

## Clients' views on quantity surveying competencies

*Peer reviewed*

### Abstract

Traditionally, quantity surveyors have fulfilled the function of financial and contract controller of projects and therefore proficiency in the related competencies is important. However, the quantity surveying profession has endeavoured to broaden the role of Quantity Surveyors to include *inter alia*, project management, and facilities management in recent years.

The article reports on the quantity surveying component of a study relative to the competencies of five built environment practitioners conducted among private and public sector clients. The focus of the study was to determine the importance of competencies, and the extent to which they manifest themselves. Based upon *inter alia*, principal component analysis, findings include that the top two of five factors, namely 'Financial planning and control' and 'Contract administration', include the traditional quantity surveying competencies.

Recommendations include *inter alia*, tertiary institutions, the South African Council of Quantity Surveying Profession (SACQSP) and the Association of South African Quantity Surveyors (ASAQS) should address the perceived deficiency relative to the competencies identified by the gap analysis, particularly those competencies that achieved evidence scores below that of the overall average evidence score.

Keywords: clients, competencies, quantity surveyors

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### **Abstrak**

Tradisioneel het bourekenaars die funksie van finansiële- en kontrak beheer van projekte vervul. Daarom is bekwaamheid van hierdie persone belangrik. Die bourekenaars-professie het daarna gestrewe om die rol van Bourekenaars te verbreed deur onder andere deesdae ook as projekbestuurders en fasiliteit bestuurders op te tree.

Die artikel lewer verslag oor die bourekenaars komponent van 'n studie wat gedoen is onder privaat- en openbare sektor kliente om die bekwaamheid van vyf praktyke in die bou-industrie vas te stel. Die fokus van die studie was om die belangrikheid van bekwaamheid te bepaal. Die studie het bevind dat die twee mees uitstaande faktore naamlik *Financial planning and control* en *Contract administration* deel vorm van die tradisionele bourekenaars bekwaamheid.

Aanbevelings sluit onder andere in dat tersiële instansies, die Suid-Afrikaanse Raad vir bourekenaars en die Vereniging van Suid-Afrikaanse Bourekenaars Professie (VSABP) die tekortkominge soos uiteengesit in die analise en veral daardie tekortkominge wat laer as die gemiddelde telling was, aandag moet geniet.

Sleutelwoorde: kliente, bekwaamheid, bourekenaars

## 1. Introduction

**B**uilt environment professionals are charged with the responsibility of assessing clients' needs and realising a productive design through added value engineering. This requires the continuing development of skill, application and experience in the knowledge-intensifying cycle (Council for Scientific and Industrial Research, 2004). The following quotation included in the South African Construction Industry Status Report — 2004, published by the Construction Industry Development Board (CIDB) (2004), provides insight relative to the performance of the design team: "The quality of delivery varies and clients expressed dissatisfaction particularly with regard to timely preparation of designs, handling of variations, invoicing and final settlement of accounts."

This article is based upon a component of a Doctoral study, and reports on the competencies of quantity surveyors based upon responses emanating from private and public sector clients. The input gathered from clients is invaluable as they in essence constitute the primary customers of quantity surveyors, and therefore their input can inform the practice of quantity surveying. The Johari window can be

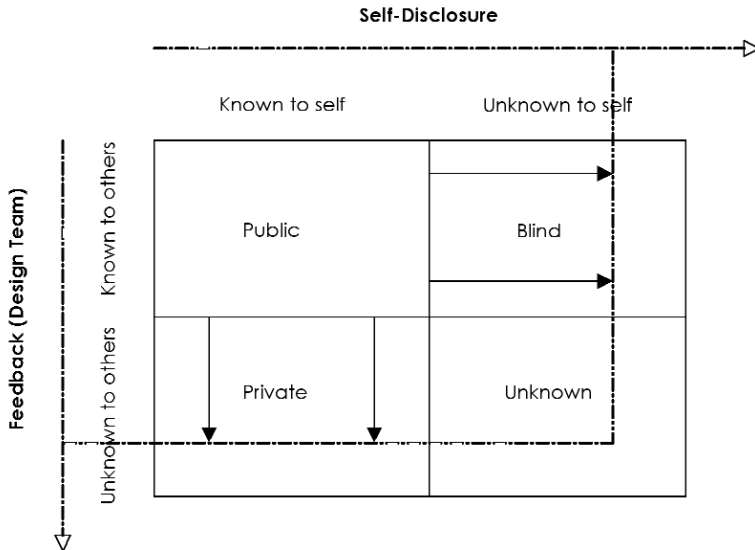


Figure 1: Johari window  
Source: Robbins, 1998

used to explain the importance of input gathered from others and from self-disclosure. The combination of disclosure and feedback can enlarge the congruence area of the Johari window (Figure 1) as well as help to identify areas of focus for relevant future education and training of quantity surveyors (Nkado, 1999).

