

# THE ROLE OF QUANTITY SURVEYORS FOR THE SUCCESS OF SMALL-SCALE CONSTRUCTION PROJECTS IN SRI LANKA

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## ABSTRACT

*Several small-scale construction projects are being implemented around the country being a part of development process in Sri Lanka. Most of the Quantity Surveying related areas has become major problem making subjects in those projects and there is lack of involvement of the Quantity Surveyors in those projects when comparing with other professionals in the industry. This research was conducted to highlight the importance of involvement of Quantity Surveyors for success of such projects in Sri Lankan construction industry. Mixed-method approach was used in this research. Most important Quantity Surveying roles that directly impact for the success of small-scale construction projects were determined and categorized under the different stages of construction projects by using semi-structured interviews and questionnaire survey as primary data collection methods. These data were analyzed by using Correlation analysis and Relative Importance Index (RII) analysis as statistical analysis methods. Identified Quantity Surveying roles were ranked based on the impact on the success of those small-scale projects using RII values. Further Correlation analysis was performed to show the relationship between Quantity Surveyor's involvement and success of small-scale construction projects. Barriers for satisfactory involvement of Quantity Surveyors in small-scale construction projects and strategies to increase the involvement of Quantity Surveyors were identified by analyzing data from semi-structured interviews using manual content analysis. Among those barriers most of the interviewees stated that obtaining the service from non-professionals at lower cost was the major barrier and introducing service packages to the client in early stages of project was considered as the main strategy to increase the Quantity Surveyor's involvement to small-scale construction projects. However, the research was concluded that the involvement of client and contractor Quantity Surveyors to the pre-construction and post-construction phases are critical to the success of small-scale construction projects in Sri Lanka.*

**Keywords:** *Construction Industry; Quantity Surveyor; Small-Scale Construction Projects.*

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## **1. INTRODUCTION**

The construction industry is a key component and more significant industry of a country's economy (Lewis, 2004). The construction industry is considered to be one of the major contributors to the national economy (Ngai, et al., 2002). The construction industry plays a major role in producing wealth and improving the living standards of the people of a country (Illangakoon, 2017). Yogeshwaran, et al. (2018) emphasized that in the construction industry, the role of Quantity Surveyor has become one of the key professions. Furthermore, Olanrewaju and Anahve (2015) stated that in a construction project, Quantity Surveyor has become one of the leading profession in cost management, procurement process and the contractual matters throughout the project. According to Dada and Jagboro (2012), Quantity Surveyors should involve in construction projects in pre-construction, construction and post construction stages.

Nkado and Meyer (2001) emphasized that Quantity Surveyors are contributing to the overall performance of the construction projects. According to Perera, et al. (2007), Quantity Surveyor needs to engage in construction industry as a profession who's scope is more than taking off the quantities. Hwang, Zhao and Toh (2014) emphasized that there is a lack of consensus on the definition of the small-scale construction projects. Further it stated that identification of small scale construction projects was done based on the schedule and project cost. Illangakoon (2017) defined the small-scale construction projects which are undergone according to the Construction Industry Development Authority/Standard Bidding Document/03 (CIDA/SBD/03) guideline. Most of the time the clients of the small scale construction projects inaccurately presumed that the Quantity Surveyor's services are limited to the large scale construction projects and that Quantity Surveyor's services are not called when constructing or developing small scale projects (Visser, 2009).

Bremer, et al. (2019) emphasized that clients of residential construction projects have not proper idea about the role of the Quantity Surveyor. According to the Dasanayaka (2019), small scale construction projects need to identify their cash flow issues and suggest some strategies to stabilize them. Poor Quantity Surveying practices in small-scale construction projects is one of the main reasons to reduce their improvements (Weerakoon, et al., 2020). As per the existing literature, the proper Quantity Surveying practices are lacking in the small-scale construction projects in Sri Lanka. Therefore, for the success of those projects Quantity Surveyors needs to be involved in small scale construction projects. Therefore, this study aims to increase the involvement of the Quantity Surveyors to success of small-scale construction projects in Sri Lanka. Accordingly research has four objectives such as defining Quantity Surveyor's role in small scale construction projects in Sri Lanka, investigating relationship between the involvement of Quantity Surveyors and success of small-scale construction projects in Sri Lanka, identifying barriers for satisfactory involvement of Quantity Surveyors in small-scale construction projects in Sri Lanka and strategies to increase the involvement of Quantity Surveyors in small scale construction projects in Sri Lanka.

