



FACTORS AFFECTING VIRTUAL TEAM'S MANAGEMENT IN CONSTRUCTION INDUSTRY IN EGYPT; A LITERATURE REVIEW

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Abstract: In the recent period, the new breed of virtual team has arisen in numerous building businesses. Whereas the use of Information and Communication Technologies (ICTs) has brought numerous team members of building projects from all over the world together. However, managing a virtual crew working in a building project is still a tough job. Especially because the map of foreign investments with diverse nationalities is observing significant changes following the recent economic reform measures in Egypt, where it experienced a huge rise in the amount of foreign direct investment. Therefore, this study attempts to identify factors affecting virtual team's efficiency in construction projects in Egypt. To achieve the research aim, a study of the literature was conducted. The outcomes of this research contribute to identifying all the issues of virtual team management through theoretical framework. This study is devoted to teams operating in the construction sector to accomplish the success of construction projects conducted by virtual teams via better communication to boost project delivery.

Keywords: Virtual Team, Construction Projects, and Egypt.

1. Introduction

The construction industry has distinctive characteristics and structures that distinguish it from other industries [5]. These characteristics have culminated in the complexity and difficulties associated with achieving acceptable, sustainable, and effective product quality. The construction industry must make significant process changes in the area of communication to promote the transfer of information across teams and projects. In the future, virtual environments will make it increasingly difficult for the industry to rely on the tacit knowledge of organizations or people [6]. Global tendencies to outsource work and reduce staff numbers, along with the broad availability of telecommunications devices, continue to encourage firms to explore using virtual teams [7]. The construction industry continues to lag behind in the use of communication technologies and the creation of virtual teams, while understanding that extra full-time personnel generally result in higher negative utility.

2. Introduction to virtual teams

Virtual teams are characterized as groups of persons collaborating beyond place, time, and organizational barriers by using modern communication technology [4]. There is a method for defining virtual teams known as the "dichotomy approach" that focuses on distinguishing traditional and conventional teams via a definition centered on distance, time, and organizational boundaries [8]. Collocation of all team members, whether traditional or conventional, is becoming more challenging and uncommon. However, when team members are co-located, a heavy reliance on new technology is necessary. Numerous aspects of virtual teams are applicable to face-to-face contact, such as the use of new communication tools, cultural diversity, and the formulation of shared objectives; thus, further and extensive classification of virtual teams is necessary [15].

2.1. Characteristics of virtual teams

Virtual teams have qualities distinct from those of conventional teams. According to Ludden, Ledwith, and Lee-Kelly (2012), there are nine categories of virtual team characteristics that have been identified in virtual team research as shown in Figure 1. The features of virtual teams will be described in depth in each of the subsequent sections [16];

- Temporary: Performing a transient task and possessing a temporary structure.
- Geographic: The geographical distribution of team members is local or worldwide.
- Social: Team members share leadership in pursuit of a common objective and maintain social boundaries.
- Culture is divided into functional, team, organizational, and national categories.
- Historical: Historical limits are based on the team's life cycle and the sort of job completed
- All team members are needed to use information and communication technologies.
- Political: Politics plays a crucial part in the operation of virtual teams and their interactions.
- Team membership focuses on the talents needed of team members, the team's dynamic, and their interdependence.
- Work: The nature of the task being completed by the virtual team that is interconnected and complicated.

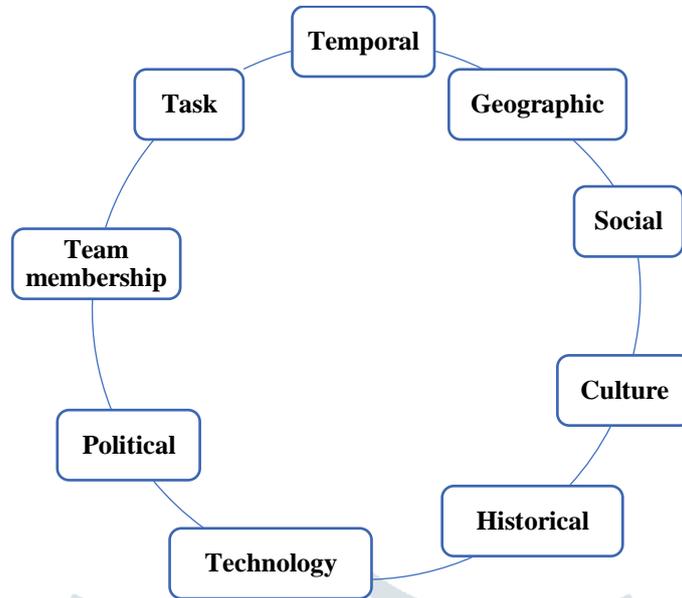


Figure 1 Characteristics of virtual teams [9]

2.2. Challenges of virtual teams in construction industry

The drawbacks of virtual teams are seen as obstacles teams experience throughout the project life cycle. Virtual team challenges may vary dependent on team membership, project types, and business culture [14]. However, as more employees work remotely, virtual teams in the construction industry encounter a number of similar issues. Based on the literature evaluation, search more than fifty electronic databases using the most relevant phrases to the subject of virtual team research (i.e., Virtual Teams, Challenges and Construction industry). However, there is a paucity of publications about virtual teams in the construction business, thus these articles feature difficulties from other industries. The publications were chosen using a mix of archival journals and conferences. The first list was generated by reading the abstract and conclusion of the articles, while the second list was made by reading the whole article. Only 30 article were examined in total.