According to Robbins (1998), proponents of the Johari window imply that perceptual accuracy and communication would be improved if the size of the Public area were expanded by increasing self-disclosure and by acceptance of feedback from others even if such feedback is unflattering.

Nkado (1999) and Crafford (2002) conducted research relative to the competencies required by quantity surveyors using quantity surveyors, architects and engineers as the target population. Thus, it can be argued that self-disclosure did take place and that the Johari Public area was widened.

The aim of this research is to:

- obtain feedback from the clients on the competencies required by quantity surveyors;
- reveal the extent to which quantity surveyors realise client requirements as per client perception, and
- develop a meaningful model of the competencies.

The research broadly follows the approach adopted by Nkado (1999) and Crafford (2002). Upon completion of the research the Johari Public area should be even larger, yielding vital feedback for the quantity surveying profession.

A justification for a study of competencies required by the design and construction team is that the ability of the design and construction team to meet the differing and changing client needs depends on the knowledge base of each discipline. Prokesch (1997) advocates that building and leveraging knowledge is the key to success in this age of globalisation, while Male (1990) opines that knowledge is an important power base for professions generally.

## **2. Quantity surveying competencies**

The quantity surveyor is essentially a building economist, advising clients and architects on costs of alternative designs to ensure that the project is kept within the agreed budget (Seeley, 1997). Leveson (1996) indicates that quantity surveying competencies lie in the

financial and contractual control of the building project, but advises quantity surveyors to pay attention to developing interpersonal skills.

The RICS Assessment of Professional Competence (APC) is primarily competency-based. It requires candidates to demonstrate that they have the skills and abilities needed to perform specific tasks or functions. These are based on attitudes and behaviours as well as skills and knowledge. The specific competencies candidates must achieve depend on the APC pathway being taken. There is an APC pathway for each of the discipline areas in which quantity surveyors work. As competence can be demonstrated on the basis of actual work experience, the pathway will be determined by the candidate's employment. The candidate's supervisor and counsellor will advise the candidate on which pathway to follow. The APC pathways are as follows (RICS, 2006):

- Art and antiques;
- Building control;
- Building surveying;
- Commercial property practice;
- Environment;
- Facilities management;
- Geomatics;
- Housing management and development;
- Machinery and business assets;
- Management consultancy;
- Minerals and waste management;
- Planning and development;
- Project management;
- Property finance and investment;
- Quantity surveying and construction;
- Research;
- Residential property practice;
- Residential survey and construction;
- Rural;
- Taxation allowances, and
- Valuation.

Each APC pathway requires a period of structured training during which the candidate completes the mandatory and technical competencies that make up the minimum requirements for the APC (RICS, 2006). The competencies have three levels of attainment which are progressive in terms of skills and abilities (RICS, 2006):

- Level 1 — knowledge and understanding;
- Level 2 — application of knowledge and understanding; and
- Level 3 — reasoned advice and depth of technical knowledge.

The candidate must satisfy three types of competency (RICS, 2006):

- Mandatory competencies — personal, interpersonal and business skills common to all pathways;
- Core competencies — primary skills of the chosen APC pathway; and
- Optional competencies — selected by the candidate with the supervisor and counsellor from the list for the chosen pathway.

## **2.1 Mandatory competencies**

These competencies are a mix of professional practice, interpersonal, business and management skills that are considered common to, and necessary for, all surveyors. These competencies are compulsory for all candidates. Candidates must achieve the following minimum standards (RICS, 2006):

To level 3:

- Conduct rules;
- Ethics; and
- Professional practice.

To level 2:

- Client care;
- Communication and negotiation; and
- Health and safety.

To level 1:

- Accounting principles and procedures;
- Business planning;

- Conflict avoidance, management and dispute resolution procedures;
- Data management;
- Sustainability; and
- Team working.

