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Competencies of Quantity Surveyors in Construction Industry: Document Reviews from Different Quantity Surveyor Professional Bodies

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Abstract. Competencies are the process of equipping professional needs and skillsets, which allows a profession to take responsibility for a prescribed body of knowledge. It started by determining the fundamental range of competencies that the professional able to understand and then applying the competencies in the right areas. Quantity Surveyors who work in the construction industry are also not left behind in having specific competencies while delegating their profession as cost and contract advisor in the construction projects. The objective of this paper is to review guidelines and policies regarding Quantity Surveyor competency from different professional bodies governing the Quantity Surveyors profession locally and globally. The document works as a process in evaluating documents where, eventually, produced empirical knowledge and developed understanding. The data obtained from this document analysis will help the researcher to come out with a conceptual model to be used in the mixed-method research approach later. The conclusion summarises that from six professional bodies governing the Quantity Surveyors profession, each professional body emphasized the competencies to be divided into a sub-category of mandatory skills, core competency, and optional competencies.

1. Introduction

1.1 Competency & Professional

Over the years, the idea of competency was defined in many varied ways. Competency sometimes being defined in different perspective. [1-3] they refer competency as 'core competency' which relate to a comprehensive set of core technologies and vital core skills that ensure competitive advantages for an organization. The competency mentioned by these authors are more organizationally driven rather than individually focused. On the other hand, [4-6] are most interested to relate it as 'individual' aspect of competency. Then, [7] have added two new perspectives into this definition which are human attributes and value orientation. [8] attempted to define professional competency from personal point of view whereby they believed that competence is the capability to perform well in a professional situation that involves the completion of a certain task or the problem solving skills, in a manner that can be observed and be judged by others. [9] explained competency as a competent individual that is capable of utilising

the necessary expertise in line with effective behaviour. [10] elaborate that competency is perceived as being comprised of skills, knowledge and attributes which lead to high performance in delivery the profession. Therefore, it can be conclude that, competency can be assessed based on individual which comprising of personal attributes, abilities, applied knowledge and skills which enable one individual to successfully perform their work in their specified field.

[11] explained that the original meaning of *professional* is derived from Middle English of *profess* which an adjective meaning of having professed one's vows. The idea behind that professionals were that who 'professed' their skill to others and 'vowed' to perform their profession to the highest standard. The original meaning means the essence of being a professional in order to make a public commitment to the highest standard of performance with integrity and to public service. Therefore, professional can be means profession which contains characteristics traits comprising of extensive training from high level of education, provides vital services to society well-being and performing the profession with ethics and value with high standard. Accordingly, combining the both definition of competency and professional eventually defining the professional competency as a set of individual skills comprising of personal attributes, abilities, applied knowledge and skills that gained from individual high level education which help them to provide services and performing the profession with ethics and high value of standards.

1.2 Quantity Surveyor

Various author and professional bodies have defined Quantity Surveyor (QS) in many ways. [9] defined QS as a key player who is in charge of procurement, cost and contract management. [12] explained QS as a cost and financial accountant of construction industry. Meanwhile, [13] described QS as a professional who works within the construction industry and concerned with costs and contracts on construction projects. On the other hands, [14] mentioned the definition of QS as a cost advisor who involves majorly in cost during pre-contract, post contract and includes all various costing working in the projects. The roles of QS include budgetary, planning, monitoring and valuation in the construction projects. Addition to that other professional bodies as such [15] explained QS is an expert in the art of costing a building at all its stages. Meanwhile, chartered QS are the highly trained professionals offering expert advices on construction costs. [16] otherwise called QS as Construction Economists or Cost Manager who estimates and monitor construction cost form feasibility stage of the projects through the completion of the construction period. Therefore, from the definitions given, a working definition of QS can be simplified as a person who is an expert in costing, measurement, economic and contractual matters in the project development from early until completion of construction projects.

