

The Impact of RIBA Plan of Work on the Quality of Projects in Sri Lankan Construction Industry

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Abstract: *The Sri Lankan construction industry is evidenced by frequent project failures due to the performance of triple constraint. Inefficient project planning leads the projects toward an abyss. RIBA Plan of Work is one of the leading project management techniques around the world. In the present days, many projects are moving towards the quality of projects while applying RIBA Plan of Work. It guides all stages of the project lifecycle. The objectives of the study were achieved using qualitative and quantitative data gathered through a questionnaire and semi-structured interviews. A comprehensive literature survey was carried out to understand and identify the concept of RIBA Plan of Work and triple constraint performance which affect the project quality. The relationship between time, cost and quality performance and project success was determined through the correlational analysis and the impact of the relationship was determined through the regression analysis using SPSS software. The challenges toward the implementation of RIBA Plan of Work in Sri Lanka were identified through interviews by conducting content analysis. The findings of this research discuss the critical success factors of time, cost and quality performance which has a direct impact on the final output of construction projects. Finally, insufficient knowledge, denial of acceptance, PESTEL condition difference in practiced countries, implications with regard to time for implementing RIBA Plan of Work and implications of training/educating individuals involved in Sri Lankan construction projects were identified as the challenge.*

Key Words: RIBA Plan of Work, Project Success, Sri Lanka

I. INTRODUCTION

A. Background

One of the important industries worldwide is the construction industry which is generally defined as a sector of the economy. The industry contributes a lot to the economic growth of a country whilst facing major challenges that could affect primarily the project goals and economic benefits. To choreographed above mentioned construction activities the involvement of the stakeholders are essential who are the once gain the benefits and have

the interest for the final product directly or indirectly to complete the project in successful manner. In order to successfully complete the project, there was a most important factor as ‘Project Characteristics’ that need to be considered by the stakeholders. In construction, there were three main project characteristics as Time aspects, Cost aspects, and Quality aspects that is essential to fulfilled in order to complete the project successfully.

Now a day, the Sri Lankan construction industry still suffers from poor project performance due to insufficient planning tools and practices is a major problem arising. On the nature that the construction industry operates, the industry requires an ad-hoc approach on a routine basis in the construction phase and adequate planning during the pre-construction phase which could lead to failure in terms of the triple constraint; time, cost, and quality, if not attended adequately through a firm Framework. In search of mitigating the setbacks/backdrops in the process of the Construction Industry from designing, construction to commissioning, researchers have previously suggested the use of RIBA Plan of Work in the study.

RIBA Plan of Work is well-initiated construction planning tool for project planning and management (Withanage & Silva, 2020). It comes up with a model broken down in stages to assist the project team to manage the project from commencement to completion and further. The version considered for this study is RIBA Plan of Work (2013), as a major revision to RIBA Plan of Work was incorporated into 2013 version identifies the stages that the project will undergo and highlight the significance of data/information gathering, collection and circulation of completed projects.

It has many distinguishing features such as being appropriate for the resolve of the construction industry to assistance deliver capital and operative efficiencies, carbon reductions as well as improves briefing and outcomes, more well-organized design procedures, ideal for all project sizes and types, appropriate for all procurement routes, for use by the entire project team, and finally as an versatile and simple online tool.

The main aim and the objectives of this research is to understand the concept of RIBA Plan of Work and identify the relationship and the impact between RIBA Plan of Work for time, cost and quality

performance on quality of construction projects. Finally, it is hope to understand the challenges to implement the RIBA Plan of Work in Sri Lankan construction industry.