## **2. LITERATURE SYNTHESIS**

The construction industry is a highly reactive and dynamic industry (Lewis, 2004). The worldwide construction industry has several common features and some specific features may be similar among developing countries (Olawale and Sun, 2010). Yogeshwaran, et

al. (2018) mentioned, Sri Lanka's current construction industry is seriously affecting the country's Gross Domestic Product (GDP) with the development of expressways, high-rise commercial buildings and real estate developments. Due to current practices of construction industry and industrial complexes, many difficulties arise in the construction industry and require advanced management practices and skills (Koutsikouri, et al., 2008). Moreover, small scale construction projects face serious financial and management issues, which can lead to failures of such projects (Dasanayaka, 2019). The performance of Quantity Surveyors in small scale construction projects in Sri Lanka has not yet reached up to the standards due to various circumstances (Weerakoon, et al., 2020). Therefore, there are lot of poor QS practices in the small-scale projects in the construction industry in Sri Lanka.

## 2.1 QUANTITY SURVEYOR’S ROLE IN THE CONSTRUCTION INDUSTRY

Quantity Surveyor is one of the key profession in the construction industry and Quantity Surveyor is considered as the construction economist or cost manager who is trained to manage construction cost of projects (Shafiei and Said, 2008). According to Badu and Amoah (2004), Quantity Surveyor is considered to be a person who has the knowledge to successfully analyze both construction work and cost components of a project, as well as to apply his experience to the cost related matters in construction projects. In Sri Lanka, the Institute of Quantity Surveyors of Sri Lanka (IQSSL) is the main institute governing the Quantity Surveying profession (Yogeshwaran, et al., 2014). According to Yogeshwaran, et al. (2018) in Sri Lankan context, IQSSL, Australian Institute of Quantity Surveyors (AIQS), Royal Institution of Chartered Surveyors (RICS) and Pacific Association of Quantity Surveyors (PAQS) are the governing, interacting and influential professional bodies for Quantity Surveyors professions. Commonly in the construction industry, Quantity Surveyors are working for the client or contractor (Shafiei and Said, 2008). Moreover, Towey (2012) also categorized the Quantity Surveyor profession into the contractor’s Quantity Surveyor and client’s Quantity Surveyors and identified their different roles and responsibilities. Table 1 represents the identified roles of client’s Quantity Surveyor from existing literature.

Table 1: Roles of Client's Quantity Surveyor

Roles for Client’s Quantity Surveyor	References			
	E	F	G	H
Feasibility studies, estimating and Preliminary cost advising	✓	✓		✓
Evaluation of tenders	✓	✓		
Guidance for contractual matters	✓	✓		✓
Preparation of Bill of Quantities (BOQ)	✓	✓		
Advising on selection of contractors	✓	✓		
Contract Administration			✓	✓
Attending to the join measurements			✓	
Assist to construction works	✓			✓
Preparation of statements for taxes and other expenses		✓		
Preparation of cash flow forecasting and financial reports	✓	✓		✓

Roles for Client's Quantity Surveyor	References			
	E	F	G	H
Evaluate the payment applications	✓	✓		✓
Evaluate the sub contractor's payments	✓		✓	
Provide expert advice on industrial conflicts using the process of arbitration, adjudication and legal dispute process (Dispute resolution)	✓		✓	
Evaluating or arguing with contractual claims	✓	✓	✓	✓
Evaluate the final payments	✓			

Sources: A: Said, et al. (2010), B: Visser (2009), C: Chandramohan, et al. (2020), D: Bremer, et al. (2019).

Table 2 represents the identified roles of contractor's Quantity Surveyor from existing literature.

