Developing of Multi-Criteria Decision Making Model in Assessment of Outcomes Based Best Value in UAE Public Construction Sector

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Abstract

The construction projects are carried out to develop the infrastructure, building and services as part of the development of any country. The construction projects which were carried out in UAE before faced several problems and most notably cost and time overruns. This sometimes leads to the disputes and dissatisfaction among stockholders. Hence, there is a need for a study to investigate the same and try to apply the concept of 'best value' in order to improve the success of public construction projects. This will be achieved by the concept of 'best value' in order to facilitate a clear appreciation and understanding of the concept, articulate the scope of the concept of 'best value' as conceptualized within construction project management and articulate, identify and categorize the concept of 'best value' within the United Arab Emirates complex public sector. Therefore, this research propose research methodology for developing an assessment model for outcomes based best value using Multi Criteria Decision Making tool to prioritize the most important criteria. Further studies will follow this research to entirely develop a model according to proposed research methodology.

Keywords
Management, Outcome, Project, Success and Value.

1. Introduction

The use of different definitions for projects also extends to the academic and professional literature. From an academic standpoint, Turner and Müller (2003 p.7) introduced a definition of project which is : "*project is a temporary organization to which resources are assigned to undertake a unique, novel and transient endeavour managing the inherent uncertainty and need for integration in order to deliver beneficial objectives of change*". Without doubt, projects are particularly important form of temporary organization. The seminal papers by Lundin and Söderholm (1995) as well as by Turner and Müller (2003) have tied research on project management more closely to organization theory (Sankaran et al. 2017). Since, project research has not only become more theoretically sophisticated and methodologically pluralistic, but has raised hopes that it will eventually have an impact on organization and management research more broadly, not least because of its focus on issues of time and temporality (Bakker et al. 2016). In addition, projects are mentioned as a set of tasks that are interconnected that essential to be implemented over a definite period and within assured cost (Andler 2016). It is seen that the shared themes of project's definitions are that the project is agreed to be unique in its results, temporary in nature, has a definite starting and ending point, carried out to achieve a goal that is aligned with the organization's strategic objectives and commitment to create value. From a professional perspective, according to the Project Management Body of Knowledge (PMBOK) (PMI

2017 p. 4) defined project by way of: "*a project is a temporary endeavour undertaken to create a unique product, service or result*". Project management is used in various industries, taking the form of a set of tools, methods and applications to implement activities that cannot be effectively achievable using traditional organizational structures (Bellini and Canonico 2008). Many organizations have used project management as a means of remaining competitive and accomplishing strategic change in a highly demanding business environment (Ward and Daniel 2013).

From various explanation provided, it can be argued that project management and project are not the same. However, they share certain common characteristics such as time limitedness, predefined requirement, and the use of resources. Project can be considered as entity, which is a temporary organization that meets the main aims of all stakeholders (Kujala and Artto 2000) and it represent the major entity that organizations employ in delivering and structuring their operational objectives (Cano and Lidon 2011) whereas project management can be considered as a subset of project (PMI 2017), in that project management is the means by which the aims of a project are accomplished (Ika 2009). In other words, project management is a means to an end. The aim of a project is often aligned to long-term strategic goals of the organisation whereas project management is aligned with the short-term goal of delivering the product of the project (Savolianen et al. 2012).

Providing efficient road network systems requires a distinct form of management which reflects positively on the society, economy, environment and sustainability. However, complex multi-stakeholder road projects as in the case of most critical infrastructure projects executed around the world face many challenges. One such challenge has to do with cost overruns (Huo et al. 2018). There are numerous consequences of these cost overruns, including project stakeholder dissatisfaction and disputes (Sinha and Jha 2020). In the United Arab Emirates (UAE), while we do not have available precise information on failure rate of road projects, it has been aware that infrastructure project failure rates in the country has been estimated to be as high as 50% by some scholars (Johnson and Babu 2020). This high rate of project failure across infrastructure projects in the country has created a claims dispute industry which is extremely intense (Mishmish and El-Sayegh 2018; Ojiako et al. 2018; Zaneldin 2020).

There is academic evidence that the failure of construction projects in the UAE is very high. The top three major causes of time and cost overrun was identified by Faridi and El-Sayegh (2006) as lack of initial planning, delay in preparation and sanction of drawings and deficiency of site supervision and management. El-Sayegh (2008) points out that poor management of internal and external risks along with unrealistic construction schedule, lack of proper intervention by clients and frequent design changes, are major cause of time and cost overrun of UAE projects. Also (Johnson and Babu 2020) stated that the main causes of the project delay and cost overrun in UAE is the design change by the client. Ren et al. (2008) studies Dubai construction projects and points out that the projects face unique challenges due to the existence of different culture, complex demand of style and quality, lack of workforce and involvement of world-wide teams which makes the cause of delays and cost overrun to be slightly diverse from other countries. Moreover, AlHosani et al. (2020) identified the main causes of cost overrun in complex multi-stakeholder road project in UAE which are delays in decisions making by approval authorities, changes in client requirements, construction cost underestimation, poor site management and frequency of variation orders and additional works.