II. LITERATURE REVIEW

The construction industry is extremely essential in a developing country's economy since it has a big impact on the nation's development by being a key Contributor to economic growth and public activities (Durdyev and Ismail, 2012). Due to the higher number of uncertainties in technology, budgets, and development processes, it becomes dynamic in nature also (Chan et al., 2004). Unique, resource consuming, achieving pre-set objectives, a series or complex mix of tasks, and meeting of specific requirements or specifications are some identified project characteristics which allows the term “project” to be applied universally (Alotaibi, 2019). For both Clients and Contractors, modern construction projects which are significant challenge to deliver the project successfully due to various circumstances (Doloi, 2009). The way we choose to divide works (work plans) and set up the processes will define our ultimate success of any project. Furthermore, project management techniques are guiding how we're going to get there (RIBA, 2013).

A. RIBA Plan of Work

According to different authors’ point of view, it can be defined as follows.

Table 1: Definitions for RIBA Plan of Work

| Author(s) | Definition |
|--------------------------------|---|
| 1. Muktar (2020) | An organized document that divides and arranges project life-cycle of construction projects into different key stages. |
| 2. Odediran and Windapo (2014) | A standard planning approach for a building, construction, or design stages that specifies each stage of the process. |
| 3. RIBA (2013) | In the United Kingdom, the most widely used construction project document has evolved into a definitive model for the construction process. |

Source: Research Findings, 2021

B. History of the RIBA Plan of Work

The “Royal Institute of British Architects” (RIBA) is a professional institution in the United Kingdom (UK) that mainly serves Architects in the UK but also in other parts of the world, and publishes the RIBA Plan of Work (RIBA, 2013b). In 1963, it was aimed to describe the way a construction process should be organized (Hauges, 2003). Subsequently,

it was updated few times to reflect changes in the team of project and different procurement methods (RIBA, 2013b). Fundamentally, there were seven main RIBA Plan of Work versions available in the industry in 1963, 1967, 1973, 1998, 2007, 2013 and 2020.

C. RIBA Plan of Work (2013)

RIBA Plan of Work (2013) is the major revision and most generally practicing version in construction industry, although the latest version is published in 2020. Its overview is based on past fifty years of feedback gathered from industry professionals. It has undergone a radical overhaul and construction strategy was developed by the UK government in 2011 to identify the need for a better integrated and more efficient construction industry which incorporates new techniques and sustainability (RIBA, 2013a). Among other planning techniques, it is multifold because its adaption to the construction strategies of the government. It includes changing procurement processes, and accommodating the increased use of information management such as BIM (Orrell, 2014). Besides that, the main benefit of this plan is giving more efficient in design processes. It can be used across the entire range of sectors and different sizes of projects.

Note that this is not a contractual document, yet it guides the readers to a variety of tools and other core documents that can be used by the project team, inclusive of documents pertaining to specialized services contracts, schedules of services and project protocols. RIBA Plan of Work (2013) is suited for usage in the 21st century construction industry to support in delivering capital and operational proficiencies, carbon decreases and better consultation and outcomes. Suitability of many forms of procurement is one of the main features of this work plan (RIBA, 2013).

D. Structure of RIBA Plan of Work (2013)

The RIBA Plan of Work (2013) is divided into eight phases denoted by the digits 0-7 in order to refrain from the mix up with the stages in the RIBA Outline Plan of Work 2007, which were denoted by letters, and each of the eight stages is linked to tasks. Some task bars are set, while others fluctuate (plan of works consists of alternatives given for a practice or a project) and others are optional (can be used or not used).

The alignment of the RIBA Plan of Work (2013) stage numbers with this framework helps to achieve one of the key aims, namely improved coherence throughout the construction sector. The key steps encompass strategic definition, preparation and briefing, concept design, developed design, design process, construction, handover and closeout, and in-use stage (RIBA, 2013a). Further, it has special features when comparing with the outline plan of work 2007 which is comprising eight stages and

eight task bars, retaining, simplicity while adding flexibility, mapping to government's digital plan of work, including new topics and defining terms and project strategies (RIBA, 2013).

Even though the RIBA Plan of Work (2013) does not directly contain stages that corresponds to the G,H, and J stages of RIBA Outline Plan of Work 2007, these stages relates to the bidding activities connected with traditional procurement, these activities are included to the procurement task bar. It is allowed to generate a plan of work specific for practice, on traditional or non-traditional methods of procurement but illustrates from the same template format, enabling changes within a constant general framework.