1.3 History of Quantity Surveying Profession

The roles of QS begin in the middle of 17th century upon the restoration of London and where QS develop as an occupation. During that early days, QS acted as master tradesmen, measuring the work after completion, submitting final accounts to building owner. According to [17], since 1960th the roles of QS have extended to cost planning, cost control at construction phase, preparation of bill of quantities (BQ), financial statement and also progress valuation and payments. In 1880s, expansion of procurement tendering started to begin however it only involves with selected consultation contract. Following in the 1990s, the profession of QS grew and expanding due to its competitiveness in construction industry.

1.4 Quantity Surveyors (QS) Roles

The roles of QS are involving in all phases of construction lifecycles where it begins as early as inception stage, design stage, feasibility study stage, construction and upon the completion of project. Not only that, some of the roles expands, towards extension works, refurbishment, maintenance and demolition work ([18-19]) The common roles of QS in construction industry are particularly as shown in the table 1 below.

Table 1. Descriptions of QS roles.

Roles	Descriptions
Preliminary Cost Advise	• Provide advice on cost implication based on client requirement and other construction stakeholder's decisions [19]. • The advice may have related to method used for contractor selection or tendering purposes. The advice given usually reliable so that the client are confident to proceed with QS services [20].
Cost Planning	• A part of cost control process and normally occurs in early stage of development project [21]. • [17] mentioned that cost planning offer comparatives costs with various alternatives materials to be used to clients. Besides, it helps designer to provide alternative solution to various aspects of design.
Tendering Procedure/ Procurement	• QS prepare tendering documents to be used by contractors in order to produce competitive tendering and eventually advising on tender award [19]. • The selection of contractual method usually relies on client's objective based on their financial, time and quality of construction needed [20].
Contractual Documentation /Arrangement	• QS roles includes overseeing the contractual administration and financial related to construction projects [22]. • Preparation of Bill of Quantities (BQ) is one of the roles of QS whereby QS is a systematic way to records items of works for tendering purposes [23].
Final Accounts	• Final accounts are the summary of contract sum with the agreed amount that employer willing to pay the contractor [15]. • Generally, final accounts include loss and expenses including any extensions of time claims by the contractor during under the binding contract.
Cost Control	• According to [24] cost control in construction commence from inception stage and ends with final accounts. Qs normally used several method and techniques in order to control cost in construction projects. • [25] emphasised that the need to have strict cost discipline in the entire stages of construction and the execution in order to ensure all cost controls are diligently related.

Continued.

Life Cycle Costing	• [26] explain that life cycle costing is a method of economic analysis which comprising all cost related to the construction, operation and maintaining the construction projects over a period of time. • [17] also highlighted that life-cycle costing is better to be executed at the early stage of the project to provide client the idea of the whole investments for the projects.
Value Management	• [27] explained that VM is a systematic process in order to achieve value for money at the same time providing the necessary function at the minimal cost. • According to [28] QS normally aspire to conduct VM at the early stages of projects due to avoid cost cutter during the construction stage.

Therefore, based on listed roles in the above, it portrays the definition set up for this research whereby the roles of QS majorly cover costing, economics, tendering and also contractual matters in construction project begin from pre-construction stage towards post-construction stage.

1.5 Quantity Surveyors (QS) Professional Competencies

There are many professional bodies governing QS profession around the world. This research will focus on professional bodies of QS in Malaysia and internationally. However, for international professional bodies, it will only cover the parent country of QS profession establishment in Malaysia which refers to United Kingdom and neighbouring countries around Malaysia which are Singapore, Australia and finally Pacific association of QS profession body. These professional bodies have expressly defined pathways to ensure their members are competent to practice as QS and meet high standards of professionalism. The professional bodies involve in this research are as following:

