

## An Analysis of the Multidisciplinary Approach of a Quantity Surveyor

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**Abstract**— *The profession “Quantity Surveying” (QS) plays a major role in the field of construction. Initially the work scope of a traditional Quantity Surveyor was limited within a considerable amount of work. Due to the fact of evolution of the industry, within the last decades the work scope of the Quantity Surveyor span across in the spheres of various disciplines.*

*Sri-Lankan construction industry is aware of the importance on multidisciplinary approach of the Quantity Surveying profession. Yet, it's questionable that the industry is aware of the extent of which the disciplines impact the success of a project through the QS profession. This paper is focused on Accounting, Management, Law, Information Technology and language disciplines of modern Quantity Surveying.*

*The situation is addressed throughout a Quantitative research approach by collecting the primary data from Quantity Surveying professionals in the industry and few interview sessions were adopted to get the experts' opinions. The analysis of the primary data collected, was done according to Relative Importance Index Analysis and the average of the relative importance index was calculated for each discipline to address the required extent of each discipline for the Quantity Surveying profession. According to the analysis, it was revealed that the multidisciplinary approach of the QS is important. It was found that the need of these disciplines are required to perform the work scope of Quantity Surveying and it is needed to take necessary precautions to implement and maintain certain standards which covers the above mentioned disciplines in order for local Quantity Surveyors to be well equipped, for the challenges in facing the new requirements of the construction world.*

### I. INTRODUCTION

According to Buys (2004) the first quantity surveying practice was established in England in 1785 by the firm of Henry Cooper and sons. Somehow its known that the Quantity Surveying profession dates back to the bible (Bowles & Roux, 1992).

According to the Australian Institute of Quantity Surveyors (AIQS), the QS, also known as the Construction Economist, or Cost Manager, is one of a team of professional advisers to the construction industry. As advisers they estimate and monitor construction costs, from the feasibility stage of a project through to the completion of the construction period. After construction they may be involved with tax depreciation schedules, replacement cost estimation for insurance purposes and if necessary, mediation and arbitration. Quantity Surveyors work closely with Architects, Financiers, Engineers, Contractors, Suppliers, Project Owners, Accountants, Insurance Underwriters, Solicitors and Courts and with all levels of Government authorities. Quantity Surveyors get their name from the Bill of Quantities, a document which itemizes the quantities of materials and labour in a construction project.

The role of Quantity Surveyors evolved passing major segments of development. Traditional Quantity Surveyors performed in a limited scope when it comes to costing, planning, estimating, and implementing the services. Another key state where strategies were in excellent scales which managed the timeliness efficiently and effectively. This increased the efficacy that it carried the earlier state to a larger one. The peak of evolution is the moderation of these typologies. They probably add values to the industrial upheaval. According to Best (1996) this is

more connected with the Information Technology (IT) sector. This manipulates the designing, quantity and quality performances, Computer Aided Designs (CAD), development of procurement strategies, commercial risk management, value management, contractual claims and dispute management, health and safety management, project management etc.

The fact that quantity surveying is a multi-disciplinary practice can be fulfilled as in many senses namely dynamic nature of the construction sites, major development projects which combines with the economic growth, structural potentials etc. Economic achievements are accessed through the delegation of responsibilities to the Quantity Surveyors in initiating their knowledge in to a practical implementation.

Main focus of this paper is to ascertain the extent of the requirement of the multidisciplinary approach of a QS from five selected disciplines for the successful completion of construction projects.

## II. LITERATURE REVIEW

The function of the Quantity Surveyor within the construction industry is multi-disciplinary and is expected to meet the demands of the construction projects' complexities and sizes (John, 2002).

*The Core Skills and Knowledge Base of the Quantity Surveyor* published by Royal Institution of Chartered Surveyors has examined the needs of Quantity Surveyors in respect of their education, training and continuing professional development. This reflected the requirements in the context of increasing changes and uncertainties in the construction industry and, more importantly, within the profession. Since publication of this report, there have been a number of government and educational initiatives with regard to the implementation of lifelong learning. All subject disciplines have in recent years places an increasing emphasis on the development of generic and specialist skills within their respective curricula. A course audit of such skills was first initiated by the Business and Technology Education Council (now EDEXCEL) and has since been accepted as an important component on all undergraduate and postgraduate courses in every university. The RICS report identified a range of skills that the profession would need to continue to develop if it wished to maintain its role within the construction industry. This report identified a knowledge base that includes: Construction Economics, Financial

Management, Business Administration, Construction Law (Allan Ashworth et al., 2013)

Quantity Surveyors work scope includes construction management, law relevant to construction and accountancy, construction technology, financial administration of contracts, contract law and other allied subjects of civil engineering such as building materials and construction drawing, engineering mathematics, structural design, land survey, etc. (Guha, 2013). The approach cannot be limited to these work scope. Quantity Surveyors profession requires sound knowledge not limited to the disciplines of accounting, management, construction techniques, surveying but also various aspects of the law (Maidin & Sulaiman, 2011).