## **2.2 Technical competencies**

For each APC pathway, specific technical competencies must be achieved. The competencies are divided into core and optional. For some pathways there will be an element of choice in the core competencies. For the optional competencies a choice must be made from the APC pathway list. For some pathways one optional competency can be taken from the full list of technical competencies. Some pathways allow candidates to select a mandatory competency as an optional and take it to a higher level (RICS, 2006).

For the purposes of this research the quantity surveying route was chosen and the core and optional competencies are discussed below (RICS, 2006).

Core competencies — a minimum of (RICS, 2006):

- Conflict avoidance, management and dispute resolution — to level 2;
- Construction technology and environmental services — to level 2;
- Contract practice — to level 3;
- Design economics and cost planning — to level 3; and
- Health and safety — to level 2.

Optional competencies — from the full list of competencies, a minimum of (RICS, 2006):

- Two competencies — to level 3; and
- Two competencies — to level 2.

The full list of competencies is presented in Table 1 below.

Table 1: List of APC competencies (RICS, 2006)

• Access and easements for power, water and communications infrastructure, including way leaves	• Information technology
• Accounting principles and procedures	• Inspection
• Agriculture	• Insurance and risk management
• Analysis of client requirements	• Landlord and tenant
• Asset and investment planning	• Land use and diversification
• Auctioneering	• Law
• Building pathology	• Leadership
• Business management	• Local taxation / assessment
• Cadastre and land management	• Maintenance management
• Capital allowances and grants	• Management of the built environment
• Capital taxation	• Management of the natural environment
• Collection, retrieval and analysis of information and data	• Managing people
• Commercial management of construction	• Managing resources
• Compulsory acquisition and compensation	• Mapping
• Conflict avoidance, management and dispute resolution procedures	• Marketing
• Conservation and restoration management	• Measurement
• Construction technology and environmental services	• Measurement and costing of construction works
• Consultancy skills	• Minerals management
• Contaminated land	• Negotiating skills
• Contract administration	• Object identification
• Contract practice	• Option appraisal
• Corporate and public communications	• Planning
• Corporate finance	• Procurement
• Corporate real estate management	• Project audit
• Corporate recovery and insolvency	• Project cost and financial control
• Customer care	• Project evaluation
• Design and specification	• Project process and procedures
• Design economics and cost planning	• Project strategy and control
• Development appraisals	• Purchase disposal and leasing
• Development / project briefs	• Real estate finance and funding
• Economic development	• Real estate management
• Engineering surveying	• Real estate management accounting
• Environmental assessment	• Real estate records
• Environmental audit	• Recruitment and selection



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• Access and easements for power, water and communications infrastructure, including way leaves	• Information technology
• Environmental awareness	• Remote sensing and photogrammetry
• Environmental management	• Research methodologies
• Environmental sustainability	• Risk management
• Ethics, professional identity and accountability	• Securitisation
• Financial risk management	• Selecting the project team
• Forestry and woodland management	• Self management
• Geodesy	• Spatial data capture and presentation
• GIS	• Specification preparation
• Ground engineering and subsidence	• Strategic real estate consultancy
• Health and safety	• Surveying land and sea
• Housing aid or advise	• Team working
• Housing maintenance, repair and improvements	• Use of the marine environment
• Housing management and policy	• Valuation
• Housing strategy and provision	• Verbal communication
• Hydrographic surveying	• Works progress and quality management
• Information integration and assimilation	• Written and graphic communication

### 3. Research

#### 3.1 Methodology

The descriptive survey method was employed to process the data obtained through observation. This type of research involves either identifying the characteristics of an observed phenomenon, or exploring possible correlations among two or more phenomena. In every case, descriptive research examines a situation as it is. It does not involve changing or modifying the situation under investigation, nor does it intend to determine cause-and-effect relationships (Leedy & Ormond, 2005). Thus, it observes existing conditions artificially, and is limited to ascertaining and describing the characteristics of the variables of interest in a given situation (Cropley & Harris, 2004).

An exploratory study was conducted to enable the development of an optimum list of competencies. A qualitative approach was adopted during this phase which entailed the interviewing of ten Architects, Construction Managers, Engineers, Project Managers, and quantity surveyors in the Eastern Cape and Western Cape. The

interviews investigated the various disciplines' understanding of their own competencies, and the competencies of the other disciplines', with the possibility of adding additional competencies to the pilot questionnaire. Subsequently, during the primary study, a quantitative method of data production using a questionnaire was followed.