Consequently, the construction projects which were carried out before faced several problems and most notably cost and time overruns. This sometimes leads to the disputes and dissatisfaction among stockholders who are involved in construction projects. Moreover, decision makers are always looking to implement projects within schedule, within approved budget and with acceptable quality. Unfortunately, most of construction projects suffer from this phenomena; hence there is a need for a study to investigate the same and try to apply the concept of '*best value*' in order to improve the success of public construction projects. With this as a problem statement the below research objective is formulated.

1.1 Objectives

In light of the problem, the aim of paper will be how the concept of '*best value*' can be utilized as a ground for improving the success of construction projects within the UAE in light of the academic literature alluding to high failure.

2. Literature Review

2.1 Notion of project success and failure

The research of project success has attracted the attention of numerous scholars and great number of papers associated with project success in construction and management has been published (He et al. 2019). There is challenge to describe the notion of project success. The researches of project success are wide-ranging, such as: evaluation of project success (Akal et al. 2016), identification of critical success factors (CSFs) (AlSaadi and Abdou 2016), theories and principles of project success (Chou et al. 2013), and the relationship between success factors and project success (Silvius and Schipper 2016). Many scholars fundamentally have faith in that everyone knows what is meant by '*project success*' and '*project failure*' (Ika 2009). The only convincing thing about project management is that success is a vague, inclusive, and multidimensional concept whose definition is related to a specific context.

The trends regarding project management success/ project success can be describes as follow: First, period 1 (1960s–1980s) demonstrates the highest control of the '*iron triangle*' as the criterion of success. During that period, the literature was theoretical and provided anecdotic lists of critical success factors. Second, period 2 (1980s–2000s) was conquered by experimental work such as Pinto and Slevin's (1988) '10 Critical Success Factor (CSF) framework'. Although the '*iron triangle*' is still very important, other success criteria are added (Atkinson 1999), and the emphasis shifts from project management success to project/product success (Baccarini 1999). Third, period 3, project/product, portfolio, and program success criteria and CSFs (Cooke-Davies 2002), as well as symbolic and rhetoric ones. In fact, strategic project management will be an issue (Jugdev and Müller 2005), and '*narratives of success and failure*' will have their fair share of papers (Fincham 2002).

Sources of project failure is one of the most debated issues by academics, practicing managers, governments, and many social commentators all over the world. An extant literature is therefore devoted to the discussion, and numerous causes have been identified for the reasons of project failure. An academic literature that has concentrated exclusively on reviewing project failure as a concept does exist. For instance, Jorgensen (2014 p.157) defined project failure as a concept that occurs when projects are 'both cancelled and completed with a very poor product or process quality' … and are likely to … deliver[s] something other than what was originally specified or expected. It is also conceptualized as an inability to reconcile both implicitly- and explicitly-stated (Ojiako et al. 2014) technical business project specifications of projects (Shenhar et al. 2001).

Literature on project failure includes Cule et al. (2000), Yeo (2002) and Dwivedi et al. (2013). For example, Cule et al. (2000) identified four factors likely to lead to project failure which are self-assessment, task control, environmental monitoring and client relationships. While Yeo (2002) created a broad project failure framework comprising of three sub-sets of failure factors which are process, context and content driven issues. On the other hand, Dwivedi et al. (2013) identify different failure factors for project such as project size and value, staffing build-up, absence of an influential champion and change agent and user conflicts as well as for project management for instance improper definitions of roles and responsibilities and lack of user input.

Taking into consideration the substantial literature on project success and project failure, what, however, remains of particular interest to us is that, from a dimensional stakeholder perspective, the literature either appears to be focusing exclusively on project success as in the case of Turner and Zolin (2012) or exclusively on project failure such as Dwivedi et al. (2013) . So far, it is essential to explore aforementioned notions by examining the multiple stakeholder's perceptions into outcome of project. Thus, the notion of project failure has still continued vaguely defined. It is a perception that can mean so much to different scholars because of different opinions.

2.2 Overview of construction industry

The construction projects are carried out to develop the infrastructure, building and services facilities, as part of the development of any country (Behm 2008). The major role of the construction industry as one of the most important industries can be briefly addressed by providing the amount of investments in construction or its contribution to the Gross Domestic Product (GDP) of each country (Oesterreich 2016). Construction industry represents 6% of global GDP and growing (Zegarra and Alarcon 2019). The activities of the industry have great importance to the accomplishment of national economic development goals of providing infrastructure, sanctuary and employment (Yap et al. 2019). It includes hospitals, schools, offices, houses and other buildings; urban infrastructure; highways, roads, ports, railways, airports; power systems; irrigation and agriculture systems; telecommunications etc. Other sectors and

industries are also indirectly affected by the performance of construction projects, which signify the prominent role of such projects in national economies (Zarei et al. 2018). Globally, construction in any country is a complicated sector of the economy, encompassing a wide range of stakeholders and has extensive links with other areas of activity such as manufacturing and the use of materials, energy, finance, labor and equipment (Hillebrandt 1984).