Due to increased internationalization, reduced job security, and a shift in career ownership to the individual, language skills represent a key career competence today (Itani et al., 2015).

The report of Royal Institute of Chartered Surveyors (RICS) (1971) sought to identify the distinctive competencies or skills of the Quantity Surveyor associated with measurement and valuation in the wider aspects of the construction industry. This provide the basis for the proper cost management of the construction project in the context of forecasting, analysing, planning, controlling and accounting. The management theories are applied in the field of construction through the Quantity Surveyor is not limited for the above-mentioned aspects. Guha (2013) states that a Quantity Surveyor plays an important and vital role in the management of a construction project. He gets himself involved in most of the activities in different stages of management from the very beginning to the completion of a project; although in most cases, he remains in the background.

In the planning and programming, he extends help in investigation and preparation of the preliminary project report. He furnishes the rough cost of the items incorporated in the preliminary estimate. As regards estimation of quantities of different material and time of their requirement, is the competent person to furnish that information. In the same way he furnishes the requirement of the plants and machineries those should be required for the project and the exact period of their requirement. The requirement of labour of different categories required at different time of work is also computed by him and furnished to the authority for feeding the management. Preparations of the tender

documents, preparation of the notice inviting tender are the function of the quantity surveyor. On receipt of the tenders from intending tenderers, the quantity surveyors' function is to scrutinize those, see if the tenders received were all valid and then making enquiries for the clarification needed. Even after final payment, if there be any dispute or claim, it is the Quantity Surveyor who submits an initial report on the dispute or claim if it was justified and to what extent.

Powell (1998) through the report of the *challenge of change* reviews that stark warnings to the profession, almost as a final warning that if the profession did not adapt to change in the light of the changing attitude of clients, pressures from the business world, the execution of projects, requirements of the skill based and the impact of information and technology, then it would not exist in the future. An efficient use of ICT can enhance the Quantity Surveying service as it provides access to relevant information in timely manner. Mobile characteristics enable a more efficient use of knowledge and experience on a real time basis. The ability to streamline the communication process and integrated data management systems supports and audit trail of information whilst maintaining a secure correspondence trail (Ballan and Diraby, 2011).

Information Technology (IT) has clearly affected the way in which the Quantity Surveyors have carried out their work. In some cases, it has removed some of the tedium and speeded up the processes that are used, whilst in other spheres it has enable Quantity Surveyors to both enhance and offer a wider range of services that their clients consider to be important. Information technology applies not only to using computers for their work, but also in terms of communicating with the outside world through the internet and the electronic exchange of information amongst the team and the different professions involved. Quantity Surveying has continued to respond to the changes identified in *QS2000*. Advances in ICT have had a profound impact on how Quantity Surveyors operate, their function and the scope and breath of the services they provide (Ashworth et al., 2013)

As defined by Cartlidge (2012), in response to clients' demands for added value Quantity Surveyors are engaging in all levels of e-business, from the use of email at level 1 to fully electronic procurement and tendering at level 3.

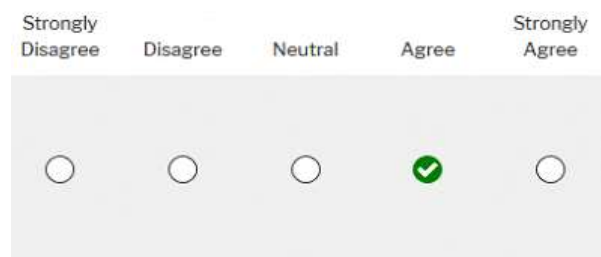
Quantity Surveyors in construction companies apply traditional Quantity Surveying practices to meet the

requirements of consultant Quantity Surveyors acting for the client. Other practices have to be used to suit the internal cost accounting and reporting requirements of the company. The practices of construction company Quantity Surveyors must therefore satisfy both external and internal needs and, in order to support corporate feedback, must be standardized across the company's projects (Cornick and Osbon, 1994).

These facts conclude the multidisciplinary approach of Quantity Surveyors and this paper is focused to determine the extent of awareness of disciplines, which impacts the success of a project through the QS profession.

