

# TEAM ROLE CONCEPT AND TEAM FORMATION IN DESIGN TEAMS IN SRI LANKA

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## ABSTRACT

*Construction is a collaborative activity which combines efforts of number of participants. Hence, teamworking in construction is inevitable. The purpose of teamworking is to exploit the benefit for the team as a whole by a particular combination of actions by team members of the team. But, if not properly managed, teams may result in process losses and inefficiencies as well. Therefore, practitioners in the industry should find ways to improve team performance. Since construction project teams consist with many sub teams such as design teams, performance of the construction industry can be improved, when team performance of sub teams are also improved. 'Team role' concept relates to team performance. Belbin's (1981, 1993) team role framework is regarded as one of the most prominent team role theory. But use of this concept in construction teams is questionable. Accordingly, this study explored consideration of team role concept in team formation in one major sub team in construction: design teams. To explore this research problem, three case studies of in-house design teams which were involved in building construction projects with separated procurement arrangement were conducted in Sri Lanka. Semi-structured interviews were used as main data collection technique. The findings revealed that individuals are assigned to design teams considering their functional roles rather than team roles and team selection is affected by several other factors such as special requirements of the project, experience of the members, qualifications required, availability of human resources, recommendations and workload. However, the study revealed implications particularly to design team selectors on how to apply team role theory in construction context.*

**Keywords:** Construction Industry, Teamwork, Team Roles, Team Formation, Design Teams.

## 1. INTRODUCTION

Team role theory is used in a great variety of practical team development and management purposes at present in different fields. But, construction literature has not given a sufficient consideration to this area. Hence, this research aimed to identify the awareness on team role concept and the consideration of team role concept in team formation with regard to construction design teams. Section one aims to synthesis the current knowledge level regarding the research area and to establish the research problem. First, teams and teamworking in construction is discussed. Secondly, team role concept will be introduced and finally, it will be discussed with regard to design team selection.

### 1.1. TEAMS AND TEAMWORKING IN CONSTRUCTION

Team is a set of two or more people who interact dynamically, interdependently and adaptively towards a common and valued goal, each having specific roles or functions to perform and a limited life-span of membership (Salas *et al.*, 1992). Andras and Lazarus (2005) explained that the function of teamworking is to maximise the utility for the team as a whole by a particular combination of actions by team members of the team. According to Katzenbach and Smith (1993), teams perform better than individuals, especially when diverse skills, judgments and experiences are brought together. However, teamworking is not a new concept and the existence of teams in this society is rooting to the beginning of mankind when they started seeking basic shelter and food to survive (Cornick and Mather, 1999).

Cornick and Mather (1999) argued that construction project of any scale, can never be realised unless a team of people with diverse knowledge and skills is created and operates together. Teamwork is a

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prerequisite for the successful delivery of construction projects (Steward and Barrick, 2000; Wong, 2007). Therefore, necessity of teams and teamworking in construction are evident.

Project team in the construction industry can be defined as a group of construction professionals and personnel from one or more organisations who come together to fulfil the necessary design, detailing and construction functions which are involved in the construction project (Chan and Tam, 2000). Cornick and Mather (1999) explained the main parties of construction project teams as the client, designer, construction manager and specialist sub contractors. According to Senaratne and Hapuarachchi (2009, p.175), construction project team within traditional procurement is, “*a collection of two or more people with complementary skills, who come from different disciplines and organisations, to perform a common objective, but with individual objectives and operating from different locations with multiple reporting relationships, whose accountability and leadership are significantly governed by the contractual arrangements*”. Teamwork is essential for integrating specialist work into total scheme of things associated with project (Fryer *et al.*, 2004). In terms of design teams, Pectas and Pultar (2006) mentioned that successful management of design is critical to quality, cost effectiveness and timeliness of projects. Further, in a survey of AEC companies in the USA (Arditi and Gunaydin, 1998) ‘collaboration among parties’ was the highest ranked factor among the many factors that affect quality in design phase. This marks the importance teamworking among the members in design teams. Thus, above literature findings elaborates the importance of teamwork in the total construction team and in design teams, particularly.

The rationale behind the role and growth in importance of teams in organisations is that teams produce superior performance to individuals (Ray and Bronstein, 1995). According to Castka *et al.* (2001) performance is implied as the purpose of teamwork. But, Steiner (1972 cited Stewart *et al.*, 2005) argued that although teams have been shown to synergistically combine the efforts of individual’s contributors in some cases, they result in process losses and inefficiency in other instances. According to Macmillan (2001), some benefits of effective teamwork and drawbacks of teamwork can be shown as in Figure 1.

