mitigating strategies into four groups, namely; '*practices*', '*knowledge*', '*progressive learning*' and '*ethics*' for ease of discussion. The study showed that all the mitigating strategies identified in this study were significant to reducing the threats to QS profession in that they are well above the average of the Likert scale adopted for the study, and the acceptable benchmark. The mitigating strategies centred on the improvement of QS services rendered to clients, acquainting with technological innovation in the built environment, and upholding the banner of the professionalism in adherence to stated ethical conduct.

Based on findings of the study, it is recommended that higher institutions of learning and the professional body (NIQS) should channel training on emerging innovative areas in the construction industry through the organisation of seminars and workshops. For instance, BIM, artificial intelligence, machine learning, cloud computing, gamification, nanotechnology, blockchain, smart contract and mixed reality are thriving areas in the built environment. Sound knowledge of quantity surveyors in these areas will make the profession remains relevant in developing countries, improve the satisfaction of construction clients and provide a platform for international ties. The professional body should also devise means of creating the awareness of the profession to the nation at all levels. The profession should also be made attractive as well to the upcoming generation in other to increase the numerical strength of the profession in developing countries.

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