E. RIBA Plan of Work on Time Performance of Construction Projects

Time duration of the construction has become increasingly essential since it is frequently used as a method of evaluating a project performance and the contractor's productivity (Kumaraswamy and Chan, 2002). Delay in coordinating actions and approving items, labour issues, budget inaccuracies cause project shutdown for weeks & months even years, improper coordination of subcontractor schedules and compliance, lack of effective communication cause wrong work done, poor weather conditions, idle time due to insufficient shipment are the barriers to keep construction on time.

Industry professionals use this work plan to determine the value of successive and reiterative design developments. The design component of the project can be controlled through the process to win the time. These are the most crucial stages to get correct because the client will decide on the project's feasibility at this point. Each stage's tasks are difficult to complete, as they are time-wasting. But with the proper coordination through this work plan it organizes the outputs of each stages are very clear before starting activities. The RIBA Plan of Work illustrates the influence on the amount of time available for tasks in following phases and backs up requests for more resources or faster work.

F. RIBA Plan of Work on Cost Performance of Construction Projects

Odediran and Windapo in 2014 stated that construction and design stages (concept, developed and technical) are the most important phases of RIBA Plan of Work and through the study; they classified cost related constraints and how they mitigated. For improve the cost performance, it suggests a careful and untroubled reflection of the most important phases as outlined in RIBA document by construction professionals and other stakeholders.

Implementation process of design brief and preparation are done in the concept design stage (stage 2). Furthermore, it includes plan proposals for

operational and construction services systems, summary specifications and preliminary cost plan, and procurement method reviews. After that, updating outline provisions and cost plan is done in the developed design stage (stage 3). While these above stages are running smooth, technical design stage (stage 4) provides sufficient information on specification to coordinate components and elements of the project. Also it provides information for statutory standards and construction safety (RIBA, 2013).

The pre-construction stage also includes information on construction, tender documents and action. Production information includes adequate details to acquire a tender or tenders, as well as an application for legislative permissions and the compilation of additional information for construction requirements under the building contract. Tender documentation is the compilation and/or aggregation of adequate details to allow tender/tenders for the project to be obtained.

G. RIBA Plan of Work on Quality Performance of Construction Projects

A memorandum of understanding in 2018 to pursue the 'quality' agenda was signed by the Royal Institute of British architects (RIBA). This agreement was made to ensure quality is foregrounded across the disciplines of architecture, surveying and construction. The RIBA's ambition to improve the quality of the built environment for the benefit of society is certainly an admirable challenge. Quality in architecture is a characteristic that has numerous definitions and values and for this very reason, since the days of Vitruvius, architects have struggled to define this concept.

Members of the RIBA personnel are already aware with the RIBA's quality management systems and project verification processes, which it has put in place and actively encourages. Takim and Adnan (2008) asserted that quality is the most significant measure of project success. Stage 1 (preparation and brief) emphasizes the need for quality objectives, which promote a focus on attaining high quality design and ensuring that these objectives are discussed early in the briefing process Fletcher & Satchwell (2015). RICS (2015) stated that the project manager must effectively involve during stage 5 (construction) in order to ensure the construction quality. Project manager role during stage 6 (handover and close out) ensures accurate as-built information, and commissions the facility.

H. Critical Success Factors (CSFs)

Time Performance:

In Iran, according to the findings by Samarghandi et al. (2016), the causes of the time overrun classified under four categories (Client, Contractor, Consultant and external reasons), performed interviews with industry professionals and industry governing

organizations. The most common consequences of time overrun, according to the study, were unawareness of inflation rate, improper planning, poor cash flow preparation, poor document handling, inaccuracy of project's initial draft, out dated contract terms and poor government budgeting of the project.