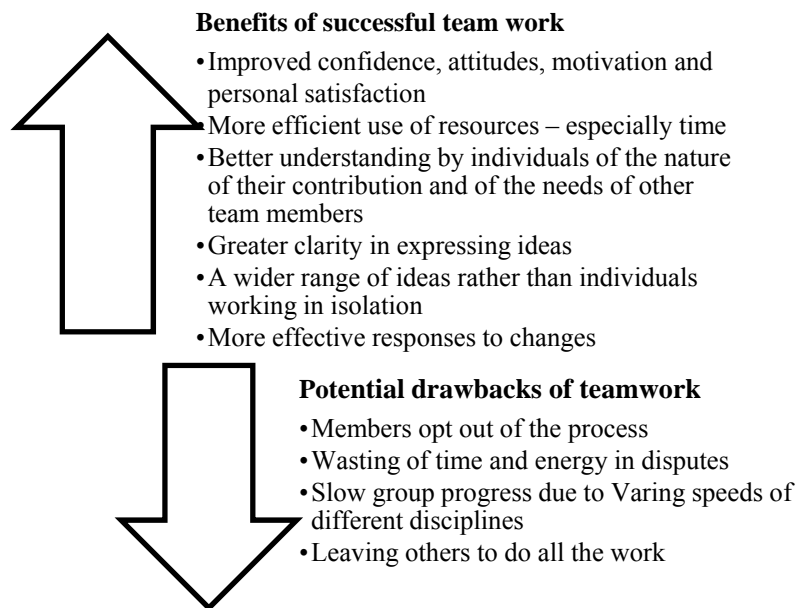


Figure 1: Potential Benefits and Drawbacks of Teamwork.  
(Adopted from: Mcmillan, 2001, p.187)

Fryer *et al.* (2004) mentioned that since the energy of a team which can be devoted to its work is finite, the time spent on dealing with the drawbacks of the teamwork, is time loss to real work. Therefore, it is important for the industry’s managers to know about teamwork and how to maintain its performance throughout a project (Fryer *et al.*, 2004). Teams being the primary unit of working in the construction industry, performance of industry can be improved when team performance is improved. Similarly, Pryke and Smyth (2006) highlighted the importance of adaptation of good teamworking practices in sub-sectors

such as design organisations, in order to enhance the performance of construction projects. In order to improve performance of teams first, it is important to pay attention to the factors which might influence the performance of a team. According to Yeh (2006), the human resources making up the team are critical for its performance.

In a team, individual human inputs should aggregate to team level outcomes and one potential mechanism which links individuals and team-level characteristics is the concept of roles (Stewart *et al.*, 2005). Therefore, it can be argued that, roles of the team members are likely to have impact on the team performance. Senior (1997) also supported the fact that crucial to performance of teams are the abilities and behaviours of their members, which are related to the roles that they play. Therefore, the next section is dedicated to review literature on the concept of role and types of roles which the team members would play.

## **1.2. TEAM ROLE CONCEPT**

Role is a sociology-origin concept and the use of role theory is has being extended to many fields like psychology, social psychology, sociology, organisational behaviour and human resources management (Gunduz, 2008). Basically, the concept of role is viewed from two types of perspectives in literature. Aritzeta *et al.* (2005) explained that from behavioural perspective (anthropological-sociological perspective), role can be defined as a combination of values, attitudes and behaviour assigned to an individual who occupies a social position (a location in a social network) associated with a specific social status (the functions assigned to that person). From the expectancy perspective (psychological perspective), a role can be defined as the behaviour expected from an individual occupying a specific position (Biddle, 1979 cited Aritzeta *et al.*, 2005). In both perspectives the role is explained in relation to a specific position occupied by the particular person. According to Higgs *et al.* (2005), the role is filled by the position owner based on his or her personal background (for example; experiences, talents, education) and on situational conditions (for example; requirements, perceptions, attitudes) which are influenced by that personal background. Externally, the role is framed by the position that is created by management, colleagues and subordinates. On the other hand, personality traits which are internally driven and relatively stable over time and across situations, also form a part of role definition (Chong, 2007).

