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Original Article

The Factors in influencing The Success of a Virtual Office in Civil Engineering Design Industry in Singapore

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Abstract

Virtual offices are becoming increasingly popular in wide range of industries which comes by virtue of its various economic benefits and increased accessibility to the marketplaces. Virtual offices are eliminating the space and time constraints making it possible to work anytime from anywhere. Alongside, it is also helping the environment in multiple ways by cutting down the transportation need, reducing energy wastages. However, virtual office concept is very new to civil engineering design industry in Singapore. This specific industry is depending almost entirely on the traditional office culture where human resource management problems persist typically. Highly competitive working culture in Singapore demands qualified employees and an effective output delivery, keeping the cost incurrence as less as possible to thrive in a business. There is not much research done in the past to build successful virtual office models in Civil engineering design industry in Singapore. This study examines the factors influencing the success of a virtual office in this industry in Singapore. It can be concluded that it is always good to have physically located staffs. Virtual office in civil engineering industry must be present partially which could bring economic and administrative profits.

Keywords: *Virtual Office; Online Facility; Working Culture; Civil Engineering*

Introduction

This study is designed to find out the factors influencing the success of a virtual office in civil engineering design industry in Singapore. There can be many types of traditional and virtual offices available in variety of industries around the world. This particular work is focusing on Civil engineering design industry in Singapore. By understanding the factors, it investigates how and why those factors are influencing the success of virtual office.Despite Singapore being a small country, it holds an impressive record on its economic stability. In order to maintain it, a lot of larger ventures as well as smart works to be done with its limited manpower which has to be optimized within the tiny country. With already existing long working hours, transportation time additionally reduces the time available for personal life. Work-life balance becomes an important topic for research for many countries in order to develop the policies for the human resources management (Guest 2002). Among the various options, virtual office is an emerging strategy which is expected to provide some solutions for various problems including work-life balance.

As explained, there can be various factors influencing the success of a virtual office in this particular area of study. The present research aimed to find the factors that

influence the success of virtual laboratory in Singapore:

Review of Literature:

Strategy and Attitudes of Virtual Office

Definition of Virtual Office

There are various definitions that can be given to virtual offices depending on the nature that particular virtual office uses. Brewer,(2010) mentioned that, Virtual workplaces are constructed of people using technology to work at a distance, with the goal of transferring knowledge (both explicit and implicit) toward specific purposes. Virtual offices are in a way similar to traditionally offices as both involved a group of people working for a common goal (McDaniel, 2011). The physical working space differentiates the traditional and virtual office. Zaccaro, *et al.* (2004) said that virtual teams are traditional teams without boundaries which uses multiple channels to communicate the thought and ideas.

Benefits of Virtual Office

Harmon*et al.* (2002), proved that, virtual offices has become more popular because of the benefits it provides to the business. Previous works done by the various researches shows the virtual offices has multiple benefits. The virtual offices provide access to hire the employees from the regional countries which considerably reduce the cost (Zemliansky & St Amant, 2008).

Success Factors of Virtual Office

It is important to understand the factors that influence the success of the virtual office in the global market. Alonso-Rasgado & Thompson(2006) argued that organizational benefits occur when the high technical team offer a system to facilitate the type of interactions and allow the employees to share their knowledge and the skills towards to the common goal Quality control approaches in virtual office.

Having proper quality control approach in any workplace or office in order to ensure the quality of output and performance is essential. It could be more significant while managing the employees virtually. Recent researches form Tsatalos & Karamanlakis (2017) proves that comprehensive quality monitoring systems can be adopted in virtual offices which is equivalent to the monitoring systems available in the traditional offices.

Responsibility Flow in Virtual Offices

Taking Responsibility is important to ensure the whole process is success in each level. Hoegl & Muethel (2016) has recommended the approach of share leadership to enhance the responsibility in the virtual offices. Human resource management should contractually ensure each virtual staff to understand and accept the roles and responsibilities.

Managing Virtual Offices

The studies form Zaccaro, *et al.* (2004) found that virtual teams are more effective when the managers of those team ensure their two main duty of getting the job done on time while the virtual team is mentally satisfied. (McDaniel, 2011) argues that communication barriers are a challenge when managing the virtual officer where employees are form all over the world. Miscommunication can occur which could bring frictions and misunderstanding among the virtual team members in the company. As a result, dependable remote staff should arrange virtual meeting to discuss time-sensitive tasks.