Table 2: Roles for Contractor's Quantity Surveyor

Roles for Contractor's Quantity Surveyor	References			
	A	B	C	D
Preparation of tender documents	✓	✓	✓	
Advising for procurement	✓	✓	✓	✓
Pricing the BOQ	✓	✓	✓	
Payment application preparations	✓	✓	✓	
Evaluating the required preliminaries	✓		✓	
Determining the variance of change from designer or client	✓		✓	✓
Assisting in the selection of Subcontractors	✓		✓	✓
Valuing the payment to subcontractors	✓		✓	✓
Preparation of cash flow forecasts and financial reports	✓		✓	✓
Preparing and updating the usage of company plant and material	✓		✓	✓
Evaluation of labour cost	✓		✓	
Project programming and planning		✓	✓	✓
Attending to the joint measurement process	✓	✓		
Preparing the claims according to contract	✓	✓	✓	✓
Dispute Resolution			✓	✓
Contract Administration			✓	✓
Building Information Management			✓	✓
Cost Advising			✓	✓
Final payment application preparation	✓		✓	
Risk Management	✓			
Taxation advice				✓

Sources: E: Cornick and Osbon (1994), F: Ashworth, et al. (2013), G: Weerakoon, et al. (2020), H: Chandramohan, et al. (2020)

## **2.2 SMALL-SCALE CONSTRUCTION PROJECTS**

In the literature, there is no solid definition for the small-scale projects. The project duration is less than or equal to 14 months are known as small scale construction projects (Liang, 2005). Illangakoon (2017) emphasized that, the small-scale construction project can be defined as the construction projects carried out in accordance with CIDA/SBD/03 guideline. However Hwang, et al. (2014) emphasized that definition for the small-scale construction projects can be discussed by referring to the project cost and time. Therefore, it would be a good definition if there is any definition that covers the project size, project duration as well as the contract price. With reference to the existing literature, if a project has one or more characteristics such as carried out in accordance with CIDA/SBD/03 guideline, initial contract value up to 10 million Sri Lankan Rupee (LKR) and project duration is less than or equal to 14 months will be considered as small-scale construction projects in Sri Lanka.

## **2.3 SUCCESS OF THE CONSTRUCTION PROJECTS**

Dasanayaka (2019) emphasized that there are different definitions and meanings for success of the projects and generally success means the measurements of achievement of targets and expectations. When considering the success of a construction project, it can be identified as a goal which is associated with time, quality and cost as the main three pillars (Chan, et al., 2002). Moreover, if the project is not completed in terms of time, cost and quality it can be identified as an unsuccessful project (Larsen, et al., 2016). Further Silva, Warnakulasooriya and Arachchige (2015) highlighted time, cost and quality as three efficiency dimensions for the success of the construction projects.

## **2.4 BARRIERS FOR QUANTITY SURVEYORS TO INVOLVE IN SMALL-SCALE CONSTRUCTION PROJECTS**

Bremer, et al. (2019) stated that there are several reasons for the drop of Quantity Surveyor intervention for small-scale projects specially in small residential and housing projects. Accordingly, authors noted that the clients of those projects are completely unaware about the service and fees of the Quantity Surveyors. Furthermore, the authors pointed out that, those project clients have misunderstood about the fact that QS scope can be cover-up by other professionals or by themselves. According to Visser (2009), clients are erroneously assuming that Quantity Surveyor fees, which are considered too high and also believed that QS services are only needed for large projects. Therefore, clients of small-scale construction projects have not clear idea of the Quantity Surveyor's role, services and their fees. According to Weerakoon, et al. (2020), if the clients make timely payments to the contractors without any delays, contractors can maintain a stable cash flows and then they can hire competent Quantity Surveyors for the construction projects. Moreover, authors stated that lack of project conditions on the recruitment of qualified individuals to small scale projects, which could impair the performance of the Quantity Surveyors. Bremer, et al. (2019) emphasized that, Quantity Surveyors have capable skills and competencies to manage time, cost, and quality. According to Rensburg and Albertus (2010), construction projects require a professional person with the ability to manage cost, time and quality parameters. Moreover, authors highlighted that to manage the cost overruns and ensure the work quality of projects, Quantity Surveyors are the most appropriate professionals. Furthermore, authors elaborated the above statement

in their research with refer to the other professions such as Project Managers, Architects, and Engineers by using following bar chart represented in Figure 1.