The populations of respondents in the primary study can be divided into two categories:

- Public sector clients — a mailing list of all the Municipal Managers in South Africa was obtained from the Department of Water Affairs and Forestry; and
- Private sector clients — a mailing list of all the property developers in South Africa was obtained from the South African Property Owners Association (SAPOA).

The total number of property developers or private sector clients on the SAPOA mailing list totalled 74 members. The total number of Municipality managers or public sector clients on the mailing list obtained from the Department of Water Affairs and Forestry totalled 284.

### **3.2 Questionnaire design**

The questionnaire consisted of three sections. Section one consisted of demographic questions, which were later used to test if any of the variables had a significant influence on the rating of the competencies.

In section two each disciplines' competencies were listed in alphabetical order with two accompanying scales, namely level of importance and evidence of competencies. The questionnaire was designed to include all the competencies which were gathered during the survey of the literature and during the exploratory phase interviews. The method of presenting all the competencies and then asking the respondents to rate the competencies according to current importance and evidence on the Likert scale was adopted from Nkado (1999). The two scales were:

- The level of importance of a competency for a career in a specific discipline at present, from 1 (not important) to 5 (very important); and
- How evident that competency is in the specific discipline in South Africa, from 1 (poor) to 5 (excellent).

Section three included a scale in which the respondents had to rate the level of importance of the performance parameters to clients, from 1 (not important) to 5 (very important).

### 3.3 Sample size and response rate

Krejcie & Morgan (1970) suggest appropriate sample sizes for effective representation of the target population. However, the authors deemed it erudite to conduct a census of the target population due to the poor response rate in construction related questionnaires.

Of the 358 questionnaires posted, 59 were returned twelve weeks after the initial mailing — this equates to a response rate of 16.8%. However, 8 of the returned responses could not be included in the analysis of the data as not a single response had been recorded thereon. No reasons were given for returning the questionnaires blank. Therefore, the effective response rate was 14.5% as shown in Table 2. However, when comparing the amount of completed questionnaires to sample size recommended by Krejcie & Morgan (1970), it represents a 22.8% response rate. This response rate is not far below the 25% response rate recommended by Nkado (1999) for construction research.

Table 2: Analysis of respondent sample

Sector	Useful questionnaires (No.)	Questionnaires posted (No.)	Required sample size (No.)	Response rate of census (%)	Response rate of required sample size (%)
Public	38	284	165	13.4	23.0
Private	14	74	63	18.9	22.2
Total	52	358	228	14.5	22.8

### 3.4 Rescaling data

Re-scaling is an explanatory, rather than causal analysis as the rescaled values are for the full set of observations over all the constructs that are rated. This limitation means that rescaling does not indicate how each respondent used the scale for each statement that was rated. According to Bendixen & Sandler (1995) “in some instances, the subsequent analyses produce results that are almost identical to those obtained when the assumption that the

original ordinal data behaved in an interval fashion was made or that the analytic techniques used were sufficiently robust. However, in equally as many instances, the interpretation of subsequent analyses was 'cleaner', easier and more precise."

Bendixen & Sandler (1995) and Nkado & Meyer (2001) argue that this procedure is essential for parametric manipulation and interpretation of the raw data. The conversion of the Likert scale was performed separately for each of the three sets of ratings of important competencies, evidence of the competencies and future importance of the competencies. Table 3 illustrates the conversions for ratings of important competencies based on a correspondence analysis of the ratings received for the 25 competencies. The rescaling shows that any assumption that the original ratings interval in nature would be questionable.

Table 3: Re-scaling for rating of important current competencies

<i>Likert scale of importance</i>			<i>Eigen Value</i>	<i>Cumulative percent retained</i>	
		Axis 1	0.20446	68.91	
		Axis 2	0.04930	85.52	
		Axis 1 co-ordinate	Axis 2 co-ordinate	Euclidean distance	Adjusted scale
1	Not important	0.818	-0.616		1.0000
2	Less than important	0.930	-0.293	0.8626	1.8626
3	Important	0.669	-0.218	0.3909	2.2536
4	More than important	0.131	0.267	1.4540	3.7076
5	Very important	-0.468	-0.126	1.2924	5.0000

### 3.5 Relative importance of competencies

After re-scaling the ordinal data to interval data, the means of the competencies were computed. The means were then converted to percentage ratings. Table 4 presents the importance and evidence ratings, and the percentage gap between the aforementioned which is calculated by obtaining the difference in the importance percentage and evidence percentage.