1.5.1 Board of Quantity Surveyors Malaysia (BQSM) & Royal Institute of Surveyors Malaysia (RISM)

BQSM is a statutory body established by an Act of Parliament namely as Registration of Quantity Surveyors Act 1967 (also known as Quantity Surveyors Act 1967) which are responsible for the registration of Quantity Surveyors, firms and corporate bodies practising as consultants. This professional body responsible for regulation of QS profession in Malaysian and also safeguarding the interest of the public and upholding right of registered QS and Quantity Surveying practices. The roles played by BQSM is to ensure that the interest of both, the public and the profession can be adequately protected [13]. BQSM has its own competency assessment to measure their members before individual can be as Professional Quantity Surveyor. The competencies assessment for this professional bodies have been jointing together with the assessment of Royal Institute of Surveyor Malaysia (RISM). Hence, the assessment will only be assessed by BQSM as the statutory body who regulates the Quantity Surveying profession in Malaysia. Once the Quantity Surveyors passing the assessment by BQSM, automatically he or she is considered pass in RISM and obtain the membership as well.

1.5.2 Royal Institution of Chartered Surveyors (RICS)

RICS is the world leading professional body for qualification and standards in land, property, infrastructure and construction. The RICS is the global professional body promoting and enforcing the highest international standards in the built environment [29]. In order to become as registered

professional under RICS, the individuals need to become as their member and pass the series of assessment which accordingly to the sector standards. Therefore, as a Quantity Surveyors, in order to become Chartered Quantity Surveyor, several competencies are needed and aligned with the knowledge, skills and experience obtained.

1.5.3 Australian Institute of Quantity Surveyors (AIQS)

AIQS is a professional standard body which ensures practicing QS to maintain the highest of professional excellence through leadership, standards and code of ethics. The AIQS have come out with the competency standards for Quantity Surveyors, Construction Economist and Cost Engineer in 2012 [16]. It describes competencies of modern Quantity Surveyors and extends beyond some of the more traditional Quantity Surveying services. The AIQS plays an important role in Australian construction industry through research of collection cost data and the publishing of the current Construction cost. Besides, it also publishes, the main standards of measurement method and cooperates with tertiary institutions on research programs.

1.5.4 Singapore Institute of Surveyors and Valuers (SISV)

The institute was established in 1982 with the emerging of Singapore Institute of Surveyors and Singapore Institute of Valuers. This institute comprises of three division of Land Surveyors, Quantity Surveyors and Valuation and General Practice. The roles of this professional body are to secure the advancement and facilitate the acquisition of knowledge for the above three divisions, to promote general interest of the profession and to maintain and improve its usefulness for the benefit of the public and lastly to regulate and improve the standards of professionals conduct and practices of its member [30]. Hence, in order to ensure the standards is delivered, the assessment for professional competence for SISV are needed as discussed in the result later.

1.5.5 Pacific Association of Quantity Surveyors (PAQS)

The Pacific Association of Quantity Surveyors is an international association of national organizations representing Quantity Surveyors in the Asia and Western region. The main objectives of establishment of PAQS are to promote the practice of QS in the region and promote 'best practice' for QS in the region. Besides that, the association also aims to promote dialogue between member organizations and encourage of regional cooperation in the practices of QS. In order to ensure their member, reach minimum level of competency standards, PAQS have highlighted the required competency as discussed in the result later.

2. Methodology

Competencies of QS were identified by analysing QS competency standards published in document and policies by professional bodies. This method involves qualitative approach of document reviews set out by professional bodies as mentioned previously which are BQSM, RISM, RICS, AIQS, SISV and PAQS which were later tabulated.

3. Results and Analysis

The identification of competencies-based form different professional bodies was tabulated as follows.

3.1 Board of Quantity Surveyors Malaysia (BQSM) and Royal Institute of Surveyors Malaysia (RISM)

The assessment of competencies in BQSM divided into three basic level; Level 1 – knowledge and understanding. Level 2 - Practical application of knowledge, conflict management and data management. Level 3 - Reasoned analytical advice and depth of technical knowledge, leadership, management of resources and people, client care, ethics and professional practice. There are fourteen area of professional experience cover under the BQSM in professional training which are;