In the UAE, the construction industry is among the fastest growing industries in the Middle East and North Africa (MENA) region. UAE is considered the second largest Arab economy and is among the high-income countries (Schiliro 2013). The construction sector contribution as a percentage of UAE's GDP is recorded 8.4% in 2017 (The Annual Economic Report 2018). It is considered as forth ranking sector among other sectors which it means as vital as to support national economy.

2.3 Critical success factors and criteria

Commonly project success researches be composed of two components project '*success criteria*' and '*success factors*' (Müller and Jugdev 2012). Project success criteria refer to the use of a group of principles or standards to determine or judge project success. CSFs, first proposed in 1979 (Fortune and White 2006), specify the project conditions, events and circumstances that facilitate final success (Ika 2009). Whereas Rockart (1979) defined critical success factors as "*the limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department or organization*". Additionally, Amade et al. (2015) stated that critical success factors are the few key variables or factors that the manager should prioritize in other to achieve his/her goals for current or future areas of activity. According to Alias et al. (2014) CSFs are inputs to project management practice which can lead directly or indirectly to project success. Effective and efficient management of CSFs is the basic requirement of project success (Iram et al. 2017).

There are many scholars who conducted different researchers in order to find out various CSFs for the project success. Based on that, different lists and models are created regarding critical success factors. The '*Golden Triangle*' components of cost, time and quality are the most commonly used criteria for assessing project success. However, quality is an ambiguous and subjective index that can lead to different understandings by different project stakeholders (Wateridge 1995). Such as, Chan et al. (2002) suggested that the criteria for project success be further distinguished between those that are objective and subjective. Additionally, Pinto and Slevin (1988) reported fourteen CSFs commonly related to implementation success across a wide range of companies and project types such as project mission, top management support, project schedules, client consultation, personnel recruitment and technical tasks. In addition, Sanvido et al. (1992) defined a set of factors that, when thoroughly and completely satisfied, ensure the successful completion of a facility. They tested seven factors (the facility team, the contract, facility experience, resources, product information, optimization information, and performance information) that predicate success on sixteen projects. Moreover, Chua et al. (1999) identified different sets of CSFs for different project objectives. Using analytical hierarchy processes, they identified sixty-seven project success factors relating to four project aspects: project characteristics, contractual agreement, project participants and interactive process. As well, Cooke-Davies (2002) investigated data from 136 European projects that were executed between 1994 and 2000 by a total of 23 organizations and was able to identify 12 factors critical to project success. He categorized these 12 factors in to three major areas: project management success, individual project success, and corporate success.

Muller and Turner (2007) consider '*project success criteria*' as the measures by which the successful outcome of a project will be judged. Due to the multifaceted nature of project success, of which only some criteria are clearly quantifiable (Williams 2016), it is typically not straightforward to measure success in projects (Samset and Volden 2012). Traditionally, project management has focused on delivering the planned outputs based on the '*iron triangle*' of schedule, budget, and quality, in which quality is defined as "*the consistent conformance to customer expectations*" (Basu 2014 p.181). However, Albert et al. (2017) illustrate clearly that this triumvirate of objectives is increasingly not the only elements for the determination of project success.

Thus, success criteria have been divided by Samset and Volden (2012) into tactical and strategic performance: Success in tactical terms typically means the criteria of iron triangle, which are short-term targets; they are measures of the project's efficiency and are fundamentally the project management issues. Strategic success, on the other hand, focuses more on the economic, societal and environmental matters, which embraces the broader and longer-term perspective of whether the project would have a sustainable influence and remain fit and compelling over its lifespan. Koops et al. (2016) illustrate the role of the '*iron triangle*' is the perceptions of public project managers. Project success includes

different criteria which are independent but come together in complex causal interactions (Williams 2016). Key to these are the higher level success criteria set up before the project is defined and is therefore relevant to the front-end, then the efficiency measures '*iron triangle*' to deliver the subsequently-defined project. Literature in this area has seen the suggestion of many criteria other than simply meeting objectives, including customer satisfaction and other stakeholder satisfaction (Williams et al 2015); the triple bottom line (economic, social and environmental criteria) (Ghanbaripour et al. 2017); flexibility - the project's ability to deal with changes in the project definition or scope with minimal impacts on schedule, budget, and quality (Shahu et al. 2012) and the controllability of the procedure between the front-end stage up to project delivery and handover (Koops et. al. 2016).

Obviously, there is no universally recognized list of project success criteria and CSFs that meet the needs of all construction projects. However, project success studies that have focused on project success criteria and CSFs have provided quantitative information and guidance for construction practices in the real world.

2.4 What is the value

The term '*value*' can be basically defined by way of something good that public desire in a product, service, or process (Hart 1971; Schwartz 2007; Schroeder 2016). Rohan (2000) detected that the word '*value*' as a noun has an entry in the Compact Oxford English Dictionary dating back to 1303s, where it has been used to refer to the fairness and equivalence of the amount of a commodity in an exchange. The use of '*value*' as a verb also has an entry around the same time and is used to describe the act of appraising worth in terms of its appropriateness for exchange of a commodity. Interestingly, however, this meaning was later broadened to incorporate more abstract exchanges and standards. Used as a verb, value refers to the process of ascertaining the merit of an entity with reference to an abstract value system structure, and used as a noun, value refers to the result of this process.