### III.METHODOLOGY AND EXPERIMENTAL DESIGN

Questionnaires and interviews are recommended to study the actual issues in the industries and the findings can be construed from the actual experiences and views (Hampson et al, 2014). Data triangulation is a method used to collect data using more than one method on the same topic. Based on this, primary data were collected via a questionnaire which were distributed among the Quantity Surveying professionals in the construction field of Sri-Lanka and conducted few interview sessions to get the expertise opinions. All the questions were multiple choice questions where the answers were designed to be in-line with Likert Scale as shown below;



Two sampling techniques were adopted. The research data were collected through 50 professional Quantity Surveyors in the industry as the sample of simple random and interviewed 5 professionals with substantial exposure in the construction field as the sample of purposive. Research problem, objectives and the related literature were the base for the preparation of the questionnaire.

### IV.DATA ANALYSIS

The collected data through the questionnaire was analysed based on the Frequency Analysis Method where responds for the questionnaire from the participants are represent in tabular form in number and a weightage was allocated to every answer in the Likert Scale ranging from 1 to 5 as given in the below table.

Answer	Weightage Index
Strongly Disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly agree	5

Thereafter, relative importance index analysis was used for further analysis. This allows identifying most of the important criteria based on participants' replies and it is also an appropriate tool to prioritise indicators rated on Likert- type scales.

$$\text{Relative Importance Index} = \frac{\sum w}{AN} = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{5N}$$

According to Tam and Le (2006) where 'w' is the weighting given to each factor, ranging from 1 to 5. A is the highest weight (i.e. 5 in the study) and N is the total number of respondents. The relative importance index is ranging from 0 to 1. The Weighted Arithmetical Mean (WAM) was used, in order to identify the overall importance of the discipline, as an average of the relative importance index which was calculated for each discipline. This value is ranging from 0 to 1 where 0 is no impact at all and 1 is considered with the maximum impact. The Weighted Arithmetical Mean is a measure of central tendency of a set of quantitative observations when not all the observations have the same importance (Dodge, 2008).

### V. RESULTS

The following table show the frequency allocation of the answers and relative importance index for each question under each discipline. Further weighted arithmetical mean (average of the said index) is also shown in the table.

Discipline	Related Question No.	Frequency					Relative ind.	WAM
		SD	D	N	A	SA		
Accounting & Economic Concepts	Accountancy process management	0	0	2	15	33	0.92	0.85
	Financial management for successful completion	0	0	0	29	21	0.88	

	QS is the Commercial manager	0	0	0	27	23	0.89	
	Knowledge on micro, macro economics	0	12	17	14	7	0.66	
	Institutions must provide Accounting skills	0	0	4	12	34	0.92	
	Accounting skills essential for QS	0	0	6	27	17	0.84	
Management	QS act as a manager	0	0	4	41	5	0.80	0.78
	Organizational behaviour for personality development	0	0	11	31	8	0.79	
	Managing the Human Resource	0	11	9	27	3	0.69	
	Identifying and analysing risk	0	0	0	34	16	0.86	
	QS is aware of managerial strategies	0	0	13	31	6	0.77	
Law	Construction law for QS	0	0	0	37	13	0.85	0.75
	legal requirements on forming a contract is	0	0	0	43	7	0.83	
	Knowledge on torts & delicts	0	0	13	34	3	0.76	
	Employment law	0	0	17	27	6	0.76	
	QS is the construction lawyer	0	18	17	14	1	0.59	
	Fluent knowledge on law is required for QS	0	3	16	25	6	0.74	
Information Technology	Computer aided measurement	1	13	13	18	5	0.65	0.69
	IT eases the work scope	0	1	11	31	7	0.78	
	Effective time & resource management through IT	0	1	14	29	6	0.76	

	Collect and store information	0	0	19	28	3	0.74	
	Knowledge on IT is mandatory	0	1	13	21	2	0.54	
Languages	Multiple languages for abroad QS's	0	3	43	4	0	0.60	0.60
	Multiple languages in-house QSs'	0	3	47	0	0	0.59	
	Multiple languages are a key aspect for a QS	0	3	43	4	0	0.60	

VI. DISCUSSION

The role of Quantity Surveyors evolved passing major segments of development. With the development the role of the QS was broadened into a multidisciplinary approach. Above findings helps to understand the extent of which the above-mentioned disciplines impact the success of a project.