Figure 1: Principal agent values for each profession

Source: Rensburg and Albertus (2010)

Visser (2009) stated that, a Quantity Surveyor can make required guidance and professional assistance specially in cost management of small-scale construction projects. However, Weerakoon, et al. (2020) mentioned that in Sri Lankan construction industry, performance of small-scale construction projects are not in a satisfactory level. Bremer, et al. (2019) proved that, there will be an increase of the performance of cost, quality and time of small-scale construction projects once after involvement of Quantity Surveyors as a principal agent. Therefore, there is a requirement to increase the involvement of Quantity Surveyors in small scale construction projects in Sri Lanka. Further findings of this research will open up some job opportunities for Quantity Surveyors in small-scale construction projects in Sri Lanka.

### 3. RESEARCH METHODOLOGY

#### 3.1 RESEARCH APPROACH

Mixed approach is a systematic integration of quantitative and qualitative methods in a single study for the purposes of obtaining a complete picture and deeper understanding of the phenomenon (Johnson, et al., 2007). Amaratunga, et al. (2002) emphasized that experimental accuracy, reliability and quality of research are often improved and that potential risks can be avoided when using the mixed method instead of a qualitative and quantitative methods. Quantitative method was used to investigate the relationship between the involvement of Qs and success of small-scale construction projects and qualitative method was used to identify the barriers and strategies for satisfactory involvement of Qs in small-scale construction projects. Thus, in order to collect both quantitative and qualitative data, mixed approach was used for this research.

#### 3.2 DATA COLLECTION

A comprehensive literature synthesis was carried out to collect secondary data to identify the Quantity Surveyor's role in construction projects as listed in above table 1 and 2.

Thereafter Quantity Surveyor’s role was defined to the small-scale construction projects in Sri Lankan context through semi structured interviews as primary data collection. Further, those semi-structured interviews were conducted to identify barriers for satisfactory involvement of Quantity Surveyors in small-scale construction projects in Sri Lanka and strategies to increase the involvement of Quantity Surveyors in small scale construction projects in Sri Lanka. Interviews were conducted as online face to face meetings through zoom and Google meet applications with duration of 30-45 minutes. The sample was selected grounded on the population of graduate Quantity Surveyors with more than 10 years of experience and 10 interviewees were selected as the sample by using purposive sampling technique. Table 3 is representing the details of interviewee sample.

Table 3: Summary of interviewee sample

Respondent Code	Service Type	Industry Experience (Years)	Profession
P1	Client/ Contractor	18	Chartered QS
P2	Client	16	Chartered QS
P3	Contractor	15	Chartered QS
P4	Contractor	12	Senior QS
P5	Contractor	13	Senior QS
P6	Client/ Contractor	17	Senior QS
P7	Client	12	Senior QS
P8	Client/ Contractor	18	Chartered QS
P9	Client/ Contractor	11	Senior QS
P10	Contractor	11	Senior QS

Then questionnaire survey was conducted as the other secondary data collection method to investigate the relationship between the involvement of Quantity Surveyors and success of small-scale construction projects in Sri Lanka. Thus, considering the time limitations, this was designed as a web-based questionnaire survey through Google forms and delivered the link through the email platforms. For this questionnaire survey, 50 respondents were selected as the sample by using simple random sampling. Table 4 emphasizes the summary of primary data collection methods for this study.