Methodology:

The methodology approach sought to understand the concept of virtual office which is relatively new to the field of civil engineering design industry in Singapore. The research approached to confirm the data collected from the literature review through the interviews with professional engineers of the civil engineering design industry who are the decision makers or the governing bodies in the industry.

This research was designed as mixed methodology as per the approaches taken above. Among the various mixed research methodologies, exploratory sequential design was chosen as the methodology for this study. It was important to establish the factor influencing the success in this industry chosen prior to understanding the connections and attitudes of the factors. Exploratory sequential design conducted the quantitative research

with the direct interviews in the first phase and the results were incorporated to continue the qualitative research in the second phase of the research with the bigger sample.

The data was collected data through the interview during the phase 1 and the responses collected during the phase 2 using the questionnaire systematic survey and analyses those data based on the logically defined categories for the detailed study. Results interpretation for Phase 1

There were 6 participants interviewed during the phase 1 and semi- prepared questions were asked during the interview. The results interpretation was carried out based on the theme set during the literature review.

Phase 2 research was conducted with 53 participants and the data collected from the online questionnaire was assessed using the SPSS software and systematic analysis. Various comparisons were done using the software to interpret the results and the validity and reliability of the results. The data collective was found to be very informative to answer the research questions

Results & Discussion

Thematic Analysis

At the end of each interview, a summary was prepared, and the factors were categorized under the specific themes.

Technical Factors

All the participants strongly considered reliability of the virtual staffs needed to carryout responsible work which has to be endorsed by the professional engineers. In Singapore's context, Professional engineer endorsing the design, holds the full responsibility. This leads the professional engineer to be comfortable with his/her own staffs who is physically located in the physical office rather than virtually located. As Preston&Colman (2000) recommends, this method was chosen since it provides discriminating power during the participants response.

Interpretation for Phase 1

During the interview some important factors have been spotted out in table 1. After the interview was over some Technical factors were shortlisted like Reliability of the work done by Virtual staffs, Size and complexity of the project, Effective information technology etc.

Table 1:Factors Found During the Interview

Serial No.	Factors
1	Reliability of the virtual staffs
2	Size and complexity of the project
3	Quality control system adopted
4	Effectiveness of the information technology adopted
5	Global accounting and finance management
6	Overheads
7	Authority & contractual requirements by the clients
8	Risk factor

Interpretation for Phase 2

Participants Background Analysis

The participants were from 27 different companies which were actively conducting civil engineering design projects in the industry. About 65% of the participants were found to be with more than 10 years of experience in the specified industry (figure 1). Saunders et al. (2012) recommends the following method for the analysis. First step to transcribed the whole interview recording including the nodding and meaningless words.

Factors Influencing the Success of a Virtual Office in Civil Engineering Design Industry

Most of the participant feedback on not to choose the virtual office came from lack of knowledge and experience. Very less percentage thought that responsibility can be managed. But correlation results show that reliability is one of the significant factors. This contradiction could be one of the reasons that affectthe success of a Virtual Office in Civil Engineering.