Meanwhile Sri Lanka as one of many developing countries, in reference to the explanations of Dolage and Rathnamali (2013), 80 percent of the building construction projects handled in Sri Lanka suffers from time overruns. According to their study, they classified and ranked the 51 factors of time overrun. Payment delays by the Client, improper planning, bad weather condition, lack of skilled labour, insufficient labour resources, and lack of experience with Contractor are identified factors according to different stakeholders' perspectives the study in the implementation phase of Sri Lankan construction projects.

Cost Performance:

In Australia, Creedy (2005) found that the factors that influence to the cost overrun are change in design and scope, higher contract tender price than original estimate, latent condition, constructability, costs of services relocation, increase in material costs, project administration cost increase, adverse weather conditions cause rework, costs of remote location, change of specification, requirement of project acceleration, issues of cultural heritage and government initiative.

In Ghana, Frimpong et al. (2003) conducted a study for groundwater projects. The final ranking factors were concluded as follow: improper planning and scheduling, wrong estimations of cost, inadequacy in control procedures, information and work approval delays, faults during construction, low speed of inspection and testing of work, insufficient labour resources, insufficient contract management, financial difficulties by Contractor, low bidding, material procurement, late delivery of materials, price escalation of material, ground conditions, adverse weather and unexpected geological conditions.

Quality Performance:

The development in construction industry focuses on the quality aspects of projects. Commentators have differing views on what constitutes a quality project. Every stage and aspect of the construction contributes to the quality of the Project (Wu et al., 2014). Quality in a construction project is performing to the required standards by the Client specified based on the scope of works, within the schedule at the budgeted cost for the intended purpose by the Client. Construction projects and quality have a strong link to each other where a project cannot be successful without quality (Arunmozhi, Suguna and Raghunath, 2015). Quality

is considered as one of the most vital factors for the success of construction projects around the world. And also, the success of the construction sector is heavily reliant on the quality of its work (Jha and Iyer, 2006). High standard of quality helps to meet the project goals and prioritize the tasks to meet project goals.

The literature on RIBA Plan of Work and project success was reviewed in this chapter. Based on the above literature review, it is clear that the previous researchers have examined a large number of factors on time, cost and quality performance as well in different parts of the World without much study carried out in Sri Lankan construction industry. Hence, it is hoped to study the RIBA Plan of Work and its' impact on triple constraint performance and popularize it in Sri Lanka.

III. RESEARCH METHODOLOGY

Due to the nature of the research, which is concerned with the construction industry, this research is of positivism philosophy, which is highly structured, data collected from large samples, measurement based and quantitative type but qualitative information can be referred (Business Research Methodology, 2011).

A. Population and Sampling

The population for the collection of quantitative data through the questionnaire, the construction professionals in Sri Lanka which are close to impossible in quantifying as all of them would not be in record (Bhardwaj, 2019). For the determination of this thesis, the sampling technique used is simple random sampling, based on similar past studies, the minimum sample required was defined as 80, yet in distribution and in collection of data, and 78 valid responses were obtained. The population for the collection of qualitative data through the interviews, just as for the questionnaire, the population is the professionals in the field, through purposive sampling technique the sample size selected as 10 (Etikan, 2016).

B. Data Analysis and Presentation

Literature survey was conducted to identify the RIBA Plan of Work from its' origin to 2021 and to identify the constraints which are directly affect to the time, cost and quality performance in the construction industry. To identify the challenges which are affecting to the implementation of RIBA Plan of Work in Sri Lanka, the fourth objective of this study was covered using this analysis method. The results of the questionnaire survey have been analyzed by SPSS to check the reliability using Cronbach's Alpha test, relationship and impact of the data.

IV. RESULTS

A. Reliability Analysis

Table 3: Reliability Analysis

| Reliability Statistics | |
|------------------------|------------|
| Cronbach's Alpha | N of Items |
| .836 | 42 |

The result of Cronbach's Alpha indicates 0.836 for this variable and it exceeds 0.7. Therefore, it can be considered the internal consistency and reliability of these questions which were obtained in the questionnaire were acceptable.