Table 2. Area of Professional Experience

No.	Area of Professional Experience
1.	Pre- Construction
2.	Contract Administration
3.	Construction Contract Operations
4.	Cost Planning and Quantification of Construction Work
5.	Post Contract Cost Control
6.	Construction Services
7.	Project Management
8.	Research and Development
9.	Public Development Policy
10.	General Management and Construction Finance
11.	Life Cycle Costing
12.	Facilities Management
12.	Sustainability and Green Building Index
14.	Building Information Modelling (BIM)

Sources : Guidelines to Two-Tier Registration of QS [13]

3.2 Royal Institute of Chartered Surveyors (RICS)

RICS competencies are categorized under three groups of mandatory, core and optional competencies. The first categories of mandatory competencies cover the personal, interpersonal, professional practice and business competencies common to all candidates. Second, core competencies are the primary competencies based on the individual chosen pathways. Finally, optional competencies are a set of competencies selected by the individual but mostly covers technical competencies. table 3, below describe the competencies highlight by RICS.

Table 3. Competencies required for Quantity Surveyor and Construction Personnel

Mandatory Competencies	Core Competencies	Optional Competencies
Conduct rules, ethics and professional practice	Estimating	Building Information Modelling (BIM) Management
Client care	Cost Planning	Capital allowances
Communication and negotiation	Procurement	Commercial Management of Construction
Health and safety	Tendering	Conflict Avoidance, Management and Dispute Resolution Procedures
Accounting principles and procedures	Contract Selection	Construction Technology and Environmental Services
Business planning	Contract Procedures	Contract Administration
Conflict avoidance, management and dispute resolution procedures	Post contract cost control	Contract Practice
Data management	Commercial management of contract	Corporate Recovery and Insolvency
Sustainability	Quantification of works	Design Economics and Cost Planning

Continued.

Team working	Construction Technology	Due Diligence Insurance Procurement and Tendering Programming and Planning Project Evaluation Project financial control and reporting Quantification and costing of construction works Risk management Sustainability

Sources : Assessment of Professional Competence, Quantity Surveying and Construction [15]

3.3 Australian Institute of Quantity Surveyors (AIQS)

The competency standards for this professional bodies comprising of general, basic skills, project cost management competencies, support competencies, asset financial management competencies and lastly specialized management competencies [16]. Table 4 below explain the competency standards by AIQS.

Table 4. Components of Competency Standards by AIQS

Basic Skills	Core Competencies	Specialist Competencies
Quantification/ Measurement	Design Cost Advice, Cost Planning & Cost Engineering	
Communication Skills	Strategic Planning	
Personal and Interpersonal Skills	Budgetary Process	
Business and Management Skills	Cost Estimating	
Professional Practice	Cost Planning	
Computer and Information Technology	Contract Documentation Procurement	
Construction Technology	General Procurement Advice	
Construction Law and Regulations	Quantification, Measurement & Documentation	
	Tender Process	
	Contract Administration	
	Account Management	Claims & Dispute Resolution
	Construction Change Management	Financial Audits
		Resources Analysis
	Support Competencies	
	Computer Services	Arbitration

Continued.

	Construction Technology Government Regulation & Law	Expert Witness/ Evidence Business Management Research & Development Cost Information Database Asset Financial Management Competencies Feasibility Studies Life Cycle Cost Analyses Tax Depreciation Special Assessments Audits Technical Due Diligence Compliance Issues Specialised Management Competencies Project Value Management Project Management Project Risk Management Quality Assurance

Sources : Competency Standard for Quantity Surveying, Construction Economists and Cost Engineers [16]

3.4 Singapore Institute of Surveyors and Valuers (SISV)

The competencies are defined at three levels of attainment which are ; Level 1- knowledge and understanding, Level 2 – Application of knowledge and understanding and Level 3 – reasoned advice and depth of technical knowledge.The assessment for professional competence for SISV includes the following elements as shown in table 5 below.