The findings were determined using archive journal, conference, and electronic book publications from electronic databases including IEEE Explore, Science Direct, Research Gate, Springer Link, and Google Scholar. This research analyzed scholarly publications published between 2000 and 2021. The nominated study was disseminated and presented to the general public throughout the year. Distance, time differences, communication, cultural diversity, trust, technical management, team cohesion, and leadership are the problems most often highlighted in publications as showed in Table 1 .

Table 1 Challenges of virtual teams source; Authors

Challenges	Description
Distance	<ul style="list-style-type: none"> • Awareness of team members • Motivational sense • Trust is more difficult to establish • Explicit management • Alignment of incentives [10]
Time differences	<ul style="list-style-type: none"> • Different working weeks (e.g. In the middle east) • Different times to start and end the working day • Different approaches to ‘lunch time’ • Different vacation periods; • Public holidays – national and regional; • Religious holidays (many vary in date each year) • Daylight saving time adjustments • Different date formats (is 10/04/2014 10th april or 4th october?).[17]
Communication	<ul style="list-style-type: none"> • Responses delay • Knowing how to use communication tools • Communication frequency • Communication quality • Closed loop communication • Communication timelines • Communication content[10]
Culture diversity	<ul style="list-style-type: none"> • Different work practices • Different attitude to time • Culture misunderstanding • Languages barriers for effective communication [11]

Trust	<ul style="list-style-type: none"> • Team trust • Relationships • Inclusion • Less social clues • Risk of conflicts • Higher risk of role ambiguity • Poor understanding of events
Technical management	<ul style="list-style-type: none"> • Creation master plan • Cash analysis • Quality management • Change order management • Mode of payment • Systematic flow of information[16]
Team cohesion	<ul style="list-style-type: none"> • Social relation • Task relations • Perceived unity • Emotions
Leadership	<ul style="list-style-type: none"> • Geography and isolation • Communication • Technology • Security • Motivation • Trust • Relationships[3]

2.3. Challenges of Virtual Teams Through Project Life Cycle

Client, consultant, contractors, subcontractors, architect, and quality surveyor are typical members of the multidisciplinary team in the construction sector. Typically, project team members are transitory and participate intermittently; they hail from varied companies and cultures and possess particular talents.

2.3.1 planning and design stages

During the planning phase of the project, it is crucial that the team communicate effectively using innovative communication technologies. Throughout the planning phase, a dependable support communication system must be established amongst all stakeholders in order to improve integration, data accuracy, and the management of project documentation. Any communication problems will result in significant misunderstandings and project delays [13].

For example, the existing structure of the industry offers multiple potential grounds of disagreement when one member wants to shift the risk to others. It is evident in the divergent goals of designers and builders: "the designer wants a practical design that expresses his philosophy, while the builder wants a buildable product within realistic risk restrictions" [12]. It demonstrates conclusively that 'conflicts, inconsistencies, and mismatches' amongst all project team members, which may be the result of simple misconceptions or preconceptions, are primarily the result of current construction practice.

2.3.2 Construction stage

This phase covers the implementation, installation, and construction of IBS components on construction sites. To accomplish the installation method, which is heavily dependent on machine-oriented skills, all operations need the usage of highly qualified personnel. Moreover, relying on foreign workers necessitated additional time and resources for extensive training to develop skills and knowledge, which affected product quality [18].

Table 2 Challenges of virtual teams during project life cycle [18],[13]

Phase	Problem
Planning and designing	Lack of teamwork, inaccurate design knowledge, unwillingness to accept opposing viewpoints, inaccurate data, delayed information update, and lack of trust.
Construction	Lack of expertise, knowledge, work conflict, poor planning and organisation, inability to standardise construction components, and insufficient supervision.

3. Theoretical Framework of Factors Affecting Virtual Management

As a consequence of the previous literature analysis, the following framework was developed to highlight the elements that influence the success of virtual teams. By success, it is expected that these teams would operate extraordinarily effectively and complete their jobs according to the specifications.