Table 4: Summary of population and sample for primary data collection

Data Collection Method	Population	Sample	Sample Technique	Covered Objectives
Semi Structured Interviews	Graduate Quantity Surveyors in Sri Lanka	10	Purposive Sampling	Objective 01, 03 and 04
Questionnaire Survey	Quantity Surveyors, Civil Engineers and Architects	50	Simple Random Sampling	Objective 02

### 3.3 DATA ANALYSIS

Secondary data collected from semi structured interviews were subjected to comprehensive manual content analysis (frequency analysis). Questionnaire survey data was analyzed through RII analysis and Correlation analysis by using SPSS software. Correlation analysis was used to identify the relationship between the involvement of

Quantity Surveyors and success of small-scale construction projects in Sri Lanka as dependent variable and the independent variable. Lim and Ting (2013) emphasized that the respondent's rated factors could be graded accurately using RII. Accordingly, based on the RII, Quantity Surveying roles have been identified that have the greatest impact on the success of small-scale construction projects in Sri Lanka. In here 1-5 likert scale was used in questionnaire survey where 1-very unimportant, 2-unimportant, 3-neutral, 4-important and 5-very important. Following Eq. 01 is the RII equation (Gunduz et al., 2013) which was used for analysis.

$$RII = \frac{\sum_{i=1}^n w_i x_i}{A * \sum_{i=1}^n x_i} \quad (Eq. 01)$$

Where,  $w_i$  = Allocated weight for factors (for this study  $i = 1, 2, 3, 4, 5$ );  $x_i$  = Number of respondents in each scale; and  $A$  = Highest weight (for this study  $i = 5$ )

## 4. RESEARCH FINDINGS AND DISCUSSION

### 4.1 RESPONDENT PROFILE

Table 5 represents the number and percentages of respondents of questionnaire survey and overall respond rate was around 90%. Out of all respondents, 47% are Quantity Surveyors, 38% are Civil Engineers and 15% are Architects. This is represented by Figure 2.

Table 5: Percentage of respondents in questionnaire survey

Profession	No of Respondents	Percentage
Quantity Surveyors	21	47%
Civil Engineers	17	38%
Architect	7	15%

Figure 3 is representing the respondent work experience. The highest number of responses were collected from the professionals who have 5-10 years of experience and the percentage is 40%.

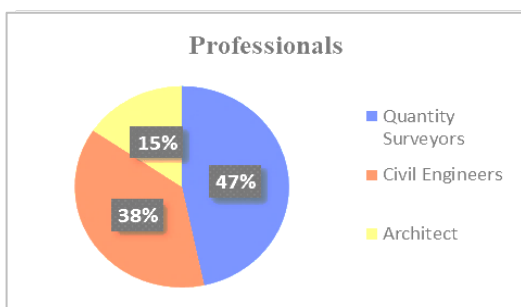


Figure 2: Percentage of respondents

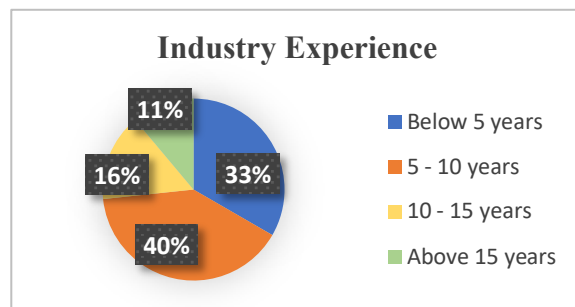


Figure 3: Respondents work experience

### 4.2 QUANTITY SURVEYOR'S ROLE IN SMALL-SCALE CONSTRUCTION PROJECTS IN SRI LANKA

Based on the existing literature, roles of client's Quantity Surveyors and contractor Quantity Surveyors were defined in the literature synthesis as listed in Tables 1 and 2. Table 6 shows the identified roles of client's Quantity Surveyors and contractor's



Quantity Surveyors which are the most important roles for small-scale construction projects in Sri Lanka with their frequencies. Frequency means the number of interviewees who identified each role as important for success of small-scale construction projects. These roles were further divided to stages of construction projects as given in Table 6.