In academic literature, roles have been classified into several types. Belbin had explained about two types of roles which are namely functional role and team role (Rajendran, 2005). ‘Functional role’ refers to the job demands that a person has been engaged to meet by supplying the requisite technical skills and operational knowledge, whereas ‘team role’ refers to a tendency to behave, contribute and interrelate with others at work in certain distinctive ways (Belbin, 1993). Belbin (1993) further emphasised that the team role describes how the individual fits into the team, not what particular function he or she performs. Thus, several people may have the same functional role but vary in their team roles.

Water *et al.* (2008) highlighted Belbin’s argument that team composition is a key factor in influencing team performance. They further argued that, when considering the team composition it is relevant to take into account the different roles which members play and the way they interact with one another. However, general composition of teams in the workplace has been determined through either functional or status considerations in order to ensure the right level of expertise and experience (Partington and Harris, 1999). Partington and Harris (1999) highlighted that this approach is failing to take into consideration the implications of individual personalities and behaviours in the team process thus, ignores the possibility that team members will have individual preferences for the roles they adopt in a team situation. Senior (1997) also argued that the notion of team roles emerged due to the fact that functional roles do not help in matters such as the way different team members approach a problem or task, the way team members interact with one another and their style of behaviour in general. She further demonstrated that individuals will not only bring the characteristics of their functional roles to their activities as members of teams, but also they will take up one or more team roles, naturally. Therefore, it is clear how the concept of team roles have become a popular issue which has a perceived bearing on team performance (Partington and Harris, 1999).

Various researchers have studied on team roles and offered different team role classifications. Among the number of team role theories available, Belbin’s team role theory (1981, 1993) is one of the most widely

accepted and currently widely used, in a great variety of practical team development and management development purposes (Water *et al.* 2008). Belbin's team role model was proposed after a nine-year study of team building and team effectiveness with management teams taking part in an executive management exercise at the Henley Management College, England (Aritzeta *et al.*, 2005). A study carried out by Fisher *et al.* (2002) revealed extended generality of the Belbin team role theory and identified that it may also have validity in non-managerial contexts. Therefore, it can be argued that this theory can be applied in the construction project teams.

Belbin argued that while the types of behaviour that people engage in are infinite, the range of useful behaviours that make an effective contribution to team performance is finite. He grouped these behaviours into eight clusters, each of which described a pattern of behaviour characteristic of the way in which one team member interacted with another. However, Belbin (1993) further asserted that this 'team role behaviour' is not fixed by individual personalities, but could be changed by situational factors and also individual learning patterns. The next section will discuss how this 'team role' theory could be considered in construction team selection.

### ***1.3. DESIGN TEAM SELECTION AND TEAM ROLE CONCEPT***

The general composition of the project team in construction is clear with the traditional functional roles required for any project (Cornick and Mather, 1999). But beside these functional roles, individuals in any team inherently adopt natural roles based on their personal preferences and characteristics (Partington and Harris, 1999) which is not well addressed in construction literature. Fryer *et al.* (2004) pointed out that project teams are not usually put together in a systematic way and mostly it depends on who is available (and when), who has the necessary experience for this particular type of building, who recommends whom and so on. People who come into these teams from different professions are likely to have different interests, skills, backgrounds and personalities which are reinforced by the pattern and focus of the education and training adopted by each profession (Fryer *et al.*, 2004). Therefore, simply bringing together a group of professionals does not necessarily ensure that they will function effectively as a team (Cooley, 1994 cited Macmillan, 2001). Constructing Excellence (2004) suggests that in forming and managing a team, to consider not only individuals' technical skills, knowledge and experience but also their ability to co-ordinate actions, behaviours and interpersonal qualities which is much more associated with concept of 'team roles'. However, more research is required to identify the applicability of team role theory in construction. Hence, this study attempts to explore the awareness of design team members on team role concept and its applicability in design team formation.

## **2. RESEARCH METHOD**

Section one discussed the key research issues through a review and synthesis of the existing literature. This section aims at discussing the methodological framework which was adopted in the study.