During the years, '*value*' studies have been challenged with a number of inconsistencies. In certain cases, fundamental issues of argument are still not well determined. For example, '*value*' has been implied as belief (Rokeach 1973); desirable (Kluckhohn 1959); preference (Rokeach 1973); interest (Perry 1954) in the literature. As stated by previous studies by Holdbrook (Holdbrook, 1999) and Dawis (1991) around 12 various terms can be synthesized to have been used by scholars over the years to indicate '*value*'. They are as follows: attitude, belief, desirable, interest, need, preference; standard, criteria, rules, norms, goals, and ideals (Dawis 1991; Holdbrook 1999).
In the realm of projects, discussions about value deal with outputs, outcome, and impact that a project delivered according to different stakeholders, levels and timescales (Turner and Zolin 2012; Davis 2014).

Project success, therefore, cannot be assessed merely in terms of goals reached at the time of project completion but also in terms of benefits compared to costs and value achieved over the project lifecycle compared to original value expectations of various stakeholders. Relevant value expectations are defined quite early, at the front end of the project. Thereby, a project's value has an important position in the strategy designed to govern the project, reflected in the project delivery model (Hjelmbrekke et al. 2017), business model (Kujala et al. 2010), and the firm's portfolio of projects (Martinsuo and Killen 2014). Organizations expect to achieve high value by setting up ambitious strategies and well-designed delivery models for projects, but this pursuit can become laborious and risky in dynamic business environments.

2.5 Concept of best value

Best Value (BV) was introduced to drive improvements and high standards in services offered by local authorities (Nettleton, 2000), predicting the wider participation, consultation, and collaboration of stakeholders within the community in respect of related legislation. It was designed to create change to deliver continuous improvement; focus on knowledge-based results and outcomes, not processes; deliver to local stakeholders; and involve stakeholders in the democratic process (Moffett et al. 2014). Infrastructure projects, such as the delivery of railways, roads, tunnels, subways, etc., shape their surroundings in significant ways. Infrastructure projects are large in financial terms (Flyvbjerg et al. 2004) and the project deliverables are expected to last and deliver value for society for decades or more. Due to their size and impact on society, infrastructure projects create interest in the eyes of various stakeholders. The delivery of long-term value makes infrastructure projects excellent contexts for research concerning project value.

It is possible to define best-value. Since value is the degree of need of an object, best-value can be used to refer to the most needed object. That is, best value is the most needed object for a subject in certain conditions. As explained by

CRC Construction Innovation (2002) that best-value is something that provides the most '*value*' in the user's estimation. There could be many factors in determining best-value; price is just one of these. Best-value would most likely be achieved through obtaining services that best meet the demands and needs of the concerned party. In his opinion, in order to ascertain best-value, several contexts have to be taken into consideration. If the context changes so will the factors impacting the perception of value. CRC Construction Innovation (2002) also emphasized that the definition of value must be context-specific and flexible enough to take account of the stakeholders' perspectives.

Thus, it is obvious that the process of finding the best-value involve finding the needs of subject (including stakeholder) in definite circumstances, choosing the criteria representing the needs between several internal factors, determining the weighting of the criteria, and evaluating the criteria.

3. Methods

3.1 Model development

The problem of the developing of outcomes based best value in UAE public construction sector needs a structured scientific method to identify the factors relating to it. The following sections explain the design of the methodology which will be adopted in this study. The following steps are planned to achieve the main objective of this research. The research will be carried out through six steps as illustrated in figure (1) below:

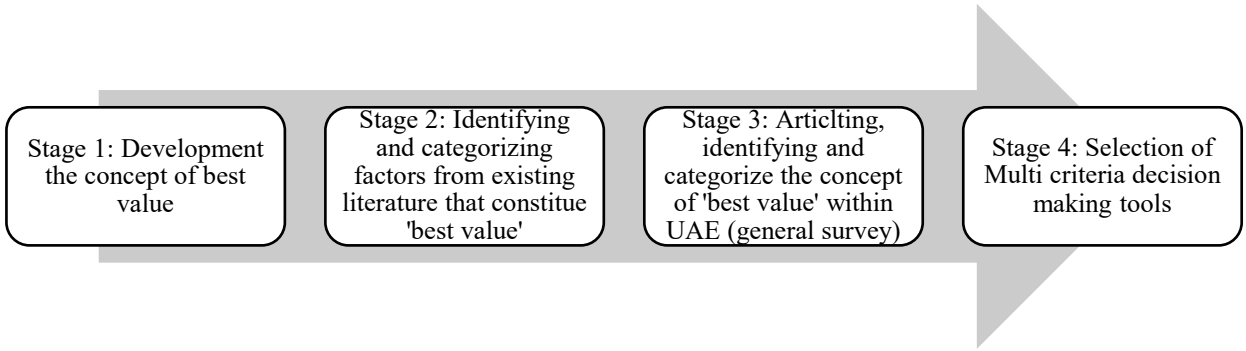

Figure 1. Research methodology of model development

Step 1: Development the concept of best value.