Table 6: Most important roles for Client's and Contractor's Quantity Surveyors in small-scale construction projects in Sri Lanka

Stage	Role for Client's Quantity Surveyor	Frequency	Role for Contractor's Quantity Surveyor	Frequency
Pre-construction stage	Preparation of BOQ for client	8	Preparation of tender documents	6
	Advising on selection of a contractor	7	Pricing the BOQ	8
	Contract Administration	6	Assisting in the selection of Subcontractors	7
Construction stage	Evaluate the payment applications	9	Contract Administration	8
	Preparation of cash flow forecasting and financial reports	8	Payment application preparations	9
	Attending to the joint measurements	8	Valuing the payment to subcontractors	7
	Evaluate the sub contractor's payments	7	Preparation of cash flow forecasts and financial reports	7
	Dispute resolutions in construction stage	6	Attending to the joint measurement process	8
Post construction stage	Evaluate the final payment applications	8	Project programming and planning	7
	Evaluating or arguing with contractual claims	7	Dispute Resolution in construction stage	6
	Dispute resolutions in post construction stage	7	Final payment application preparations	9
			Preparing the claims according to contract	7
		Dispute Resolution in post construction stage	7	
		Valuing the payment to subcontractors	6	

#### 4.3 RELATIONSHIP BETWEEN THE INVOLVEMENT OF QUANTITY SURVEYORS AND SUCCESS OF SMALL-SCALE CONSTRUCTION PROJECT IN SRI LANKA

The most important roles of Quantity Surveyors that will highly influence for the success of small-scale construction projects in Sri Lanka were determined through the questionnaire survey. Table 7 shows the most important QS roles of contractor and client Quantity Surveyors for success of small-scale construction project in Sri Lanka with their RII values and rankings. Accordingly, contract administration, preparation of BOQ, payment application preparations, evaluate payment applications, final payment application preparations and evaluate final payment applications were identified as the most important contractor and client QS roles respectively in pre-construction stage, construction stage and post construction stage.

Table 7: Most important roles which influence to the success of small-scale construction projects

Stage	Contractor's QS Role			Client's QS Role		
	Role	RII	Rank	Role	RII	Rank
<b>Pre-Construction stage</b>	Contract Administration	0.9111	1	Preparation of BOQ for client	0.8933	1
	Pricing the BOQ	0.8889	2	Contract Administration	0.8889	2
	Assisting in the selection of subcontractors	0.8844	3	Advising on selection of a contractor	0.8844	3
	Preparation of tender documents	0.8711	4			
<b>Construction stage</b>	Payment application preparations	0.8978	1	Evaluate the payment applications	0.8933	1
	Attending to the joint measurement process	0.8933	2	Preparation of cash flow forecasting and financial reports	0.8889	2
	Preparation of cash flow forecasts and financial reports	0.8889	3	Attending to the joint measurements	0.8844	3
	Valuing the payment to subcontractors	0.8800	4	Dispute resolutions in construction stage	0.8800	4
	Project programming and planning	0.8756	5	Evaluate the sub contractor's payments	0.8756	5
	Dispute Resolution in construction stage	0.8711	6			
<b>Post construction stage</b>	Final Payment application preparations	0.8978	1	Evaluate the final payment applications	0.8933	1
	Valuing the payment to subcontractors	0.8933	2	Evaluating or arguing with contractual claims	0.8889	2
	Preparing the claims according to contract	0.8844	3	Dispute Resolutions in post construction stage	0.8756	3
	Dispute Resolution in post construction stage	0.8800	4			

Further, as per Table 8, all the independent variables (IV) have strong relationships with the success of the small-scale construction projects (dependent variable). Among those independent variables IV1, IV4 and IV5 obtained strong Correlation with the dependent variable and Correlation values are 0.517, 0.612 and 0.575. Thus, the contractor's Quantity Surveyor involvement in the pre-construction and the post construction stages have a strong relationship with the success of the small-scale construction project in Sri Lanka. Moreover, the client's Quantity Surveyor involvement in the construction stage has a strong relationship with the success of the small-scale construction project in Sri Lanka.