Research philosophy of the study was 'Interpretivism'. When considering the research aim and the nature of this research, it was obvious that this study needs careful observation of human interactions and behaviours. According to Easterby-Smith *et al.* (2002), 'Interpretivism' is one of the philosophies where the reality is determined by people rather than by objective and external factors. Hence, interpretivism research philosophy was adapted in this research. According to Yin (2003), case study research is useful when, a 'how' or 'why' question is being asked about a contemporary set of events over which the investigator has little or no control. Therefore, empirical study was conducted by adapting case study research approach which helps to gain more in-depth knowledge pertaining to existing theoretical insights. Unit of analysis of the study was a 'design team' and three design teams were selected for the study, based on access and time limitations. In order to avoid complexities associated with virtual relationships in inter-organisational design teams, in-house design teams were only selected for the study. Further, design teams involved in building projects under separated procurement arrangement were selected, to avoid complexities which may occur when evaluating building and civil projects simultaneously and to avoid the contractor becoming part of the design teams. Although design teams operate from inception to completion of projects, their major role and most of the activities are in the design phase. Therefore,

projects which completed the design stage were considered for the cases. Refer Table 1 for details of the cases.

Table 1: Details of the Selected Cases

<i>Case</i>	<i>Case A</i>	<i>Case B</i>	<i>Case C</i>
<b>Type</b>	Simulator training building	Bank branch office	Head office building
<b>Project Cost (Rs.)</b>	114 millions	48 millions	915 millions
<b>Project Duration</b>	8 months	20 months	22 months
<b>Stage</b>	Design completed, construction to commence	Design completed, piling work continuing	Design completed, piling work continuing
<b>Nature of the Client</b>	Private-Client	Government-Client	Government-Client
<b>Composition of the design team</b>	Architect (Leader) Chief Quantity Surveyor Project Quantity Surveyor Structural Engineer Services Engineer Electrical Engineer	Architect (Leader) Project Architect Quantity Surveyor Structural Engineer Electrical Engineer Draughtsman	Team Leader (design) Architect Quantity Surveyor Structural Engineer Services Engineer Electrical Engineer Interior Designer Town Planner Construction Coordinator

This paper reports the research findings on the first phase of a larger research study. The techniques used for this phase of the research can be discussed under two broad types as data collection techniques and data analysis techniques. Yin (2003) stated that interviews are essential sources of case study evidence, because most case studies are about human affairs and these human affairs should be reported and interpreted through the eyes of specific interviewees. Among the wide range of ways that interviews can be conducted, semi-structured interviews have attracted interest among researchers and are widely used due to the advantage that while having a well prepared structure in advance, the questions are formed as sufficiently open enough in way in which the view points of the interviewee are more likely to be expressed in an openly designed interview situation than in a fully standardised or unstructured interview (Flick, 2006; Wengraf, 2001). Accordingly, Semi-structured interviews were used as the main data collection tool during data collection process and data was analysed using the content analysis and cognitive mapping. The findings of these are presented and discussed next.

### 3. RESEARCH FINDINGS

The aim of this section is to explicate the research findings of the empirical investigation. First, details of case studies are presented and next, findings on awareness on team role concept and formation of design teams is discussed.

#### 3.1. DETAILS OF CASE STUDIES

Selected cases were three in-house design teams of building construction projects which were adopting traditional (separated) procurement method. Cases had certain similarities and differences in terms of the background as follows;

- A project which was aimed to construct a three storey simulator training building was selected as Case A. Client has demanded for a unique building as it is the first building to be build in the country in that nature. An in-house design team of a government organisation was the design team of this project. In this organisation main person who is responsible for selecting members for design teams, is the Deputy General Manger (DGM) of Consultancy unit. When a new project comes, he selects key members. But, mostly division heads (architectural, structural engineering,

mechanical engineering, quantity surveying) are also responsible for appointing members from their own divisions to the given project.

- Construction of two storey branch office for a corporate bank was the project selected for Case B. An in-house design team of a private consultancy organisation was the design team of this project. The client of this project has had a long term relationship with this consultancy organisation. Therefore, design team was much more familiar with the project with their previous experiences of other branch offices constructed for the same client. In Case B, Managing Director of the company was the person who is responsible for forming design teams for new projects by selecting suitable members.
- Construction of twelve story head office for a governmental department was the project selected for Case C. An in-house design team of a private consultancy organisation was the design team of this project. There was a separately appointed team leader for the design phase and he was responsible for coordinating within the team and with the client. Construction Coordinator has been appointed to coordinate design team with client and contractor. In this case, the person who is responsible for selecting team members for a design team was Head of Pre Contract Unit of the particular organisation.

Having discussed about the background of the teams, findings of the study will be discussed in coming sections.