Due to lack of assessment model based on outcome based best value in UAE, research was conducted to recommend characteristics of suggested model. The proposed model characteristics are built depending on literature review to outline the research gaps and provide in-depth understanding and basis to locate the objective with scientific meaning.

Step 2: Identifying and categorizing factors from existing literature that constitute 'best value'.

The central research methods in this stage take account of a literature review and interviews. A comprehensive literature review will be conducted to identify the potential success criteria and critical factors for outcome based best value, and will be followed by structured interviews to evaluate identified criteria and critical factors.

Step 3: Articulating, identifying and categorize the concept of 'best value' with UAE.

In this step, structured interviews will be conducted to evaluate identified criteria and critical factors. As well, the questionnaire survey will be designed based on expert's perception. Later, the survey will distributed to different stakeholders who are involved in public construction projects.

Step 4: Selection of Multi criteria decision making tools.

- Different methods have been emerging in the relating the decision making process. Decision-making issues generally deal with the solution selection which is best compromise. The selection of the solution that is the decision is made keeping the real criteria and it also depends on the choices made by the decision maker. Decision making is a complex process; mathematical models are recommended for simplification and ease in use. In this study, Technique of Order Preference by Similarity to Ideal Solution (TOPSIS) will be used as model considering the goal of ranking how each stakeholder can evaluate the concept of best value in order to suggest enhancement priority between different stakeholders and main criteria of outcome best value concept as shown in figure (2). The proposed criteria will be outcome best value concept which will be based on success/ failure dimension of project and sub criteria will be the indicators of each criteria ranked in the first stage and the alternatives will be represented by stakeholders.

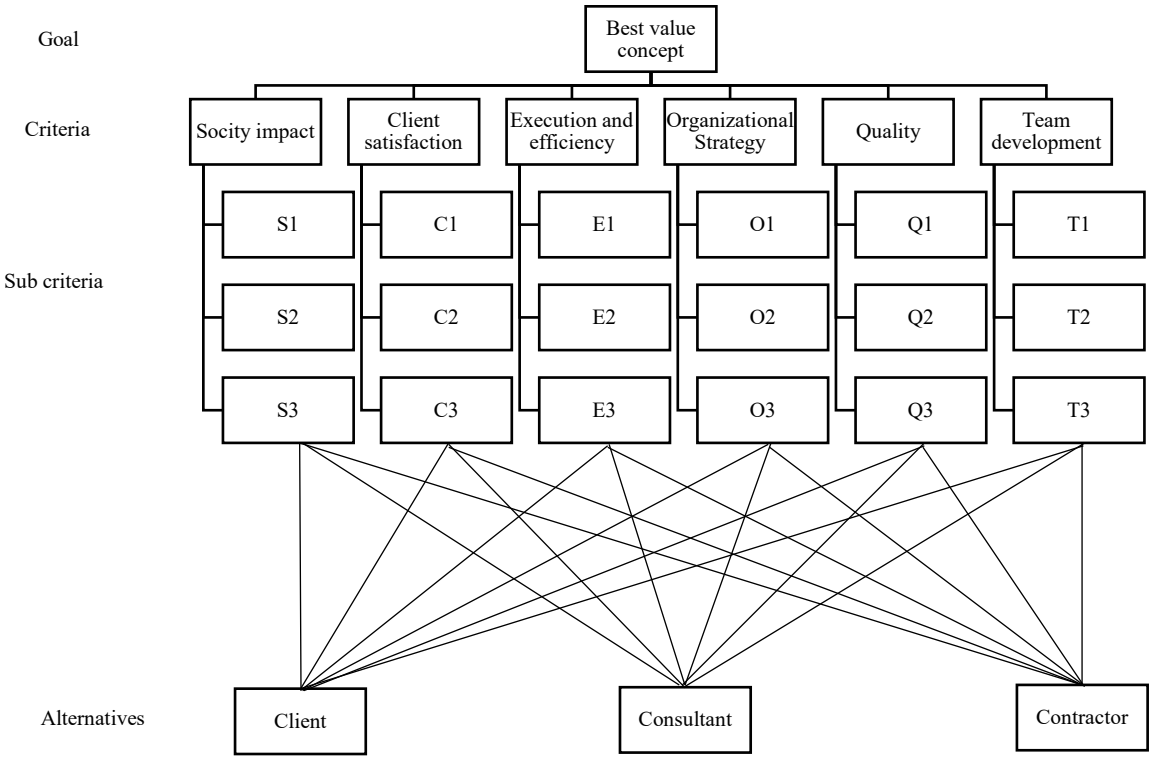

Figure 2. Proposed model assessment of outcomes based best value

4. Conclusion

Define the main factors and categories of project outcomes in UAE public construction projects, and then we may provide solid recommendations for decision makers. Such possible changes to alter the usual attitude of assessing the success of project based in cost, time and quality to wider vision of project outcomes based on evaluation the impact of project and how the outcomes may affect on society, economy and environment. In addition it may compare the

perceptions of each stakeholder in term of achieving best value of project. This research proposes a methodology to develop outcome based best value model in the field of public construction using MCDM tools which will introduce a powerful tool to allow support to decision making.