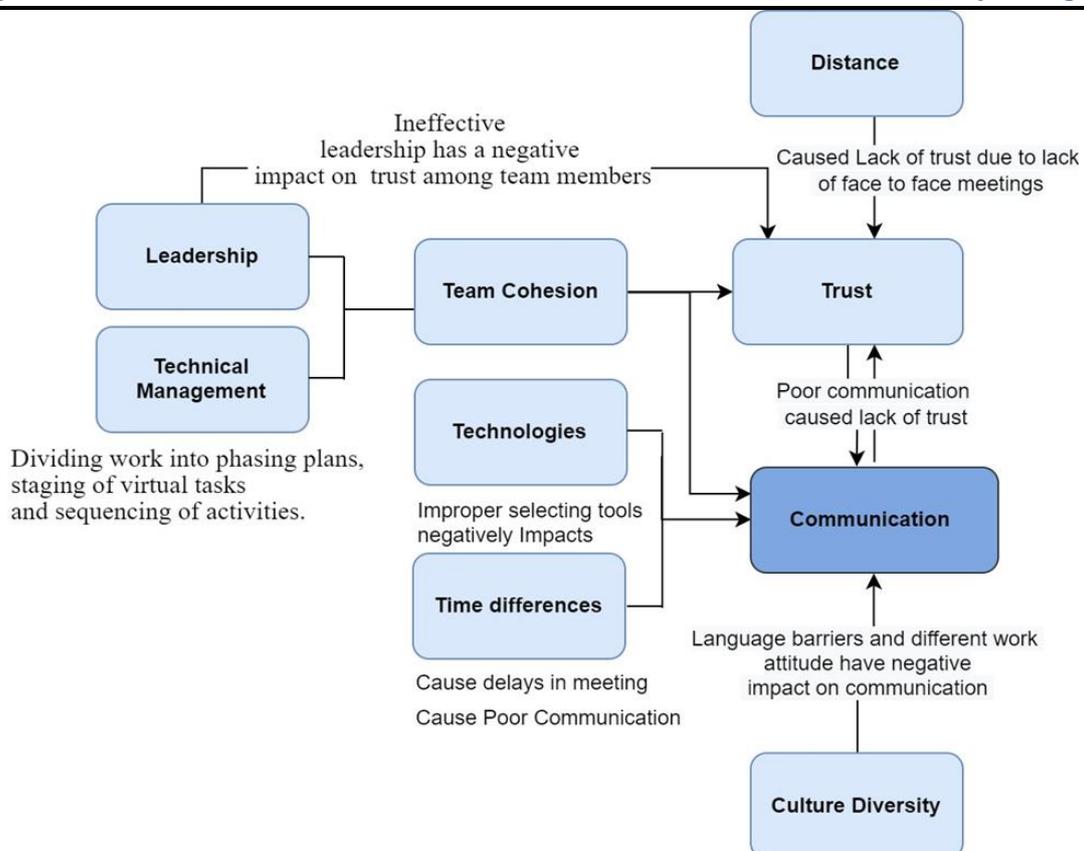


Figure 2 Theoretical framework of factors affecting virtual teams Source; Authors

Virtual Teams must be aware of the importance of trust and communication, which is why leaders must develop trust in their businesses from the start. Through team building activities, leaders may impact the creation of greater levels of trust among their teams. There are a number of technical reasons why VTs are becoming the "new normal." This subject is also connected to how easy or difficult it may be to engage with a certain team; the more challenging it is to create frequent contact and interactions, the simpler it may be to connect with that team. In the Team Development Stages, it has a relationship to VTs since it plays a big role in deciding whether a specific team is functioning or not, with the absence of organized norming and storming with the guidance of a leader being the cause [2]. As previously said, the purpose of the majority of teams, including VTs, is to advance through the stages of team growth and achieve performance [1]. The primary distinction is that virtual communication, relationship building, and trust construction occur without team members being physically present in the same room or office.

4. Discussion

Virtual teams may be a very effective way to bring together the most suitable combination of skills and knowledge to accomplish project goals without incurring the costs and overcoming the logistical challenges associated with physically assembling a team of personnel. The results of this research indicate that virtual teams in the construction business face several issues that companies must be aware of and proactively address. Literature research shows the factors impacting the performance of virtual teams remain unclear. These include leadership, communication, cooperation, coherence, commitment, conflict, interpersonal interactions, knowledge sharing, feedback, trust, diversity, acknowledgement, and empowerment. Many recognized obstacles to productive virtual teaming rely on ensuring good communication amongst all distant team members.

5. Conclusion

The construction sector is distinguished from other industries by its unique traits and organizational systems. Along with the widespread availability of telecommunications devices, global inclinations to outsource work and cut employee numbers continue to drive businesses to investigate employing virtual teams. This research contributes to the identification of all challenges associated with the management of virtual teams. It aims to discover the factors affecting the effectiveness of virtual teams in the construction sector by analyzing the concerns and difficulties that occur in project management when virtual teams are used. Virtual teams are defined as groups of people that collaborate across geographic, temporal, and organizational boundaries utilizing current communication technologies. The disadvantages of virtual teams are seen as hurdles throughout the project life cycle. Virtual team challenges may differ based on team composition, project nature, and organizational culture. During the planning phase of the project, it is vital that the team use modern communication technology to communicate efficiently. Through team-building exercises, leaders may foster stronger levels of trust among their teams. Virtual communication, connection development, and trust building are distinguished by the fact that team members are not physically present in the same room or workplace.

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