Measuring the Global Virtual Teams (GVTs) Performance: Confirmation Study

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Abstract

Objectives: This paper found that there is a need to propose a framework to measure the global virtual teams' performance involving online training and development, organizational commitment, and motivation in global IT projects. Also this research aims to examine the relationship among online training and development, organizational commitment, motivation, and virtual teams' performance in global IT projects success, propose a framework to assist the project manager to measure the global virtual teams' performance in global IT projects involving the online training and development, organizational commitment, and motivation based on defined measures and Key Performance Indicators (KPIs) for the global virtual teams in global IT projects which is our contribution for this study. Method: The Confirmation study were conducted which is including study (expert-questionnaire interview, pilot study, and empirical study (the survey) then the framework proposed. The proposed framework was evaluated through experts from academics and industries. Findings: The results of the confirmation/preliminary study confirmed the validity of the conceptual framework and the validity and reliability of the instrument. Confirmation/empirical study were verified the conceptual framework and the final framework was proposed. Applications: This framework is to assist the project manager to measure the global virtual teams' performance in global IT projects.

Keywords: Global Virtual Teams (GVTs), Global Virtual Teams' Performance Online Training and Development, Key Performance Indicators (KPIs), Motivation, Organizational Commitment, SEM-PLS

1. Introduction

The reliance of companies and organizations on IT systems which are often complex is increasing with the increase in computerized and automated operations. As a result of this reliance on such IT systems, these companies and organizations are making huge investments into the development, improvement and maintenance of these systems. Global Virtual Teams (GVTs) have been produced by the recent global village which is a product of technological advancement. In recent times organizations, have adapted GVTs as a way of meeting the needs of the global marketplace which is also the product of technological advancement. GVTs are described as those teams that are geographically dispersed across national boundaries but are connected through advanced communication technology like instant messaging, email and video conferencing.

The paper is made up of five sections: Section 1 makes the introduction of the research. Section 2 contains the background of the study as well as the literature review. Section 3 presents the theoretical foundation and the hypothesis development. Section 4 contains the research methodology while the conclusion and recommendation for future work is presented in Section 5.
2. Existing Work

2.1 Global Virtual Teams’ Performance

The organizations focus on individual performance, some other concentrate on both team performance and individual outcomes. In comparison to virtual teams, individual output may be more noticeable in face-to-face setting. It is very important for the measures of GVTs to as well focus on individual outcomes. The quality, quantity, creativity, cost, and timeliness of the team's deliverables. When organizations assess individual outcomes they do so at the same level which they do for team outcomes but they assess individual outcomes based on their ability to meet milestones which they have set for general team performance and personal deadlines.

Through KPIs organizations able to measure their performance in terms of the objectives and goals. The relevant information which is required by organizations is to understand that if they are achieving their goals and objectives or not is provided by KPI. The present study considered as effectiveness and efficiency in the Key Performance Indicators (KPIs) for measuring the performance of global virtual teams’ performance, argues that a project can only be successful if the measures of efficiency and effectiveness are satisfied.

- Efficiency measures correspond to the strong management and internal organizational structures (time, cost).
- Effectiveness measure in this study is defined as the satisfaction a user as well as the usefulness of the project.

2.2 Measures and Key Performance Indicators (KPIs)

Standard scales were used in this study and measured on a 5-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. Access to online training was measured using the item scale developed by. Benefits from online training and development were measured using the item scale adopted from study. Support for online training and development was measured using item scale based on scale adopted from. In order to measure organizational commitment, the use of a scale of Affective commitment, normative commitment, and continues commitment developed by. Motivation was measured using item scale adopted from. Finally, the (GVTs) performance was measured using items scale by which contains the variables of effectiveness and efficiency which are measured in this study; the measurement scale was originally used by. The measures for global IT project success which are related to the performance of global virtual teams were adopted from.

2.3 Theoretical Foundation and Hypothesis Development

It is assumed that the major components of sustainable competitive advantage will be provided by human capital. Even though today organizations are forced to be innovative in order to maintain their competitive position, they do not pay much attention to the people who are instrumental in to the success of the organization.

The center of modern practice of management in any organization is employee training. Alongside other activities like selection and reward, recruitment, employee training is gradually becoming the core element of Human Resources management functions. Only through sustainable training Human Resource successful plan for the future and this implies that one of the crucial aspects of organizational strategy is organizational training.

The systematic activities which are designed for the development and improvement of employees' knowledge, skills and behaviors for the purpose of performing their job-related task and meeting the quality requirements of HR in future is regarded as organizational training. Some researchers have analyzed employees perception of training. Findings revealed that employees perceived organizational training as operationalized with a multidimensional structure, access, benefits and support. In the next section, a hypothesis is developed regarding the effects of training on motivation and organizational training based on these components (access, benefits and support) which are associated with the attitudes and behaviors of employees towards their organizations.