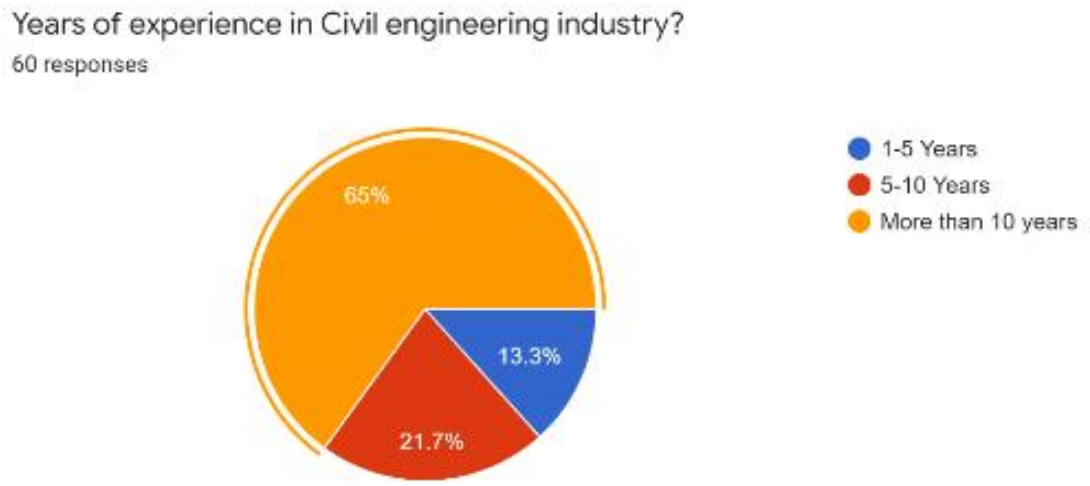

Figure 1: Participants Experience

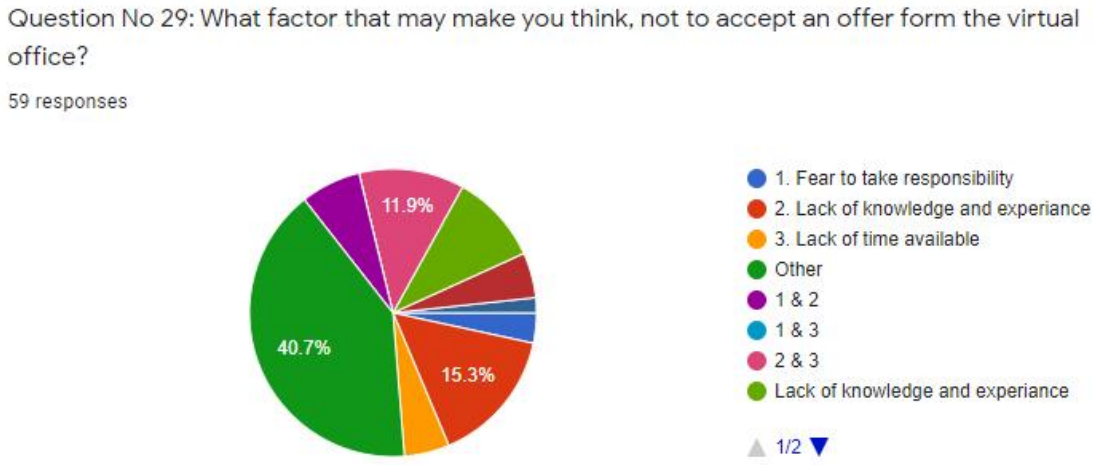

Figure 2: Factors that Affect Virtual Office Set up

Therefore the factors that influence virtual lab set up among employee found 5 factors and the study showed that these factors were interdependent Dirks (1999).The factor “Lack of awareness” could be the factors that created some myths about the virtual office which delay the emergence of the virtual office in civil engineering design industry. It was proven that the technology available shall create a comprehensive quality control and monitoring of virtual office which eventually can enhance the reliable and responsible and effective work force available in the virtual office to make the model successful (Lipnack & Stamps, 1997). Thus, any type of projects can be managed with minimum physical employees to work in traditional office while majority shall work through the virtual offices.

Relative important index correlation

Since the questionnaire prepared based on the factors found in the phase 1 study, the questions were grouped up as shown in table 1 and relative important index found using SPSS software individually. Group average of the relative important index was ranked up. It shows that the factor no 8: global finance and accounts has the highest mean while information technology, reliability & size and complexity of the projects were next in the order.

Correlation analysis

As recommended by Ho (2013) spearman correlation analysis done by considering the Satisfaction level on the success of the virtual office as the dependent factor while other eight

factors found during the phase 1 of the study as the independent factors. To have a significant influence, the *P* value shall be less than the 0.01 in the spearmen correlation analysis.

Conclusion:

The research work evaluates the feasibility of the virtual office in civil engineering design industry in Singapore. It is evident that virtual office can provide economic benefits while it has been significantly influenced by the following factors

1) Reliability of the virtual staffs
2) Effective information Technology infrastructures
3) Size and complexity of the projects
4) Quality control system adopted

Though contractual and legal requirements and risk factors do not influence the success of the virtual office considerably it is still required based on the context of Singapore design industry structure. Thus, it is always better to have physically located staffs. Virtual office in civil engineering industry shall partially exist which could bring economic and administrative benefits. But full virtually located office is not possible in civil engineer design industry.

Recommendation:

It is recommended that Civil engineering design industry in Singapore shall develop business model in combination to both traditional and virtual offices. Part of the team shall be located virtually and work through the virtual office with reliable and well qualified engineers and physical office must be operationaltocarry out the projects smoothly.

Limitations and Further Study:

This study was carried out with limited period of time and focusing on locally located participants. It is recommended to carry out further study which shall include virtual staffs located globally.

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Conflicts of Interest:

The authors declares that the research review was conducted in the absence of any commercial or economic associations that could be construed as a potential conflict of interest.

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