References

Akal, A., Abu El-Maaty, A., and El-Hamrawy, S., A circular framework for evaluating highway construction projects success: AHP approach, *Civil Engineering Journal*, vol. 2, no. 7, pp. 324-333, 2016.

Albert, M., Balve, P., and Spang, K., Evaluation of project success: a structured literature review, *International Journal of Managing Projects in Business*, vol. 10, no. 4, pp. 796-821, 2017.

AlHosani, I., Dweiri, F., and Ojiako, U., A study of cost overruns in complex multi-stakeholder road projects in the United Arab Emirates, *International Journal of System Assurance Engineering and Management*, vol. 11, no. 6, pp. 1250-1259, 2020.

Alias, Z., Zawawi, E., Yusof, K., and Aris, N., Determining critical success factors of project management practice: A conceptual framework, *Procedia-Social and Behavioral Sciences*, vol. 153, pp. 61-69, 2014.

AlSaadi, R., and Abdou, A., Factors critical for the success of public–private partnerships in UAE infrastructure projects: experts' perception, *International Journal of Construction Management*, vol. 16, no. 3, pp. 234-248, 2016.

Amade, B., Ubani, E., Omajeh, E., and Njoku, U., Critical success factors for public sector construction project delivery: a case of Owerri, Imo State, *International Journal of Research in Management, Science and Technology*, vol. 3, no. 1, pp. 11-21, 2015.

Andler, Ni., *Tools for project management, workshops and consulting: a must-have compendium of essential tools and techniques*. John Wiley & Sons, 2016.

Atkinson, R., Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria, *International Journal of Project Management*, vol. 17, no. 6, pp. 337-342, 1999.

Baccarini, D., The logical framework method for defining project success, *Project Management Journal*, vol. 30, no. 4, pp. 25-32, 1999.

Bakker, R., DeFillippi, R, Schwab, A., and Sydow, J., Temporary organizing: Promises, processes, problems, *Organization Studies*, vol. 37, no. 12, pp. 1703-1719, 2016.

Basu, R., Managing quality in projects: An empirical study, *International Journal of Project Management*, vol. 32, no. 1, pp. 178-187, 2014.

Behm, M., Construction sector, *Journal of Safety Research*, vol. 39, no. 2, pp. 175-178, 2008.

Bellini, E., and Canonico P., Knowing communities in project driven organizations: Analysing the strategic impact of socially constructed HRM practices, *International Journal of Project Management,* vol. 26, no. 1, pp. 44-50, 2008.

Cano, J., and Lidón, I., Guided reflection on project definition, *International Journal of Project Management*, vol. 29, no. 5, pp. 525-536, 2011.

Chan, A., Scott, D., Lam, E., Framework of success criteria for design/build projects, *Journal of Management in Engineering*, vol. 18, no. 3, pp. 120-128, 2002.

Chou, J., Irawan, N., and Pham, A., Project management knowledge of construction professionals: Cross-country study of effects on project success, *Journal of Construction Engineering and Management*, vol. 139, no. 11, pp. 04013015, 2013.

Chua, D., Kog, Y., and Loh, P., Critical success factors for different project objectives, *Journal of Construction Engineering and Management*, vol. 125, no. 3, pp. 142-150, 1999.

Cooke-Davies, T., The "real" success factors on projects, *International Journal of Project Management*, vol. 20, no. 3, pp. 185-190, 2002.

CRC Construction Innovation, Final Report: feasibility study linking best value procurement assessment to outcome performance indicators, CRC for construction Innovation, Brisbane, Qld., 2002.

Cule, P., Schmidt, R., Lyytinen, K., & Keil, M., Strategies for heading off is project failure, *Information systems management*, vol. 17, no. 2, pp. 65-73, 2000.

Davis, K., Different stakeholder groups and their perceptions of project success, *International journal of project management*, vol. 32, no. 2, pp. 189-201, 2014.

Dawis, R., *Vocational interests, values, and preferences*, 1991.

Dwivedi, Y., Ravichandran, K., Williams, M. D., Miller, S., Lal, B., Antony, G. V., and Kartik, M., IS/IT project failures: a review of the extant literature for deriving a taxonomy of failure factors, *International Working Conference on Transfer and Diffusion of IT*. Springer, Berlin, Heidelberg, June 27, 2013, pp. 73-88.

El-Sayegh, S., Risk assessment and allocation in the UAE construction industry, *International Journal of Project Management*, vol. 26, no. 4, pp. 431-438, 2008.

Faridi, A., and El-Sayegh, S., Significant factors causing delay in the UAE construction industry, *Construction Management and Economics*, vol. 24, no. 11, pp. 1167-1176, 2006.

Fincham, R., Narratives of success and failure in systems development, *British Journal of Management*, vol. 13, no. 1, pp. 1-14, 2002.

Flyvbjerg, B., Holm, M., and Buhl, S., What causes cost overrun in transport infrastructure projects?, *Transport reviews*, vol. 24, no. 1, pp. 3-18, 2004.

Fortune, J., and White, D., Framing of project critical success factors by a systems model, *International Journal of Project Management*, vol. 24, no. 1, pp. 53-65, 2006.