In regards to offering quality services employee training can improve the performance of employees thereby enabling the organization obtains comparative advantage. Defined training as “a planned and systematic effort to modify or develop knowledge, skill, and attitude through learning experience, to achieve effective performance in an activity or range of activities”. Therefore, in this regard training can be regarded as an investment in the most significant resource of the organization which is human resource.
In spite of this assumption only few empirical studies have conducted to support the notion that organizational performance is positively influenced by Human Resource Management. It has been suggested by researchers that organizations need to provide adequate and regular employee training so that employees will be able to achieve organizational goals with greater confidence. Organizational goals can be achieved if employees are committed to the organization. Some studies that have been carried out in some western countries have revealed that the level of employee commitment is positively influenced by training. Such studies also highlighted the positive effect of training on different work-related outcomes that improve organizational performance. There is need for more studies to be conducted in order to investigate the impact of training on the performance of employees in terms of effectiveness and efficiency. Thus, the hypothesis for this study is as follows:

H1 (a): There is a positive relationship between training and global virtual teams’ performance in global IT projects.

H1 (b): The performance of global virtual teams in global IT projects is positively affected by Employees’ perceived degree of support for online training.

H1 (c): The performance of global virtual teams in global IT projects is positively affected by the Employees’ perceived degree of benefits.

In the area of human resource management and organizational behavior organizational commitment is regarded as one of the major concepts. Organizational commitment has been divided into three aspects (contuinance, affective and normative commitment) by despite the fact that it is a single construct. Affective commitment is defined as “an employee’s emotional attachment to, identification with and involvement in the organization”; continuance commitment is “commitment based on the costs that employees associate with leaving the organization”; and normative commitment is “an employee’s feelings of obligation to remain with the organization”.

If employees strongly believe in their organization they are more driven towards accepting the goals and objectives of the organization thereby being motivated to go the extra miles in order to achieve those goals and objectives; such employees often have high level of organizational commitment. This implies that employees can be motivated to achieve the goal of the organization if they are strongly attached to the organization with seeking personal benefits.

The willingness of an employee to accept the values and strategies of an organization is determined by the level of organizational commitment the employee has; this commitment makes the employee dedicated to working for the betterment of the organization while remaining loyal to the organization.

The relationship between employee commitment level towards their organization and work-related outcomes like performance, turnover and organizational citizenship behavior has been examined by a number of researches. Similarly, some other studies which were conducted in India have indicated that there is a direct relationship between organizational commitment and trust, cultural values, participation satisfaction with a mediating relationship between human resources practices and turnover intentions. However, only few studies have carried out to investigate the effect of training on the commitment level of employees as well as its subsequent impact on the quality of service rendered by employees. Therefore, this study investigates the mediating role of commitment in the relationship between online training and development and the performance of global virtual teams in IT projects.

- Access to training and organizational commitment

The perception which employees have about the opportunities which they are given to participate in training programs irrespective of their eligibility loyalty to managers or criteria and selection process for training attendance is referred to as perceived access. One of the factors that contribute to the development of a strong culture is employees probability of gaining access to a training program because there is positive relationship between this factor and organizational commitment. Findings of previous studies have shown that in comparison to other factors like job satisfaction, job security and monetary benefits, giving employees the opportunity to attend training can be the most influencing factor of organizational commitment. A study conducted revealed that a positive relationship exists between perceived access to training and organizational commitment. In addition, it was found that the level of employee commitment increases if they are given the chance to attend trainings thereby exhibiting high rate of training attendance.

It was further highlighted by that the probability of having greater number of employees that are committed.
is higher in organizations that are perceived to have fair accessibility to training programs. The perception that the organization is willing to invest in its employees may be developed in the minds of the employees if training programs are effective. Therefore, a higher level of commitment towards the organization is encouraged among employees. Results of previous studies conducted in countries like US and Malaysia have revealed that there is a positive association between perceived accessibility and higher level of affective commitment. This implies that the level of employee commitment may be increased by organizations through promotion of training programs as well as making them accessible to their employees.

Describes access to training as employees’ perception of their possibility to attend trainings that are organized by the organization irrespective of the fair selection criteria, formal application procedure and loyalty to managers or eligibility. A simple philosophy is often used in determining yearly organizational trainings that are organized by Human Resources. The topics, number of training programs, training venue and the circulation of information about the training are all done by the Human Resources Department alongside decision makers. Afterwards, the training programs are now assigned to employees whose performances are relatively good by department managers. This method of selection is good because it is time and cost effective. However, it does not serve the major purpose of training but rather serves as a system of reward for employees with better performance. Instead of designing trainings in a manner that is predetermined according to number of trainings annually, a better approach which is more productive is to increase the perceived access of employees.

One significant factor that can enhance the development of a strong corporate culture is organizational training because there is a positive relationship between access to organizational training and organizational commitment. It has also been revealed that the probability of having a greater number of committed employees is higher in organizations that have high level of perceived fair access to organizational training programs. Employee may have the perception that their organization is willing to invest in them if trainings are effective thereby showing more commitment to the organization. If the expectations and desires of employees are met through access to organizational training, then this hypothesis will be supported. Thus, the hypothesis:

H2 (a): There is a positive relationship between access to training and organizational commitment.