Table 8: Results of correlations analysis

Independent Variables	Sig. Value	Pearson Correlation
Contractor's Quantity Surveyor involvement in the pre-construction stage (IV1)	0.000	0.517
Client's Quantity Surveyor involvement in the pre-construction stage (IV2)	0.030	0.324

Independent Variables	Sig. Value	Pearson Correlation
Contractor’s Quantity Surveyor involvement in the construction stage (IV3)	0.020	0.345
Client’s Quantity Surveyor involvement in the construction stage (IV4)	0.000	0.612
Contractor’s Quantity Surveyor involvement in the post construction stage (IV5)	0.000	0.575
Client’s Quantity Surveyor involvement in the post construction stage (IV6)	0.040	0.308

#### 4.4 BARRIERS FOR SATISFACTORY INVOLVEMENT OF QUANTITY SURVEYORS IN SMALL-SCALE CONSTRUCTION PROJECTS IN SRI LANKA

Table 9 shows the identified barriers for satisfactory involvement of Quantity Surveyors in small-scale construction projects in Sri Lanka which were identified through semi structured interviews.

Table 9: Barriers for satisfactory involvement of Qs in small scale construction projects

Barriers	Interviewee Code										Frequency
	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	P <sub>5</sub>	P <sub>6</sub>	P <sub>7</sub>	P <sub>8</sub>	P <sub>9</sub>	P <sub>10</sub>	
Client’s less awareness about the Quantity Surveyor’s roles in the construction projects	✓	✓	✓	✓		✓		✓		✓	7
Client’s less awareness about the Quantity Surveyor’s fees		✓		✓	✓	✓		✓	✓	✓	7
Contractor’s cash flow issues	✓	✓		✓	✓	✓	✓		✓	✓	8
Obtaining services from non-professionals at low cost	✓	✓	✓	✓	✓	✓	✓		✓	✓	9
Lack of legal influence to obtain services from non-professionals	✓	✓	✓		✓		✓	✓	✓		7

Out of 10 interviewees 9 interviewees stated that, most of the time in the industry there are non-professionals who having lack of knowledge about the construction industry and do some Quantity Surveying related works at low charge. Interviewee P<sub>1</sub> stated that, some person in the industry are preparing and pricing the BOQ but they haven’t any qualifications at least certificate levels or diplomas. Furthermore, P<sub>1</sub> pointed out, as a result most of the time clients cannot manage the project cost when using such kind of erroneous estimates. P<sub>2</sub> emphasized that, most of the time clients of small-scale projects need to prepare the BOQ only to get approve their bank loans and they haven’t any idea about the purpose of the BOQ and other contract documentation. Interviewees P<sub>4</sub> and P<sub>6</sub> stated that many of the clients in small-scale construction projects are known only to Civil Engineers and Architects as professionals in the industry. P<sub>10</sub> stated that small-scale construction projects have some fear of hiring professionals with their fluctuating cash flows.

#### 4.5 STRATEGIES TO INCREASE THE INVOLVEMENT OF QUANTITY SURVEYORS IN SMALL-SCALE CONSTRUCTION PROJECTS IN SRI LANKA

Table 10 shows the strategies to increase the involvement of the Quantity Surveyors for small scale construction projects in Sri Lanka which were identified through semi structured interviews.

Table 10: Strategies to increase the Involvement of QSs in small scale construction projects

Strategies	Interviewee Code										Frequency
	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	P <sub>5</sub>	P <sub>6</sub>	P <sub>7</sub>	P <sub>8</sub>	P <sub>9</sub>	P <sub>10</sub>	
Introduce service packages to the client in early stages of the projects	✓	✓	✓	✓		✓	✓	✓	✓	✓	9
Working as a freelance Quantity Surveyor		✓		✓	✓	✓		✓	✓	✓	7
Charge according to the percentage of the contract as a contractor's QS	✓	✓		✓	✓	✓	✓		✓	✓	8
Influencing professional bodies and the government to introduce legal backgrounds for professions		✓	✓	✓	✓		✓		✓	✓	7