Ghanbaripour, A., Langston, C., and Yousefi, A., Implementation of 3D integration model for project delivery success: Case study, *Journal of Construction Engineering and Management*, vol. 143, no. 8, pp. 05017012, 2017.

Hart, S., Axiology-theory of values, *Philosophy and phenomenological research*, vol. 32, no. 1, pp. 29-41, 1971.

He, Q., Wang, T., Chan, A., Li, H., and Chen, Y., Identifying the gaps in project success research, *Engineering, Construction and Architectural Management*, vol. 26, no. 8, pp. 1553-1573, 2019.

Hillebrandt, M., *Analysis of the British construction industry*, Springer, 1984.

Hjelmbrekke, H., Klakegg, O., and Lohne, J. Governing value creation in construction project: a new model, *International Journal of Managing Projects in Business*, vol. 10, no. 1, pp. 60-83, 2017.

Holbrook, M., *Consumer value: a framework for analysis and research*. Psychology Press, 1999.

Huo, T., Ren, H., Cai, W., Shen, G., Liu, B., Zhu, M., and Wu, H., Measurement and dependence analysis of cost overruns in megatransport infrastructure projects: Case study in Hong Kong, *Journal of Construction Engineering and Management*, vol. 144, no. 3, pp. 05018001, 2018.

Ika, L., Project success as a topic in project management journals, *Project Management Journal*, vol. 40, no. 4, pp. 6-19, 2009.

Iram N., Khan, B., Ahmad, M., and Sahibzada, U., Critical factors influencing the project success: An analysis of projects in manufacturing and construction industries in punjab, Pakistan, *International Journal of Business Studies Review*, vol. 1, no. 1, pp. 101-113, 2017.

Johnson, R., and Babu, R., Time and cost overruns in the UAE construction industry: a critical analysis, *International Journal of Construction Management*, vol. 20, no. 5, pp. 402-411, 2020.

Jorgensen, M., Failure factors of small software projects at a global outsourcing marketplace, *Journal of Systems and Software*, vol. 92, pp. 157-169, 2014.

Jugdev, K., and Müller, R., A retrospective look at our evolving understanding of project success, *Project Management Journal*, vol. 36, no. 4, pp. 19-31, 2005.

Kluckhohn, C., *Values and value-orientations.* In: Parsons, T., Shils, E.A. (Eds.), Toward a general theory of action. Harvard University Press, Massachusetts, pp. 388-433, 1959.

Koops, L., Bosch-Rekveldt, M., Coman, L., Hertogh, M., and Bakker, H., Identifying perspectives of public project managers on project success: Comparing viewpoints of managers from five countries in North-West Europe, *International Journal of Project Management*, vol. 34, no. 5, pp. 874-889, 2016.

Kujala, J. and Artto, K., Developing corporate project management practices through quality award framework. Paper presented at Project management Institute Annual Seminars and Symposium, Houston, TX. Newtown Square, PA: *Project Management Institute*, 2000.

Kujala, S., Artto, K., Aaltonen, P., and Turkulainen, V., Business models in project-based firms–Towards a typology of solution-specific business models, *International Journal of Project Management*, vol. 28, no. 2, pp. 96-106, 2010.

Lundin, R., and Söderholm. A., A theory of the temporary organization, *Scandinavian Journal of management*, vol. 11, no. 4, pp. 437-455, 1995.

Martinsuo, M., and Killen, C., Value management in project portfolios: Identifying and assessing strategic value, *Project Management Journal*, vol. 45, no. 5, pp. 56-70, 2014.

Mishmish, M., and El-Sayegh, S., Causes of claims in road construction projects in the UAE, *International Journal of Construction Management*, vol. 18, no. 1, pp. 26-33, 2018.

Moffett, S., Walker, T., and McAdam, R., Best value and performance management inspired change within UK councils: A knowledge management perspective, *Building a competitive public sector with knowledge management strategy*, IGI Global, pp.199-226, 2014.

Müller, R., and Jugdev,K., Critical success factors in projects: Pinto, Slevin, and Prescott-the elucidation of project success, *International Journal of Managing Projects in Business*, vol. 5, no. 4, pp. 757-775, 2012.

Müller, R., and Turner, R., The influence of project managers on project success criteria and project success by type of project, *European Management Journal*, vol. 25, no. 4, pp. 298-309, 2007.

Nettleton, B., Best value and direct services, *Proceedings of the Institution of Civil Engineers-Municipal Engineer*, vol. 139, no. 2, pp. 83-90, 2000.

Oesterreich, T., and Teuteberg, F., Understanding the implications of digitisation and automation in the context of Industry 4.0: A triangulation approach and elements of a research agenda for the construction industry, *Computers in industry*, vol. 83, pp. 121-139, 2016.

Ojiako, U. Chipulu, M., Gardiner, P., Williams, T., Mota, C., Maguire, Shou, Y., and Stamati, T., Effect of project role, age and gender differences on the formation and revision of project decision judgements, *International Journal of Project Management*, vol. 32, no. 4, pp. 556-567, 2014.

Ojiako, U., Chipulu, M., Marshall, A., and Williams, T., An examination of the 'rule of law' and 'justice' implications in Online Dispute Resolution in construction projects, *International Journal of Project Management*, vol. 36, no. 2, pp. 301-316, 2018.