- Support for training and organizational commitment

Employees who have the perception that their organization support skill development and upgrading for the purpose of finding better solutions to job-related problems feel obligated to exhibit higher level of commitment to their organization. A study carried out by revealed that there is a positive relationship between perceived support for training and organizational commitment. It was further revealed that the higher the perception employees have about the support received from their organizations the more they want to participate in such training programs. In the same vein, found that there is a direct relationship between support for training and the level of employee effective commitment to organization. Based on these findings, a conclusion is drawn that employees’ perception of accessibility to training programs can be increased through support for participation in training programs. This in turn leads to a feeling of attachment to the organization among employees.

Employees are encouraged to undertake psychological obligations aimed at improving their work performance if they perceive that the organization supports them in developing skills which they can use in solving work-related problems. On the other hand if employees perceive lack of support from their organization they are less likely to feel obligated to the organization because they feel betrayed by the organization thereby reducing their level of commitment to the organization. There are two directions of support and they are vertical and horizontal; horizontal support is the extent to which peers/colleagues are willing to assist each other in good faith while vertical support is the perceived support from tenured workers or superiors. Not only can the attitudes of employees towards their colleagues be enhanced through employees perceived degree of horizontal or vertical support but also their level of job satisfaction as well as affective organizational commitment can be increased. So, our hypothesis is as follow:

H2 (b): The commitment level of employees is positively affected by employees’ perceived degree of support for online training.

- Benefits of training and organizational commitment
Training programs conducted by any organization are reciprocal in nature. Therefore, if employees perceive that trainings which are organized by the organization are beneficial to them as well as the organization then they are more interested in participating in such trainings and this trainings may produce better outcomes in the future\(^{(4)}\). It has also been observed by\(^{(42)}\) some intangible benefits can be obtained from most training programs that are successful. It was found by\(^{(47,48)}\), found that one of the intangible outcomes of training programs organized for employees is organizational commitment. It was also found by\(^{(5)}\) perceived benefits of training is positively correlated to organizational commitment\(^{(11)}\), states that there are three perspectives of training program benefits which include: (a) personal benefits, (b) job related benefits, and (c) career benefits. The benefits which an employee that is attending a training program can expect to obtain in relation to improvement of job performance, network development and attainment of personal growth and development is regarded as personal benefits. Better relationships can be established with colleagues and managers through job-related benefits and this also gives a break from daily work routine. Career benefits can be described as the results of employee participation in training programs which could include the achievement of career objectives and pursuing new paths of career development\(^{(11)}\).

Employees are highly motivated to attend training programs when they believe that by attending those programs they obtain positive outcomes\(^{(24,55)}\). Based on this\(^{(24)}\) posits that a higher level of organizational commitment is exhibited by employees that understand the benefits of training programs so that can be allowed to attend such programs organized by the organization. Similar findings have been revealed by other researchers\(^{(48)}\). It was also found by\(^{(24)}\) that benefits of training programs are strongly correlated to affective commitment. The level of commitment of employees is influenced by the perceived benefits of attending a training program as they aim to attain greater heights in their career and personal goals.

Benefits of any organizational training are reciprocal. According to\(^{(5)}\) the probability of applying what has been gained from participating in training programs as well as the willingness to attend such programs in the future is higher in employees that feel the training programs are beneficial to them and the organization. From a management perspective, it is expected that training program can provide several benefits to the organization which include increased efficiency, employee development as well as improved performance of employee\(^{(51,52)}\). From the employees’ perspective, results of training may be beneficial to their career, jobs and personal development. The expectations of the employees from organizational training could be career-related, job-related or even personal. The job-related benefits are reflected in the employees’ expectation that the efforts they put into training programs may result into improvements of their current positions or promotions. The development of skills which may be required for a future job may be enhanced through career-related benefits. The political, social and psychological results which may or may not be directly associated with work but enhance the essential motivation are reflected in the personal benefits of training\(^{(53,54)}\).

Thus, the positive feelings which employees have towards training should be related to their career development, personal development, job or a combination of any of the benefits. So, our hypothesis is as follow:

\(H2\) (c): The level of commitment of employee to an organization is positively affected by employees’ perceived degree of benefits from online training.

The management’s level of commitment to the quality services it aims at offering customers is highlighted through the mandatory training programs which it organizes. Findings of research conducted by\(^{(55)}\) also serves as empirical evidence confirming that the level of productivity of an organization which invests in its employees is higher than that which makes little or no investment. It can therefore be said that the performance of employees as well as competitive ability can be greatly increased through trainings\(^{(56)}\). Trainings also communicate to the employees that the organization is committed to improving their performance\(^{(52)}\). Through such beliefs employees are encouraged to go extra miles to demonstrate their commitment to the organization.