Table 5. Components of Competency Standards by SISV

Mandatory Competencies	Core Competencies	Optional Competencies
Conduct rules, ethics and professional practice	Measurement and Tender Documentation	Feasibility Studies
	Tender and Procurement	Dispute Resolution
	Cost Planning Control Post Contract Administration Tender and Estimation Construction Management and Resources Procurement	Risk Management Value Management Insolvency Insurance Matters Third Part Technical/ Professional Audits Sustainability Building Information Modelling Productivity

Sources : Assessment of Professional Competence [30]

3.5 Pacific Association of Quantity Surveyors (PAQS)

The competency standards for this professional bodies comprising of basic skills, core professional competencies and lastly specialized competencies [31]. Table 6 below show the details of the competency standards by PAQS.

Table 6. Components of Competency Standards by PAQS

Basic Skills	Core Competencies	Specialist Competencies
Quantification/ Measurement	Cost Management	Tax Depreciation
Communication Skills	Strategic Planning	Special Assessment
Personal and Interpersonal Skills	Budgetary Process	Audit pre/post contract
Business and Management Skills	Cost Estimating	Technical Due Diligence
Professional Practice	Cost Planning	Compliance Issues
Computer and Information Technology	Procurement	Project Management
Construction Technology	General Procurement Advice	Project Risk Management
Construction Law and Regulations	Contract Documentation (Bill of Quantities)	Quality Assurance
	Tendering Process	Arbitration
	Contract Administration	Expert witness/Evidence
	Account Management	Business Management
	Construction Change Management	Research and Development
	Asset Financial Management Competencies	Cost Information Data Base
	Feasibility Studies	Claims and Dispute Resolution
		Construction Financial Audit
		Resource Analysis
		Life Cycle Cost Analysis
		Project Value Management
		Computer Services
		Measurement and Statistical Analysis
		Constructability Analysis and the Environment

Sources : Competency Standard for Quantity Surveyors in the Asia-Pacific Region [31]

3.6 Similarities and Differences of QS Competency

Table 7 below show the similarities and differences of competency for QS profession as highlighted by each professional body as mentioned in the above section.

Table 7. Similarities and Differences of QS Competency by different professional bodies

Professional Body	Description
BQSM/RISM	[13] apply three level of attainment similar to RICS and AIQS, however extra category is allocated under Level 2 and Level 3. No categorization and cluster for competencies is made where QSs need to cover at least three areas of the competencies in area of professional experience.
RICS	RICS competencies are categorized under three groups of mandatory, core and optional. This categorization which is based on their significance to the profession is considered under the following three levels of attainment: Level 1- knowledge and understanding, Level 2- Application of knowledge and understanding; Level 3- reasoned advice and depth of technical knowledge. The level of attainments for this professional bodies are quite similar to Malaysian's measurement of attainment for each competency. [32] recognize these three levels as Level 1- knowing, Level 2 – doing and Level 3-advising.
AIQS	[16] clusters competencies implicit into competency unit each of which describes a particular element of QS's role in terms of performance criteria, range indicators and evidence guides. These units then classified under core and specialist units which core units representing competencies that are considered as compulsory for QSs and specialist units describing functions that can be performed both by QSs and other construction professionals.
SISV	[30] categorized competencies as mandatory, core and optional competencies. The level of attainments for this professional bodies are quite similar to RICS (United Kingdom)'s and BQSM/RISM (Malaysian)'s measurement of attainment for each competency. Their competencies requirements are abbreviated and precise to describe functions that can be demonstrate by QSs.
PAQS	PAQS competencies are categorized as core and specialist where this is similar to AIQS but are more abbreviated.

4. Conclusion

As conclusion, majorly the competencies highlighted by professional bodies governing Quantity Surveyors profession in Malaysia and internationally more or less are similar. However, the level of attainment and area of competencies are allocated differently depends on the priority focus by the said professional bodies. Even though that, the similar pattern can be seen where most of the professional bodies emphasized on three main categories which are mandatory competencies (basic skills), core competency and optional competencies (specialist competencies). This eventually will help researcher to identify the same pattern and theme and will be categorized into the same categories using thematic analysis. Then, the categories under the main competencies (mandatory, core and optional) will be used later in the competency model development.

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