B. Correlation Analysis

The data were obtained through the detailed questionnaire as quantitative data and the relationships were proven using correlation analysis through SPSS. The intensity of the relationship between the independent and dependent variables are examined.

According to the results of the correlation analysis, positive weak relationships were indicated between independent variables (time performance, cost performance and quality performance) and dependent variable (project success) which satisfies the alternative hypothesis. The relationship between independent variable and dependent variable exists when the significance value of each independent variable indicates less than 0.05.

Table 4: Correlation Analysis

| Correlations | | | | |
|---------------------|--------|--------|--------|--------|
| | ATP | ACP | AQP | APS |
| Pearson Correlation | 1 | .452** | .271* | .458** |
| ATP Sig. (2-tailed) | | .000 | .016 | .000 |
| N | 78 | 78 | 78 | 78 |
| Pearson Correlation | .452** | 1 | .415** | .246* |
| ACP Sig. (2-tailed) | .000 | | .000 | .030 |
| N | 78 | 78 | 78 | 78 |
| Pearson Correlation | .271* | .415** | 1 | .278* |
| AQP Sig. (2-tailed) | .016 | .000 | | .014 |
| N | 78 | 78 | 78 | 78 |
| Pearson Correlation | .458** | .246* | .278* | 1 |
| APS Sig. (2-tailed) | .000 | .030 | .014 | |
| N | 78 | 78 | 78 | 78 |

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

C. Regression Analysis

The third objective of this study was to identify the impact of implementing RIBA Plan of Work for time, cost and quality performance. After determining the relationship by correlation analysis using quantitative data, the impact was determined by the regression analysis. As per the variance value of the particular relationship, the positive or negative impact was determined. When the positive value is indicated in variance, the dependent variable increases, the independent variable also rises. When

indicating the negative value is in variance, the independent variable increases, the dependent variable declines.

Table 5: Coefficient of all Independent Variables with the Dependent Variable

| Model | Coefficients ^a | | | | |
|------------|-----------------------------|------------|---------------------------|-------|------|
| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | B | Std. Error | Beta | | |
| (Constant) | 1.504 | .776 | | 1.938 | .056 |
| ATP | .514 | .141 | .418 | 3.650 | .000 |
| ACP | -.017 | .161 | -.013 | -.106 | .916 |
| AQP | .200 | .132 | .170 | 1.510 | .135 |

a. Dependent Variable: APS

D. Challenges towards the implementation of RIBA Plan of Work

Most important challenges mentioned by the experts were insufficient knowledge of RIBA Plan of Work in the industry, denial to acceptance of RIBA Plan of Work, PESTEL condition difference in practiced countries, implications with regard to time for implementing RIBA Plan of Work to Sri Lankan projects and implications of training/educating individuals involved on Sri Lankan projects.

V. DISCUSSION AND RECOMMENDATIONS

The overall research process was briefly pointed out as the conclusion of this research. The main objective of this study is to understand and identify the concept of RIBA Plan of Work and discuss the challenges towards the implementation of RIBA Plan of Work within Sri Lankan context to improved project success in the industry. The project success, RIBA Plan of Work, impact of RIBA Plan of Work on time, cost and quality performance, critical success factors and successfully completed projects through RIBA Plan of Work were discussed in the Literature Review.

The questionnaire, semi-structured interviews and international literature surveys were conducted as data collection methods of this study to gather the data for the analysis. Literature survey was conducted to identify the RIBA Plan of Work from its' origin to 2021 and to identify the constraints which are directly affect to the time, cost and quality performance in the construction industry. The questionnaire was carried out to determine the relationship between independent variables and dependent variable and to observe impact among them. Then, semi-structured interviews were conducted to determine the challenges which affect to the implementation of RIBA Plan of Work in Sri Lankan construction industry towards the project success.