The level of organizational commitment exhibited by employees may mediate the relationship between the different perceptions about training and its benefits on the quality of service. In other words, drastic improvement may be observed in the quality of service rendered to customers by employees if they are trained in the area of technical skills and problem solving\(^{(58,59)}\). It was found by\(^{(5)}\) that the relationship between access to training, perceived benefits of training, perceived support for training and commitment and team performance is mediated by organizational commitment.
Not only does such training improve the competency of employee but it also creates a sense of obligation for employees to repay it and this is displayed in form of increased level of commitment to organization. Customers are provide with better and faster solutions by employees who feel that they are supported by the organization through training programs.

Opines that employees level of commitment can be increased by perceived accessibility to training programs thereby resulting into improved performs terms of providing better quality service. Based on this it was concluded by the influence of social support for training from four organizational constituents (top management, supervisors, peers, and subordinates) that organizations can achieve the performance which they desire through perceived accessibility since it affects employees commitment level.

The most widely researched area in the field of marketing is service quality because it is regarded as a complex aspect. There are a number of dimensions of customer service which are mainly based on different customer service related areas.

According to, quality service is the difference between what a customer expects in terms of service and the kind of service offered; if what is offered does not give satisfaction to the customer then the customer feels discontented. The way employees welcome their customers and attend to their needs reflect the commitment of employees. Employees who feel a sense of belonging in an organization are more likely to accept and execute duties sincerely than those that are there only because it is an obligation.

Findings of research have shown that through the keenness demonstrated by employees in terms of discretionary efforts, customer satisfaction can be achieved thereby leading into positive words of mouth publicity and customer retention. It has also been observed that long-term relationships with customers can be built if an organization has a workforce that is committed. More so, employees that are dedicated to an organization and use discretionary efforts are more likely to offer quality customer service. However, only few studies have been conducted to examine the relationship between organizational commitment and customer service quality; such studies have only been conducted in the hospitality industry.

According to organizational commitment in early times defined it as the “strength of a person’s bond with the organization”. Another definition given by defined organizational commitment as the perception of the organizational interests as being more relevant than that of the person. Another researcher defined organizational commitment as the employees’ self-identification with their organization, willingness to continue working with the organization, willingness to go extra miles to ensure that the goals of the organization are achieved and adoption of the values, goals and principles of the organization. A study which was carried out in Austria among finance professionals revealed that there is a relationship between employees’ organizational commitment to customers and their job. A number of studies have also shown that high level of organizational commitment increases job performance, reduces absenteeism and increases employee turnover. It was further revealed by this study that organizational commitment was negatively correlated to employees intention to leave the organization and it was also found that employees who had no sense of belonging to the organization displayed little or no commitment to the organization thereby having higher probability of being absent from work, arriving late or resigning. Based on this our hypothesis is as follows:

H3: There is a positive relationship between organizational commitment and the performance of global virtual teams’ in global IT projects. There is a consensus among many researchers that the level of employee commitment is influenced by the perceived benefits of a training program. For instance, emphasized that when employees perceive that they will benefit from training programs their level of performance will be high. Further studies by researchers have shown that the commitment level of employees that perceive that training program will be beneficial to them is often high thereby enhancing their performance and delivery or quality service. So, our hypothesis is as follows:

H4 (a): The relationship between accessibility to online training the performance of global virtual teams’ in global IT projects is mediated by organizational commitment.

H4 (b): The relationship between perceived support for online training and global virtual teams’ performance in global IT projects is mediated by organizational commitment.

H4 (c): The relationship between perceived benefits from online training and global virtual teams in global IT projects is mediated by organizational commitment.

As discussed earlier, one of the most essential strategies which organizations can use in assisting their employ-
ees to obtain appropriate skills and knowledge which is required for dealing with environmental challenges is training and as such researchers have concentrated on finding ways through which the effectiveness of training can be enhanced. In this case, the trainees’ level of training motivation becomes the major determining factor for training effectiveness. In the context of training, the willingness of an employee to participate in a training program is influenced by motivation. So therefore, without considering training motivation, it is impossible for employees to enjoy all the benefits of training. Results of studies have indicated that there is an association between training motivation and effectiveness of training. It has also been revealed in other studies that among other determining factors, motivation plays a key role in the effectiveness of training. As suggested by attitudes and motivations are characteristics which are malleable personal factors that are critical to achieving training effectiveness. Employees may not be able to enjoy the benefits of a training program despite having the ability to learn the content of the training; this is due to little or no motivation. In other words, the effectiveness of training is determined by both the motivation to learn as well as the capability.

Several researches have indicated that among other variables of training effectiveness, attitudes and motivation play very significant roles in enhancing training effectiveness. Based on the fact that motivation is one of the major determining factors of training effectiveness, some studies have been conducted to determine the factors that influence training motivation. Some particular suggestions of such factors include contextual factors like organizational climate, training assignment and framing of training.

Furthermore noted that the benefits which can be obtained from voluntary attendance of training course have been over-emphasized. It was further indicated that the level of motivation to attend a training program is higher in those employees who are forced to attend than in those that voluntarily attend added that employees that are appointed to attend a training program are more motivated to attend than those that voluntarily decide to attend.