### **3.2. AWARENESS ON TEAM ROLE CONCEPT AND FORMATION OF DESIGN TEAMS**

It was observed that some members of these studied teams were aware of the existence of team roles through their education, seminars or practical experience. Most of the members who were aware have learnt it by practical experience and not through education and training. Further, it was noticeable that most of the members in all three cases were not aware of Belbin's team role concept. However, when explained, team members emphasised that having a proper knowledge about team role theories will be beneficial for team working.

Turning to team selection, it was evident that 'team roles' was not currently a considerable factor in design team selection in these three cases. Instead, design teams were basically formed based on the functional roles required for the project. Composition of three teams considered was different in terms of the types of functional roles. Different types included architects, structural engineers, services engineers, electrical engineers, quantity surveyors, town planners, interior designers, draftsmen as well as especially appointed team leaders and/or coordinators. Team selector of case C mentioned, "*we basically analyse the project; size of the project, capacity and the features like foundation, structure, services to be incorporated (electrical, fire detection and fire fighting, air conditioning and so on), requirements for external works or interior decoration and based on that decide the composition of the design team*". Types of functional roles required for a particular project have been decided based on the scope of the project. For example, if the interior design is out of the scope of the particular project, the design team does not need to have an interior designer. Further, team selectors highlighted the importance of selecting suitable number of functional roles. Case B team selector mentioned that "*we have to provide sufficient number of functional roles for a particular project, otherwise project cannot be done*". Sufficient number of professionals from each discipline is appointed to the team based on the scale and complexity of the project. Sometimes, minimum number of professionals required from each discipline is indicated by the client or by his consultants on behalf of the client. In such instances team selectors have to strictly adhere to them in order to be competitive in the bidding process. Architect of Case A mentioned, "*Sometimes, architectural division itself has a team. This includes senior architect, project architect and more which depends on the scope of the project. Sometimes these two may be the same. It is similar in the engineering and quantity surveying also*". This shows how the scale of project affects the number of members from each discipline.

According to all these cases, team selection which is mainly based on functional roles is again dependent upon some other factors such as special requirements of the project, experience of the members, qualifications required, availability of human resources, recommendations and workload. Figure 2 shows the cognitive map representing factors considered by team selectors in appointing team members to design teams as emerged through cases.