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Table 4: Importance and evidence of quantity surveying competencies

Competency heading		Rating (%)		Gap (%)
		Importance	Evidence	
QS07	Cost control	94.6	82.0	15.7
QS10	Estimating	94.5	80.9	16.9
QS17	Measurement (Quantities)	94.5	83.6	13.5
QS19	Plan reading	93.3	86.2	8.9
QS09	Economics of construction	89.2	76.5	15.8
QS22	Professional practice	88.6	81.1	9.4
QS04	Construction contract practice	88.5	82.0	8.2
QS03	Computer literacy and information technology	86.9	83.1	4.8
QS21	Procurement	82.6	79.7	3.7
QS29	Skills to work with emerging contractors	82.3	67.7	18.2
QS31	Time management	82.3	79.3	3.7
QS32	Valuation	82.0	78.7	4.2
QS20	Planning and organising skills	80.7	78.2	3.2
QS08	Development appraisal	80.0	74.9	6.4
QS06	Coordinating	79.8	75.4	5.4
QS27	Risk management	79.0	71.2	9.8
QS33	Value management	78.6	76.5	2.7
QS05	Construction technology and environmental services	77.5	77.3	0.3
QS15	Management of joint quantity surveying appointment	77.4	69.1	10.5
QS25	Quality management / control	77.1	75.8	1.6
QS23	Project management	76.6	76.8	0.2
QS01	Advanced financial management	76.5	71.9	5.7
QS18	Personal and interpersonal skills	75.1	79.8	5.9
QS30	Structural knowledge	75.0	72.9	2.6
QS13	Leadership and general management skills	74.4	73.5	0.1
QS28	Skills in managing a business unit	73.5	71.4	2.7
QS02	Arbitration and other dispute resolution procedures	73.1	66.9	7.9
QS12	Law	68.2	69.2	1.3
QS24	Property investment funding	65.0	62.8	2.7
QS26	Research methodologies and techniques	64.7	67.3	3.3
QS11	Facilities management	63.1	68.5	6.7
QS14	Macro-economic perspectives	62.2	68.8	8.2
QS16	Marketing	54.3	61.6	9.2

The five most important current competencies required by quantity surveyors as ranked by clients are cost control, estimating, measurement, plan reading, and economics of construction. All the competencies were ranked as above average in terms of current importance. This supports Male's (1990) statement that the principal competencies of measurement, financial and contractual control of construction projects underpin the practice of quantity surveying.

The five competencies that quantity surveyors are most proficient in according to clients are plan reading, measurement, computer literacy and information technology, cost control, and construction contract practice.

The top five competencies in terms of deficiency as represented by the gap analysis are skills to work with emerging contractors, estimating, economics of construction, cost control, and measurement (quantities). It is notable that four of these are among the five most important current competencies. Furthermore, the sixth highest deficiency is relative to management of joint quantity surveying appointment.

### **3.6 Principal Component Analysis**

Principal Components Analysis (PCA) is a data analysis tool that is usually used to reduce the dimensionality or number of variables of a large number of interrelated variables, while retaining as much of the information or variation as possible. PCA calculates an uncorrelated set of variables such as factors or PCs. These factors are ordered so that the first few retain most of the variation present in all of the original variables. Unlike its cousin Factor Analysis, PCA always yields the same solution from the same data, apart from arbitrary differences in the sign.

The computations of PCA reduce to an eigenvalue-eigenvector problem. NCSS uses a double-precision version of the modern QL algorithm as described by Press (1986) to solve the eigenvalue-eigenvector problem.

PCA was applied to ratings of importance of the 33 competencies in the questionnaire. The principal analysis was carried out on the rescaled data. Several methods have been proposed for determining the number of factors that should be kept for further analysis. Several of these methods will now be discussed. However, remember that important information about possible outliers and linear depend-

encies may be determined from the factors associated with the relatively small eigenvalues, so these should be investigated as well.

Kaiser (1960) proposed dropping factors whose eigenvalues are less than one, since these provide less information than is provided by a single variable. Jolliffe (1972) feels that Kaiser's criterion is too large. He suggests using a cut off on the eigenvalues of 0.7 when correlation matrices are analysed. Other authors note that if the largest eigenvalue is close to one, then holding to a cut off of one may cause useful factors to be dropped. However, if the largest factors are several times larger than one, then those near one may be reasonably dropped.