The appointment to attend a training program by management shows that such training is essential and also the manner in which the appointment is done enhances the employee’s perception of the training. Thus, the perception of the trainee about the importance of the training as well as the value of the particular training is increased based on the manner in which the supervisor frames the assigning of the training.

Hygiene was suggested as one of the factors that influence employees work motivation in an early study by. Factors of hygiene include the presence or absence of job satisfiers like pay, working condition, interpersonal relationships and company policies; these factors themselves do not cause great job motivation and satisfaction. Dissatisfaction can be eliminated by good hygiene. Based on this, good hygiene among other factors is regarded as a factor that also inspires employees to pursue training practices in their organizations. According to previous studies, it can be said that the factors of motivation include motivating environment, training assignment, hygiene factors and relevance of training.

Motivation can be defined as an individual’s willingness to put in efforts towards a set of behaviors. In a training context, the willingness to participate in a training program, learn the content of the training program and apply what has been learnt in the training to one’s job can be influenced by motivation. Therefore, without putting training motivation into consideration it may be impossible for trainees to enjoy all the benefits of training. A review of studies conducted in the past was done by who found that the effectiveness of training as well as its outcomes are influenced by training motivation. Suggests that low motivation could make employees not to reap the benefit of training program even if they have the ability to understand and learn the course content. So therefore in order to motivate employees, appropriate ways of satisfying the needs of employees need to be found because every individual has different needs. These different needs can be classified into few major categories which include recognition, workers’ participation and team belonging. Again employees will feel more motivated to attend training programs if they feel that their participation is crucial to the growth of the organization; this makes the employees feel motivated and empowered. This kind of feeling of motivation makes employees work in a manner that benefits not just them but also the organization. As put by: “The participative approach addresses development of good supervisor-subordinate relationships and cohesive work groups in order to satisfy both social needs and the needs of business demand”.

It is suggested that managers use a system which identifies and rewards those workers that perform well as a means of motivating employee participation. For instance,
in food processing company, workers who identify ways of saving cost through improved means of production should be rewarded. Apart from financial rewards, recognition is said to be one of the powerful means of inspiring employees.\textsuperscript{85} states that “positive reinforcement” is particularly effective when it is used for teams instead of individuals and therefore it is recommended that an award of recognition for example be given to “best performing crew of the month”. Even though some researchers opine that financial incentive is a great way to reward the efforts of employees, it has also been found by other studies that many other employees have been motivated through recognition.\textsuperscript{87}

Another great way of motivating employees is through team belonging. This was found in a study which was conducted among construction workers.\textsuperscript{87} Notes that when teams are given self-management opportunities they become more motivated because it allows for active participation among team members and the group as a whole is given more responsibility to make decisions. One of the benefits of such empowerment is the building of good relationships with other members of the organization. So, our hypothesis is as follows:

H5 (a): The relationship between accessibility to online training and the performance of global teams in global IT projects is moderated by motivation.

H5 (b): The relationship between perceived support for online training and performance of global virtual teams in global IT projects is moderated by motivation.

H5 (c): The relationship between perceived benefits from all theories above we will propose our conceptual framework (Figure 1.)

3. Materials and Methods

The conceptual framework of this study was developed based on a review of literature. Through the survey the conceptual framework is verified. The survey instrument used in this study was a structured questionnaire which was used in measuring the performance of global virtual teams in relation to their involvement in online training, organizational commitment and motivation. A pilot study was conducted in the early stage of instrument development and the conceptual framework was validated through an interview which was conducted among six experts. The reliability and validity of instrument was tested using experts which are typical respondents. The validity of the conceptual framework as well as the validity and reliability of the instrument was confirmed through the results. Afterwards, the online survey was conducted. A total number of 103 employees from IT companies in Technology Park Malaysia (TPM) participated in the survey; in this IT companies, some of their staff work virtually. The respondents were randomly selected.

Figure 1. The Conceptual Framework

3.1 Confirmation Study/ Preliminary Study (expert-questionnaire interview and pilot study)

In order to refine the instrument before sending it out to the actual respondents, a pilot study was carried out. In the early phase of instrument development, a structured interview was conducted among 6 experts out of which 4 were from the industry and the remaining two were academics in this field of study. This was also done as a way of validating the conceptual framework. The draft of expert questionnaire interview was sent to two experts, the first one in expert English language and the second one in expert in questionnaire design. This was done before the structured interview was conducted. The results of the structured interviews which were conducted among experts were analyzed. Based on the feedback obtained from experts, the conceptual framework was refined. Subsequently, the instrument for the study was developed according to the refined framework. Prior to sending the questionnaire the content and face validity of the questionnaire was tested. Before sending the questionnaire, the draft of questionnaire was tested in terms of content, and face validity. This pilot study was conducted.
among few randomly selected staffs of the IT companies in Technology Park Malaysia (TPM) working virtually, suggest that the sample size for pilot test should normally be small, ranging from 15-30 respondents but it is to be increased substantially if the test involves several stages. Therefore, a total of 40 copies of questionnaire were sent to the respondents for pilot study using online survey (survey monkey) and 25 of the questionnaires were completed. The results confirmed the validity of the conceptual framework as well as the validity and reliability of the instrument.