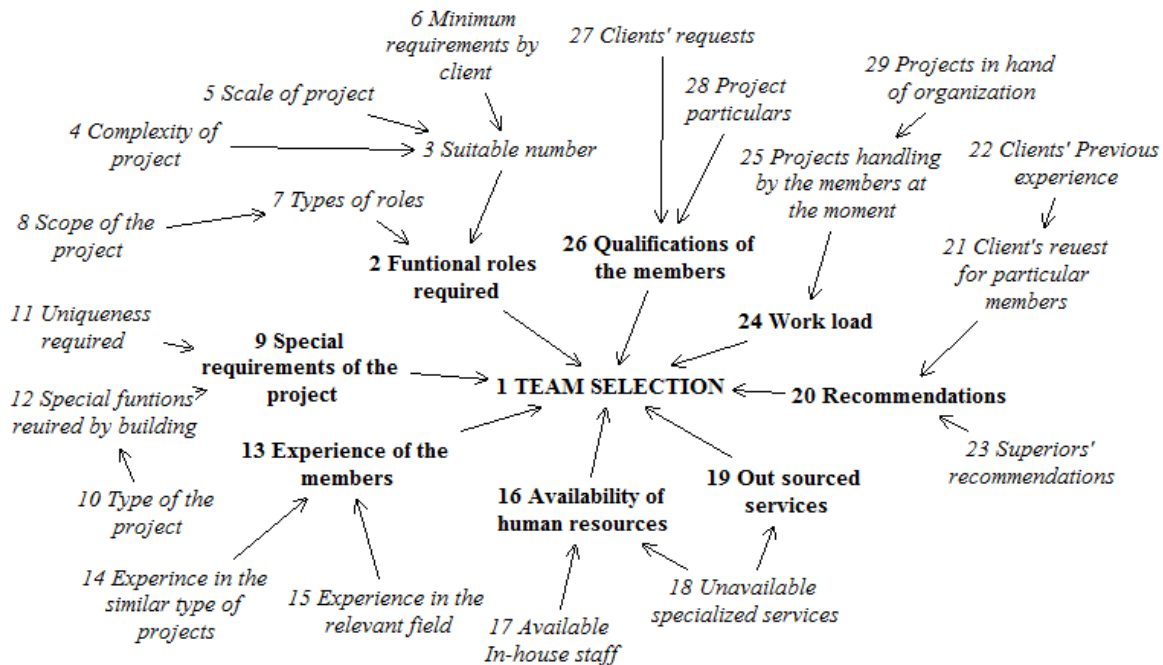


Figure 2: Cognitive Map Showing Factors Affecting Design Team Selection

Special requirements of the projects demands for particular persons needed for the project. For example, in a hospital project which has many complicated medical equipment, services of a bio medical engineer may require to assist architect, even though it is not normally required for a normal building project. Team selector of case A mentioned “for example, when the client wants a unique building, we have to select the correct team and specially, pick the correct architect having particular skills”.

Member’s experience on similar type of project and experience in the relevant field were considered in team formation. Team selector of case C stated, “We try to get most experienced person for that particular project. If we are going to design a university, the first priority will be going to the architect who has experience in that. If it is a high rise building, structural engineer need to have high rise experience.” When there is no person who has the relevant experience or when the opportunity needed to be given to new members, experience gap is filled with the assistance of senior members who have overall knowledge in all the areas.

Recommendations made by clients and superiors are also become factor to be considered in team selection. In certain instances, members were selected considering the recommendations of clients and seniors of the organisation. Mostly this is based on the previous experience with the particular member. According to team selectors, this usually affects the selection of architect. Team selector of case C mentioned, “Some clients prefer to go with the people who have worked previously. So, whenever possible, we give them that facility.” When technical or educational qualifications such as diploma level, B.Sc., M.Sc., and so on are mentioned under project particulars, members who fulfil those qualifications should be selected. Further, qualifications of the members should be sufficient enough to carry out the given task.

Mostly, team selectors have to select members from available resources. If the in-house staff is not enough they may have to go for outsourcing. Team selector of case B mentioned, “We get the services from outside, when we don’t have a certain specialisation. For example, we have out sourced structural

*engineering function.*” Further, work load of the members also restrict the selecting a particular member to a team. Number of projects handled by the particular member at the moment, complexity of their work affects the selection of the particular member to a new team.

Hence, empirical findings revealed that design teams formed based on the functional roles of the members, but not according to their team roles. As mentioned in literature review, Cornick and Mather (1999) stated that general composition of the project team in construction is very clear due to the traditional functional roles required for any project and case study findings also confirmed the fact. Further, empirical findings showed that team selection is again dependant on the factors such as special requirements of the project, experience of the members, qualifications required, availability of human resources, recommendations and workload. These research findings are in line with the Fryer *et al.* (2004). Another thing which is apparent is that these factors act as barriers to consider team roles during the team selection.

#### 4. CONCLUSIONS

This research study focused on how design team selection is done and its consideration to team roles with regard to design teams in Sri Lanka using three case studies. Many authors highlighted the importance of adopting good teamworking practices in construction industry. Accordingly, team role concept appeared in the literature as an important aspect of successful teams. In the case studies, although members believed that having a proper knowledge about concept of team roles would be beneficial to the construction professionals, it was apparent that team members were not properly aware of team role theories. Reason for this may be that, Sri Lankan education system had not sufficiently addressed this area. But, it would be beneficial to the professionals in design teams, if they are better educated about it while they are learning, before entering into the industry. Overall, research problem framework developed through the literature could be described through the empirical findings as given below.

As discussed in Section 3.2, design teams in the construction industry were found to be formed mainly based on the functional roles rather than team roles. Further, team selection was dependant on other factors such as special requirements of the project, experience of the members, qualifications required, availability of human resources, recommendations and workload. These factors are essential in order to provide required technical capacities and knowledge to carry out the required functions by each member. However, these factors could at the same time act as barriers to consider team roles in forming design teams.

The key message delivered through this exploratory study for construction practitioners is to be knowledgeable on how to select and adjust their team roles depending on the project requirements, functional roles and associated responsibilities as well as, the team setting under which they operate. Similarly, recognising one another’s team roles would help members to minimise internal conflicts and allow using the members’ talents to the best advantage of the team. Hence, proper awareness on team role concept should be given to professionals working in design teams through education. Also, arrangements within design organisations should be made so as to improve teamworking capacity and successful team role behaviour. The future work of this research aims at exploring current team roles of the members in identifying effect of balanced teams on team performance.

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