Another criterion is to preset a certain percentage of the variation that must be accounted for and then keep enough factors so that this variation is achieved. However, usually this cut off percentage is used as a lower limit. That is, if the designated number of factors do not account for at least 50% of the variance, then the whole analysis is aborted.

Cattell (1966) first documented the scree graph. Studying this chart is probably the most popular method for determining the number of factors, but it is subjective, resulting in differing people analysing the same data, but with differing results. The scree plot is a rough bar plot of the eigenvalues, which enables immediate determination of the relative size of each eigenvalue. Many authors recommend it as a method of determining how many factors to retain. The word scree, first used by Cattell (1966), is usually defined as "the rubble at the bottom of a cliff." When using the scree plot, the eigenvalues which constitute the 'cliff' must be differentiated from the 'rubble' — the factors which constitute the 'cliff' are retained. Cattell & Jaspers (1967) suggest that those which constitute the 'cliff' plus the first factor of the 'rubble' be retained.

The following methodology was adopted relative to the selection of factors:

- All factors with an eigenvalue greater than one were eligible for selection;
- Visual inspection of the scree plot was undertaken to see where the 'knee' is. The 'knee' of the curve indicates the number of factors to use;
- The percentage of total variance should generally be above 35% (Nkado, 1999; Zikmund, 1994); and
- All the variables should be represented in the factors chosen.

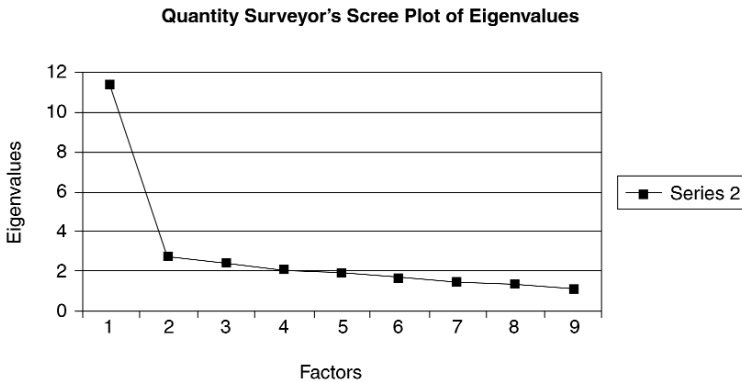


Figure 2: Quantity Surveyor's Eigenvalue scree plot

The first ten factors all had eigenvalues higher than one, but when looking at the scree plot it can be seen that only five are needed. The five factors explain 61.6% of the inertia, which is above the 35% needed. The Varimax rotation of the five-factor solution was used so that only one factor gets a high loading for each competency in order to simplify the interpretation of the factors. The factor loadings after the Varimax rotation are shown in Appendix 7. It should be noted that only the loadings greater than 0.4 were considered to be relevant. Variables loaded onto more than one factor were placed under the factor that the variable had the highest loading. Table 5 presents all the competencies under their respective factor headings, including their rankings for current importance and evidence of competency.

Table 5: Factor Structure Summary after Varimax Rotation

Ref	Factor Loading	Quantity Surveying competency	Rank	
			Importance	Evidence
<i>Factor 1: Core technical and general management skills</i>				
QS17	-0.496321	Measurement (Quantities)	3	2
QS18	-0.404652	Personal and interpersonal skills	23	8
QS23	-0.593813	Project management	21	14
QS26	-0.455421	Research methodologies and techniques	30	30
QS29	-0.427637	Skills to work with emerging contractors	10	29
QS30	-0.813442	Structural knowledge	24	21
QS31	-0.628055	Time management	10	10
		Average of ranks	17.3	16.3