3.2 Confirmation Study/ Empirical Study (The Survey)

Total of 103 questionnaires were distributed to randomly selected staffs of IT companies in Technology Park Malaysia (TPM) working virtually. A summary of the demographic distribution of respondents is presented in (Table 1). According to these results majority of the respondents were males (74.8%) within the age range of 26 to 35 years (66%). For nationality, the highest percentage belonged to those who were Asian (56.3%) followed by Middle East (38.8%). In terms of education, majority of the respondents were undergraduate (85.4%) and only 12.6% fell under postgraduate level. Results for qualification showed that “IT Professional” had the highest frequency (69.9%) followed by “IT Project Manager” (14.6%) and then “System Analyst” (13.6%). For the work experience, the highest percentage belonged to those who had experience of 6 to 10 years (38.8%) followed by 1 to 5 years (35.9%).

For organizational characteristics, the results of frequency table for type of industry showed that 94.7% of companies were computer/IT based companies and only 4.9% were in telecommunication. According to these results 60.2% of organizations were private and 38.8% semi government. The results also showed that the highest frequency for number of projects was “1 to 10” projects (72.8%) followed by “11 to 20” (23.3%). The majority of companies (88.3%) had less than 10 staff. Results for duration of last global IT indicated that the majority of the respondents were on a project for “more than one month” (70.9%). Results for “number of native languages used by members in last global virtual team” showed that the majority used 1 to 5 (93.2%) and for “number of locations in last global virtual team” the highest frequency belonged to 1 to 5 (97.1%). The response of respondents to the question “what are the most time differences between 2 locations?” showed that 1 to 5 hours had the highest frequency (92.2%). (See Table 2).

3.3 Data Analysis

Convergent and Discriminant Validity

In PLS, the use of discriminant and divergent validity is employed in assessing validity. Convergent Validity (CV) measures the extent to which a measure correlates positively with the alternative measures of similar construct. Simply put, CV signifies the measures which should be related in reality and share a high proportion of variance. The use of Average Variance Extracted (AVE) is required

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>26</td>
<td>25.24</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>77</td>
<td>74.76</td>
</tr>
<tr>
<td>Age</td>
<td>Less than 26</td>
<td>14</td>
<td>13.59</td>
</tr>
<tr>
<td></td>
<td>26 - 35</td>
<td>68</td>
<td>66.02</td>
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<tr>
<td></td>
<td>36 - 45</td>
<td>19</td>
<td>18.45</td>
</tr>
<tr>
<td></td>
<td>46 - 55</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Nationality</td>
<td>Asian</td>
<td>58</td>
<td>56.31</td>
</tr>
<tr>
<td></td>
<td>Middle East</td>
<td>40</td>
<td>38.83</td>
</tr>
<tr>
<td></td>
<td>European</td>
<td>5</td>
<td>4.85</td>
</tr>
</tbody>
</table>

For Education Level, Undergraduate 88 85.4, Postgraduate 13 12.6, IT Project Manager 15 14.85, System Analyst 14 13.86, IT Professional 72 71.92, Work experience Less than one year 2 1.94, 1-5 years 37 35.92, 6-10 years 40 38.83, 11-15 years 19 18.45, 16-20 years 4 3.88, More than 20 years 1 0.97.
in order to establish CV while the indicators outer loading should be high (Table 3). AVE is the average amount of variance in indicator variables which is explained by a construct. An AVE value must be at least 0.5 which implies the adequacy of CV, implying that a latent variable is able to explain more than a half of its indicators on average. In order to determine which indicator should be eliminated or retained outer loading relevance testing is performed.