Through a detailed literature survey, the first objective of this study was achieved. The history of

RIBA Plan of Work and introduction, structure, life-cycle stages of a project, core tasks of RIBA Plan of Work (2013) were identified by considering RIBA work stages separately. It provides a clear guide for those who are new to the subject. The second objective of this study was to categorize the relationship between time, cost and quality performance and success of construction projects as per the conceptual framework. The data were obtained through the detailed questionnaire as quantitative data and the relationships were proven using correlation analysis through SPSS. The intensity of the relationship between the independent and dependent variables are examined. According to the results of the correlation analysis, positive weak relationships were indicated between independent variables (time performance, cost performance and quality performance) and dependent variable (project success) which satisfies the alternative hypothesis. The relationship between independent variable and dependent variable exists when the significance value of each independent variable indicates less than 0.05

A. Limitations

This research was limited only to study the impact of RIBA Plan of Work 2013 version in Sri Lankan construction industry towards the success of construction projects. Another limitation that was faced in this research was the Covid-19 pandemic. This led to conducting phone interviews instead of face-to-face interviews.

B. Recommendations

Based on the research findings, it is recommended for the Clients, Contractors and Consultants the following:

Long-Term Recommendations

- Minimize the challenges identified by construction professionals in the construction industry for the quality of the projects
- Provide adequate training for application of RIBA Plan of Work for the quality of the projects

Short-Term Recommendations

- Conduct workshops for construction professionals in the industry concerning RIBA Plan of Work for the quality of the projects
- Formation of specific team for the evaluation of RIBA Plan of Work for the quality of the projects

With regard to future research, the following is recommended:

- Application of RIBA Plan of Work for the quality of the public sector projects in Sri Lanka
- The construction professionals' contribution for implementation of RIBA Plan of Work for the quality of the projects.

VI. REFERENCES

- Abbas, A., Din, Z.U. and Farooqui, R. (2016). Achieving Greater Project Success & Profitability through Pre-construction Planning: A Case-based Study. *Procedia Engineering*, 145, pp.804–811.
- Bhardwaj, P. (2019). Types of sampling in research. *Journal of Practice of Cardiovascular Sciences*, 5(3), pp.157–163.
- Business Research Methodology (2011). *Research Philosophy – Research Methodology*. [online] *Research-Methodology*.
- Doloi, H. (2009). Analysis of pre-qualification criteria in contractor selection and their impacts on project success. *Construction Management and Economics*, 27(12), pp.1245–1263.
- Etikan, I. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), p.1.
- Fletcher, P. and Satchwell, H. (2019). *Briefing*. RIBA Publishing.
- Kerzner, H. (2001). *Strategic planning for project management using a project management maturity model*. New York: John Wiley.
- Leedy, P.D. and Ormrod, J.E. (2001). *Practical research : planning and design*. 7th ed. Merrill Prentice Hall: Upper Saddle River, N.J.
- Mollaoglu-Korkmaz, S., Swarup, L. and Riley, D. (2011). Delivering Sustainable, High-Performance Buildings: Influence of Project Delivery Methods on Integration and Project Outcomes. *Journal of Management in Engineering*, 29(1), pp.71–78.
- Phillips, E.M. and Pugh, D.S. (2005). *How to get a PhD : a handbook for students and their supervisors*. Open University Press: United Kingdom.
- RIBA (2013). *RIBA Plan of Work 2013 Overview*.
- Samarghandi, H., Tabatabaei, S.M.M., Taabayan, P., Hashemi, A.M. and Willoughby, K. (2016). Studying the Reasons for Delay and Cost Overrun in Construction Projects: The Case of Iran. *Journal of Construction in Developing Countries*, 21(1), pp.51–84.
- Shibani, A., Mahadel, O., Gassan, D., Agha, A. and Saidani, M. (2021). CAUSES OF TIME OVERRUNS IN THE CONSTRUCTION INDUSTRY IN EGYPT. *International Research Journal of Modernization in Engineering Technology and Science*, 3(1).
- Sinclair, D. (2013). *Assembling a collaborative project team: practical tools including multidisciplinary schedules of services*. London: Riba Publishing.

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