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Ref	Factor Loading	Quantity Surveying competency	Rank	
			Importance	Evidence
<i>Factor 2: Financial planning and control</i>				
QS07	-0.710398	Cost control	1	4
QS10	-0.806625	Estimating	2	7
		Average of ranks	1.5	5.5
<i>Factor 3: Contract administration</i>				
QS01	0.520905	Advanced financial management	22	22
QS04	0.79554	Construction contract practice	7	5
QS05	0.501241	Construction technology and environmental services	18	13
QS08	0.593621	Development appraisal	14	19
QS09	0.536542	Economics of construction	5	15
QS21	0.434016	Procurement	9	9
QS22	0.607119	Professional practice	6	6
		Average of ranks	11.6	12.7
<i>Factor 4: Control and decision making</i>				
QS03	-0.583648	Computer literacy and information technology	8	3
QS06	-0.665509	Coordinating	15	18
QS19	-0.562997	Plan reading	4	1
QS25	-0.535748	Quality management / control	20	17
		Average of ranks	11.8	9.8
<i>Factor 5: Commercial Management</i>				
QS02	-0.494321	Arbitration and other dispute resolution procedures	27	31
QS11	-0.478954	Facilities management	31	28
QS12	-0.775524	Law	28	25
QS13	-0.744793	Leadership and general management skills	25	20
QS14	-0.684322	Macro-economic perspectives	32	27
QS15	-0.627105	Management of joint quantity surveying appointment	19	26
QS16	-0.613609	Marketing	33	33
QS20	-0.571566	Planning and organising skills	13	12
QS24	-0.652098	Property investment funding	29	32
QS27	-0.422768	Risk management	16	24
QS28	-0.598811	Skills in managing a business unit	26	23
QS32	-0.547028	Valuation	12	11
QS33	-0.676898	Value management	17	16
		Average of ranks	23.7	23.7

The competencies that are loaded onto Factor 1 are mostly core technical competencies and managerial competencies. Hence the name 'Core competencies and general management skills'. The average importance ranking of the competencies for this factor is 17.3, which results in a rank of fourth among the factors. This factor supports Factor 2 and 3, which encompasses competencies with higher importance ratings.

Factor two comprises of the two competencies which can be seen as core traditional competencies to the quantity surveying profession. This factor is labelled as 'Financial planning and control'. The average importance ranking of the competencies for this factor is 1.5, which results in a rank of first among the factors. Since the competencies present in this factor is ranked the highest in terms of current importance it is also considered to be one of the principal factors as depicted in the model (Figure 3).

Factor three encompasses most of the competencies related to the administration of contracts. Thus, this factor is named 'Contract administration'. The average importance ranking of the competencies for this factor is 11.6, which results in a rank of second among the factors. This factor along with Factor two is considered to be the principal factors as indicated in the model (Figure 3).

Factor four is named 'Control and decision making'. The main reason for the name is due to the fact that the co-ordinating and quality control competencies are included in this factor. The average importance ranking of this factor is 11.8, which results in a rank of third among the factors.

Factor five consists mostly of competencies required for managing a commercial business. Thus the factor is named 'Commercial management'. The average importance ranking of this factor is 23.7, resulting in the lowest ranking among all the factors.

### **3.7 Model**

The model indicates that the factors are interdependent and interact. The model also indicates that Factors 2 and 3, which consist of the primary competencies for effective quantity surveying are supported by Factors 1, 4, and 5, which are mostly secondary competencies. These factors in turn are influenced by the inter-relationships between the practitioners, continuing professional development (CPD) / research and universities, which in turn are influenced by the RICS, ASAQS, and SACQSP. These three organisations are ultimately influenced by the local and global environment.

The model highlights the importance of a sound working relationship between the stakeholders involved in the practice of quantity surveying.