Table 2. Frequency distribution for organizational characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Industry</td>
<td>Computer/IT</td>
<td>97</td>
<td>95.10</td>
</tr>
<tr>
<td></td>
<td>Telecommunication</td>
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<td>4.90</td>
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<tr>
<td></td>
<td>Total</td>
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<td>99</td>
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<tr>
<td>Organization Type</td>
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<td>Private</td>
<td>62</td>
<td>60.78</td>
</tr>
<tr>
<td>No. of projects</td>
<td>1-10</td>
<td>75</td>
<td>72.8</td>
</tr>
<tr>
<td></td>
<td>11-20</td>
<td>24</td>
<td>23.3</td>
</tr>
<tr>
<td></td>
<td>21-30</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>More than 30</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>No. of Members</td>
<td>1-10</td>
<td>91</td>
<td>88.3</td>
</tr>
<tr>
<td></td>
<td>11-20</td>
<td>11</td>
<td>10.7</td>
</tr>
<tr>
<td></td>
<td>More than 30</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Duration Time</td>
<td>Less than one month</td>
<td>19</td>
<td>18.4</td>
</tr>
<tr>
<td></td>
<td>More than one month</td>
<td>73</td>
<td>70.9</td>
</tr>
<tr>
<td></td>
<td>More than one year</td>
<td>10</td>
<td>9.7</td>
</tr>
<tr>
<td>No of Languages</td>
<td>1-5</td>
<td>96</td>
<td>93.2</td>
</tr>
<tr>
<td></td>
<td>6 - 10</td>
<td>7</td>
<td>6.8</td>
</tr>
<tr>
<td>No of Locations</td>
<td>1-5</td>
<td>100</td>
<td>97.1</td>
</tr>
<tr>
<td></td>
<td>6 - 10</td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td>Time difference</td>
<td>Less than one an hour</td>
<td>4</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td>1-5 hours</td>
<td>95</td>
<td>92.2</td>
</tr>
<tr>
<td></td>
<td>More than 5 hours</td>
<td>4</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Table 3. Average Variance Extracted (AVE)

<table>
<thead>
<tr>
<th>Construct</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOT</td>
<td>0.521</td>
</tr>
<tr>
<td>PBOT</td>
<td>0.584</td>
</tr>
<tr>
<td>SSOT</td>
<td>0.648</td>
</tr>
<tr>
<td>MOT</td>
<td>0.747</td>
</tr>
<tr>
<td>OC.AF</td>
<td>0.641</td>
</tr>
<tr>
<td>OC.CN</td>
<td>0.648</td>
</tr>
<tr>
<td>OC.NR</td>
<td>0.675</td>
</tr>
<tr>
<td>GPF.PE</td>
<td>0.669</td>
</tr>
<tr>
<td>GPF.PF</td>
<td>0.674</td>
</tr>
</tbody>
</table>

The reason for discriminant validity is to measure the extent to which a construct is truly different from other constructs by empirical standards. In doing this, cross-loading values in the PLS algorithm are examined and the outer loading on related constructs should be greater than all its loadings on other study of constructs, the evaluation also accounts for previous reported studies. For this purpose, bootstrapping option in Smart PLS 2 was run twice; with and without moderators. Finally, an evaluation of the t-value of the beta (B) path co-efficient was performed for the purpose of testing the hypothesis of the study using a one-tailed test where a t-value lies 1.645 or greater at the confidence level of 0.05.

4. Results and Discussion

4.1 Initial Path Model without Moderators and Mediators

The research hypothesis was assessed and tested using structural equation modelling (Partial Least Squares; PLS). According to the research model, the first model evaluates the effect of all independent variables including access to online training, perceived benefits of online training and supervisory support for online training on global virtual teams’ performance and global IT projects success. Figure 2 shows the path model without considering organizational commitment as a mediator and moderator.
Figure 2. Initial Path model without Moderators and Mediators.

The results of boot strapping method show a p-value for each relation. All structural model relationships were significant considering a p-value = 0.05. In the model both IV’s had a significant and a positive coefficient which means that higher level of access to online training, perceived benefits of online training and supervisory support for online training will lead to achieving a better performance of global virtual teams as well as success in global IT projects. It was found that the effect of access to online training on global virtual teams’ performance and global IT projects success was positive and significant which had the highest effect (B=0.282, p=0.001) followed by supervisory support for online training (B=0.263, p=0.008). Perceived benefits of online training also had positive influence on global virtual teams’ performance and global IT projects success (B=0.240, p=0.009). Most of the previous studies agreed that employee training plays a significant role in improving employee performance.

4.2 The Mediation Effect of Organizational Commitment

In the second step the constructs of “organizational commitment” were added to the first model as independent and exogenous variables including its mediating effect on dependent variable Figure 3. Results of boot strapping method after introducing mediator variables (organizational commitment) in the model showed the effect of all three independent variables including access to online training (B=0.126, p=0.09), supervisory support for online training (B=0.035, p=0.618) and perceived benefits of online training (B=0.102, p=0.196) were not statistically significant on global virtual teams’ performance and global IT project success while all these IVs significantly influenced organizational commitment as a mediator.

Figure 3. Path Model Including Organizational Commitment as a Mediator.

These results indicated that supervisory support for online training (B=0.405, p=0.027) followed by access to online training (B=0.281, p=0.002) had the highest effect on organizational commitment and the lowest effect belonged to perceived benefits of online training (B=0.235, p=0.000). According to these results organizational commitment showed a significant and positive effect on global virtual teams’ performance and global IT projects success (B=0.562, p=0.000).

According to the results it was found that organizational commitment was able to mediate positively the relationship between access to online training, benefits of online training and development, supervisory of online training and development and global virtual teams’ performance alongside global IT projects success which is supported by a study conducted by.