Key findings are as follows;

1. Accounting and Economic concepts (WAM; 0.85)  
Majority of the respondents agreed that the knowledge of accounting and economic concepts are key factors to complete a project with the application of eternal triangle of construction which is known as managing the cost, quality and time.
2. Management (WAM; 0.78)  
Average value of relative importance index of "management" is 0.78 which is also a positive respond from the participants. This implies that the understanding of managerial concepts is necessary for QSs'.
3. Law (WAM; 0.75)  
The basic awareness of the legal system and law found to be a key discipline for a QS. Especially the areas of construction law and the preparations of contracts.
4. Information Technology (WAM; 0.69)  
Despite the availability of several IT based products in the field of construction, the participants are in moderate agreement with the comments made in the questionnaire. However, this is mainly due to the adoption of manual methods in Sri-Lankan context.

5. Languages (WAM; 0.60)

Participants believe that the understanding of languages is not a key discipline for a QS in comparison with the top three disciplines. However, it also carries an average relative importance index score of 0.60.

Based on the values given out by the respondents and interviews carried out by the researcher proves that the industry has recognized the importance of multidisciplinary approach of the Quantity Surveyor.

However, with reference to the expertise opinion it was revealed that the effective use of several computer software enables Quantity Surveyors to manage time, cost and quality of a project efficiently.

VII. CONCLUSION AND RECOMMENDATIONS

Based on the above findings it proved that the industry is aware of the importance of the multidisciplinary approach of the Quantity Surveyor. However, to execute the work scope promptly, Quantity Surveyors must have a sound knowledge regarding the following disciplines.

Accounting and economic concepts, management and law are the critical disciplines out of the selected disciplines for the paper. The knowledge as well as the practical implementation of these disciplines are in a high extent so that it could impact the successful completion of a project. IT knowledge is important but it is not a must. Which is a must being the knowledge on costing and measuring software. Being able to speak in multiple languages are an extra skill but the proper use of English language is required as it's the international language of the world.

Considering above, necessary steps should be taken at the levels of educational bodies to enable future Quantity Surveyors to engage smoothly with the multidisciplinary approach. The organizations must promote the QSs' who possess these disciplines in order to encourage current and future Quantity Surveyors to add value to the construction industry.

Further, organizations should carry out periodic training and development programs/ Continuing Professional Development programs (CPD) conducted by the relevant major stakeholders of Sri-Lankan Quantity Surveying or by the expertise in the field of construction, who are aware

of the knowledge and practical implementation of the above disciplines.

The relevant major stakeholders must attend to take necessary actions to implement and maintain certain standards which covers the above-mentioned disciplines in order for local Quantity Surveyors to be well equipped, for the challenges in facing the new requirements of the construction world.

Finally, the governing bodies, of Quantity Surveyors in Sri-Lanka must set out a frame of reference for the work scope with the implementation of the multidiscipline for the profession of Quantity Surveying.

*of Information Technology in Construction (ITcon)*, 19(28), pp.474-493.

Guha, P.K., 2013. Quantity Surveying (Principles and Applications).

Itani, S., Järilström, M. and Piekkari, R., 2015. The meaning of language skills for career mobility in the new career landscape. *Journal of world business*, 50(2), pp.368-378.

Maidin, A.J. and Sulaiman, S.S., 2011. Importance of legal education for quantity surveying professionals: A proposal for developing a legal studies module for Malaysian system. *Journal of Applied Sciences Research*, 7(SPECIAL ISSUE), pp.2249-2256.

Quantity Surveyors Research Group, 1992. The Core Skills and Knowledge Base of the Quantity Surveyor.

#### REFERENCES

Ashworth, A., Hogg, K. and Higgs, C., 2013. *Willis's practice and procedure for the quantity surveyor*. John Wiley & Sons.

Ballan, B., 2011. A value map for communication systems in construction. *Journal of Information Technology in Construction (ITcon)*, 16(44), pp.745-760.

Best, R., de Valence, G., Langston, C. and Smith, P., 1996. Information technology and the evolution of the quantity surveying profession-future directions. *INCIT 96 Proceedings: Bridging the Gap*, p.151.

Bowles, J.E. and Le Roux, G.K., 1992. *Quantity Surveying: An Introduction*. QS publications.

Cartlidge, D., 2012. *Quantity surveyor's pocket book*. Routledge.

Cornick, T. and Osbon, K., 1994. A study of the contractor's quantity surveying practice during the construction process.

Dodge, Y., 2008. *The concise encyclopedia of statistics*. Springer Science & Business Media.

El-Diraby, T.E., 2014. Validating ontologies in informatics systems: approaches and lessons learned for AEC. *Journal*