Perry, R., *Realms of value; a critique of human civilization*, 1954.

Pinto, J., and Slevin, D., Critical success factors across the project life cycle: definitions and measurement techniques, *Project Management Journal*, vol. 19, no. 3, pp. 67-75, 1988.

PMI, A guide to the Project Management Body of Knowledge, *Project Management Institute*, 2017.

Ren, Z., Atout, M., and Jones, J., Root causes of construction project delays in Dubai, *24th Annual ARCOM Conference*, Cardiff, UK, September 1 – 3, 2008, pp. 749-757.

Rockart, J., Chief executives define their own data needs., *Harvard Business Review*, vol. 57, no. 2, pp. 81-93, 1979.

Rohan, M., A rose by any name? The values construct, *Personality and Social Psychology Review*, vol. 4, no. 3, pp. 255-277, 2000.

Rokeach, M., *The nature of human values*, Free press, New York, 1973.

Samset, K., and Volden, G., The proposal, *Project Governance*. Palgrave Macmillan, London, 2012. 46-80.

Sankaran, S., Müller, R., and Drouin, N., Eds. *Cambridge handbook of organizational project management*. Cambridge University Press, 2017.

Sanvido, V.,Grobler, F., Parfitt, K., Guvenis, M., and Coyle, M., Critical success factors for construction projects, *Journal of Construction Engineering and Management*, vol. 118, no. 1, pp. 94-111, 1992.

Savolainen, P., Ahonen, J., and Richardson, I., Software development project success and failure from the supplier's perspective: A systematic literature review, *International Journal of Project Management*, vol. 30, no. 4, pp. 458-469, 2012.

Schiliro, D., Diversification and development of the UAE's economy, 2013.

Schroeder, M., *Value theory*, In Stanford encyclopedia, edited by E. N. Zalta. Stanford, CA: Metaphysics Research Lab, Stanford University, 2016.

Schwartz, S., Basic human values: Theory, methods, and application, *Risorsa Uomo*, vol. 2, pp. 261-283, 2007.

Shahu, R., Pundir, A., and Ganapathy, L., An empirical study on flexibility: a critical success factor of construction projects, *Global Journal of Flexible Systems Management*, vol. 13, no. 3, pp. 123-128, 2012.

Shenhar, A., Dvir, D., Levy, O., and Maltz, A., Project success: a multidimensional strategic concept, *Long range planning*, vol. 34, no. 6, pp. 699-725, 2001.

Silvius, A., and Schipper, R., Exploring the relationship between sustainability and project success-conceptual model and expected relationships, *SciKA-Association for Promotion and Dissemination of Scientific Knowledge*, vol. 4, no. 3, pp. 5-22, 2016.

Sinha, A., and Jha, K., Dispute resolution and litigation in PPP road projects: evidence from select cases, *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, vol. 12, no. 1, pp. 05019007, 2020.

The Annual Economic Report, Ministry of Economy, UAE, 26th Edition, 2018

Turner, J., and Müller, R., On the nature of the project as a temporary organization. *International Journal of Project Management*, vol. 21, no. 1, pp. 1-8, 2003.

Turner, R., and Zolin, R., Forecasting success on large projects: developing reliable scales to predict multiple perspectives by multiple stakeholders over multiple time frames, *Project Management Journal*, vol. 43, no. 5, pp. 87-99, 2012.

Ward, J., and Daniel, E., The role of project management offices (PMOs) in IS project success and management satisfaction, *Journal of Enterprise Information Management*, vol. 26, no. 3, pp. 316-336, 2013.

Wateridge, J., IT projects: a basis for success, *International Journal of Project Management*, vol. 13, no. 3, pp. 169-172, 1995.

Williams, N., Ferdinand, N., and Pasian, B., Online stakeholder interactions in the early stage of a megaproject, *Project Management Journal*, vol. 46, no. 6, pp. 92-110, 2015.
Williams, T., Identifying success factors in construction projects: A case study, *Project Management Journal*, vol. 47, no. 1, pp. 97-112, 2016.
Yap, J., Chow, I., and Shavarebi, K., Criticality of construction industry problems in developing countries: Analyzing Malaysian projects, *Journal of Management in Engineering*, vol. 35, no. 5, pp. 04019020, 2019.
Yeo, K., Critical failure factors in information system projects, *International Journal of Project Management*, vol. 20, no. 3, pp. 241-246, 2002.
Zaneldin, E., Investigating the types, causes and severity of claims in construction projects in the UAE, *International Journal of Construction Management*, vol. 20, no. 5, pp. 385-401, 2020.
Zarei, B., Sharifi, H., and Chaghouee, Y., Delay causes analysis in complex construction projects: a Semantic Network Analysis approach, *Production Planning & Control*, vol. 29, no. 1, pp. 29-40, 2018.
Zegarra, O., and Alarcón, L., Coordination of teams, meetings, and managerial processes in construction projects: using a lean and complex adaptive mechanism, *Production Planning & Control*, vol. 30, no. 9, pp. 736-763, 2019.

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