4.3 The Moderation Effect of Motivation

The moderating effect of motivation was explored to determine if motivation has a significant effect on the relationship between all components of online training and development and global virtual teams’ performance and global IT projects success. In many situations, researchers have a continuance (Rather than a categorical) moderator variable which they believe can affect the strength of one specific relationship between two latent variables. The direction of relationships may be changed by moderators. In the last step motivation was added to the first model as independent and exogenous variables including its moderating effect on dependent variable. See (Figure 4).
Measuring the Global Virtual Teams (GVTs) Performance: Confirmation Study

Figure 4. Path Model Including Motivation as Moderator.

Table 4. List of Hypothesis and Relative Paths

<table>
<thead>
<tr>
<th>Path</th>
<th>H</th>
<th>B</th>
<th>P-Value</th>
<th>T-Value</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOT -&gt; GPF</td>
<td>H1(a)</td>
<td>0.282</td>
<td>0.001</td>
<td>3.497</td>
<td>Supported</td>
</tr>
<tr>
<td>SSOT -&gt; GPF</td>
<td>H1(b)</td>
<td>0.263</td>
<td>0.008</td>
<td>2.672</td>
<td>Supported</td>
</tr>
<tr>
<td>PBOT -&gt; GPF</td>
<td>H1(c)</td>
<td>0.240</td>
<td>0.009</td>
<td>2.726</td>
<td>Supported</td>
</tr>
<tr>
<td>AOT -&gt; OC</td>
<td>H2(a)</td>
<td>0.281</td>
<td>0.002</td>
<td>3.183</td>
<td>Supported</td>
</tr>
<tr>
<td>SSOT -&gt; OC</td>
<td>H2(b)</td>
<td>0.405</td>
<td>0.027</td>
<td>4.568</td>
<td>Supported</td>
</tr>
<tr>
<td>PBOT -&gt; OC</td>
<td>H2(c)</td>
<td>0.235</td>
<td>0.000</td>
<td>2.244</td>
<td>Supported</td>
</tr>
<tr>
<td>OC -&gt; GPF</td>
<td>H3</td>
<td>0.562</td>
<td>0.000</td>
<td>4.607</td>
<td>Supported</td>
</tr>
<tr>
<td>AOT -&gt; OC -&gt; GPF</td>
<td>H4(a)</td>
<td>0.158</td>
<td>0.014</td>
<td>2.499</td>
<td>Supported</td>
</tr>
<tr>
<td>SSOT -&gt; OC -&gt; GPF</td>
<td>H4(b)</td>
<td>0.228</td>
<td>0.003</td>
<td>3.045</td>
<td>Supported</td>
</tr>
<tr>
<td>PBOT -&gt; OC -&gt; GPF</td>
<td>H4(c)</td>
<td>0.132</td>
<td>0.047</td>
<td>2.012</td>
<td>Supported</td>
</tr>
<tr>
<td>AOT * MOT -&gt; GPF</td>
<td>H5(a)</td>
<td>0.191</td>
<td>0.031</td>
<td>2.184</td>
<td>Supported</td>
</tr>
<tr>
<td>SSOT * MOT -&gt; GPF</td>
<td>H5(b)</td>
<td>-0.079</td>
<td>0.336</td>
<td>0.966</td>
<td>Not Supported</td>
</tr>
</tbody>
</table>

The interaction between motivation and all IVs were entered to the final model. According to these results it was found that motivation was able to moderate positively the relationship between access to online training global virtual teams’ performance and global IT projects success (B=0.191, p=0.031) while the moderating effect of motivation for perceived benefits of online training (B=0.080, p=0.223) and supervisory support for online training (B=-0.079, p=0.223) was not statistically significant. According to the results it was found that motivation was able to moderate positively the relationship between access to online training global virtual teams’ performance and global IT projects success which is supports a study conducted by11. The moderating effect of motivation for perceived benefits of online training and supervisory support for online training was not statistically significant which is different from previous studies of13 and14. This negative effect could be justified by the fact that most of the GVTs are professional especially those working in IT project development for many years. So, they think that the benefits of online training will be limited for them because of the large experience that they gain from many years of working. Most GVTs mostly work remotely. So, they mostly don’t get enough support from their organization and the organizations hardly keep in touch with them. For list of hypothesis and relative paths see (Table 4).

5. Conclusion

A framework for measuring the global virtual teams’ performance involving online training and development, organizational commitment, and motivation is proposed. The employees from IT companies in Technology Park Malaysia (TPM) working virtually were randomly selected as samples for this study. The results of the Confirmation/preliminary study confirmed the validity of the conceptual framework and the validity and reliability of the instrument. Confirmation/empirical study were for verifying the conceptual framework and the final framework. Based on analyses and findings generated through structural equation modelling (SEM-PLS), it can be concluded that organizational commitment had slight mediating effect while motivation was a moderator in this
This study will open a new opportunity for those who want to further investigate global virtual teams’ performance.

6. References


68. Wahn JC. Sex differences in the continuance component of organizational commitment. 1998 Sep; 23(3).


83. Tai W. Effects of training framing, general self-efficacy and training motivation on trainees' training effectiveness.