Out of 10 interviewees, 9 stated that the Quantity Surveyors should introduce a service packages for small scale construction projects. In this service packages, client/lead consultant will request required QS services for the project and payment will be done as per the scope of services and totally for the project. (E.g.: 1 lakh or 1.5 lakh for total project). Interviewee P<sub>1</sub> emphasized that Quantity Surveyors should act as a client agent to manage designer and contractor selection for small scale construction projects. Interviewee P<sub>3</sub> stated that if the Quantity Surveyor could introduce himself to the project before other professionals, the Quantity Surveyor could find the management role in such projects. P<sub>10</sub> emphasized that if contractors maintain good quality in the industry in recruiting professionals, they have more opportunities to get more projects. Seven interviewees emphasized the need for a proper legal background for small-scale projects in Sri Lanka and P<sub>4</sub> suggested that certain legal requirements should be introduced from professional bodies and government for such projects. Further interviewees P<sub>8</sub> and P<sub>9</sub> emphasized that Quantity Surveyors can introduce their service through modern digital platforms such as Fiverr, Freelancer and Houzz. Moreover, the interviewees highlighted and recommended to use software such as planswift, iTWO costX, Cubicost, Autodesk Revit, Sweet home 3D and SketchUp to offer QS services through digital platforms as new diversified area of the modern Quantity Surveying.

#### 4.6 DISCUSSION

Based on the above results of the study, 14 roles were identified for contractor's Quantity Surveyors and 11 roles for client's Quantity Surveyor in the small-scale construction projects in Sri Lanka. Therefore, the most important roles are available for the contractor's party. Further, the significance levels of IV1, IV2, IV3, IV4, IV5 and IV6 were under 0.050. Thus, there are strong Correlations between each independent variable and dependent variable which can be concluded that, QS role directly affects to the

success of small scale projects in Sri Lanka. Further, Weerakoon, et al. (2020) noted that the contractor's cash flow issue led to a reduction in the Quantity Surveyor's involvement in small-scale construction projects which was mentioned by 9 interviewees out of 10 in this study. Introducing service packages to the clients in the early stages of the projects is the most common strategy obtained at the higher frequency level (9 responses) to increase the involvement of the Quantity Surveyor in small scale construction projects in Sri Lanka. Bremer, et al. (2019) also argued that if the Quantity Surveyor could be involved in the early stages of the project, it would be a strong basis for engaging in small-scale projects such as housing projects. Moreover, Quantity Surveyors can offer their services in the digital platforms using software such as planswift, iTWO costX, Cubiccost, Sweet home 3D and SketchUp which is good sign for future of Quantity Surveying with few additional competencies.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

There were 14 number of important contractor's Quantity Surveyor's roles and 11 number of client's Quantity Surveyor's roles identified for small scale construction projects in Sri Lanka. The Correlation analysis result stated that all the variables has a direct relationship with the success of the small-scale construction projects and among that, involvement of contractor's Quantity Surveyor in the pre-construction stage and post construction stage has a strong relationship with success of the small-scale construction projects in Sri Lanka. Contract administration, payment application preparations and final payment application preparation have been identified as the highest RII value roles for the contractor's Quantity Surveyor during the pre-construction stage, construction stage and post-construction stage respectively. Moreover, preparation of BOQs, evaluating payment applications and evaluating final payments have been identified as the highest RII value roles for client's Quantity Surveyor. Further, obtaining services from non-professionals at low cost and contractor's cash flow issues were identified as the main barriers for satisfactory involvement of Quantity Surveyors in a small-scale construction projects. Introducing service packages to the client in early stages of the projects and charging according to the percentage of the contract sum as contractor's Qs can be emphasized as strategies to increase the involvement of the Quantity Surveyors in small scale construction projects in Sri Lanka. Furthermore, interviewees further highlighted that Quantity Surveyor can be involved in small-scale construction projects as a freelance Quantity Surveyors using digital platforms and modern software. The involvement as a contractor's Quantity Surveyor to the pre-construction and post-construction stages are critical to the success of small-scale construction projects. From the contractor's point of view, the contract percentage-based fee system is a better strategy to get the services of a Quantity Surveyors than by recruiting for permanent jobs.

This study was focused only the small-scale building construction projects in Sri Lankan context as the limitation. Furthermore, the definition used for small-scale construction projects may vary depending on price fluctuations and the economy of the country. For future studies, identifying additional competencies required to perform as a Quantity Surveyors for the success of small-scale construction projects can be recommended.

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