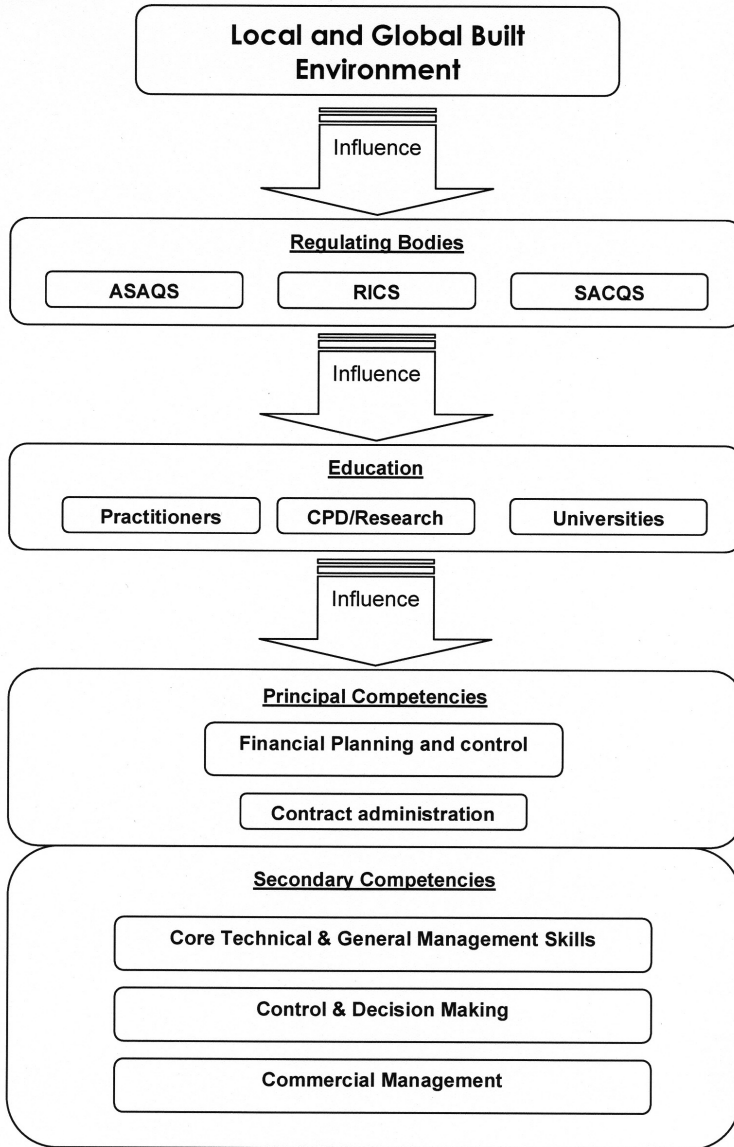


Figure 3: Quantity surveying competency model

### 3.8 Client requirements

Table 6 presents the importance of various parameters to clients, the evidence of quantity surveyors' competency relative thereto, and the gap between importance and evidence. After re-scaling the ordinal data to interval data the means of the importance and evidence of parameters were computed. The means were then converted to percentage ratings. All the parameters were above average importance. It is notable that the traditional project parameters, namely cost, quality, and time, are ranked within the top four. It is also notable that in all cases the evidence of competency relative to a parameter is lower than the importance of the parameter. Table 6 also indicates the gap between the importance of a parameter and evidence of competency relative to a parameter. The largest gap, or deficiency, is relative to construction health and safety, which could be attributable to the status afforded thereto in tender and contract documentation. The second and third largest gaps are relative to related parameters, namely occupant health and safety, and the environment.

Table 6: Importance of parameters to clients and evidence of quantity surveying competency relative thereto

<i>Parameter</i>		<i>Importance</i>		<i>Evidence</i>		<i>Gap</i>	
		<i>%</i>	<i>Rank</i>	<i>%</i>	<i>Rank</i>	<i>%</i>	<i>Rank</i>
1	Cost	98.5	1	86.1	1	12.5	9
2	Value	98.4	2	85.2	2	13.2	8
3	Quality	98.2	3	73.5	3	24.8	7
4	Time	97.9	4	71.7	4	26.2	6
5	Developmental issues	92.6	9	65.8	5	27.5	5
6	Black economic empowerment	93.4	7	64.4	6	29.0	4
7	Environment	93.3	8	59.9	7	33.4	3
8	Occupant health and safety	95.3	5	59.5	8	35.8	2
9	Construction health and safety	94.4	6	58.5	9	36.0	1

#### **4. Conclusions**

There is a need for quantity surveying skills in the built environment.

Based upon the predominating competencies in terms of importance, it can be concluded that quantity surveyors are perceived to fulfil their traditional role of financial and contractual controller of projects — cost control; estimating; measurement (quantities); plan reading; economics of construction; professional practice; construction contract practice; computer literacy and information technology, and procurement. The results of the PCA, namely the first and second ranking of 'Factor 2: Financial planning and control', and 'Factor 3: Contract administration' respectively, reinforce this conclusion.

The low ranking in terms of importance of the so called new competencies such as project management and facilities management, namely 21st and 31st respectively, lead to the conclusion that clients do not perceive these to be the functions of quantity surveyors.

The evidence of competencies in the form of the percentage deficiency relative to the importance of parameters according to clients reinforces the conclusion that quantity surveyors still fulfil the traditional role of financial and contractual controller of projects. However, it can also be concluded that quantity surveyors are deficient in terms of competencies relative to the other parameters, in particular health and safety, and the environment, but also developmental, time, and quality.

#### **5. Recommendations**

It is recommended that tertiary institutions, the SACQSP, and the ASAQS should address the perceived deficiency relative to the competencies identified by the gap analysis, particularly those competencies that achieved evidence percentage scores below that of the overall average evidence percentage score. This recommendation requires interventions during curricula design, accreditation, assessment of professional competency, and continuing professional development.

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