



# Success Factors for Building and Managing High Performance Global Virtual Teams

Dan Schilling Nguyen, Ph.D<sup>a\*</sup>

<sup>a</sup>*Mt Washington College National Online Program,*

*1015 Windward Ridge Parkway, Alpharetta, GA 30005, USA*

<sup>a</sup>*Email: dan.nguyen@waldenu.edu*

## Abstract

With the phenomenon of globalization, the global virtual team (GVT) is widely recognized as an innovative functioning atmosphere that relies mostly on information communication technologies (ICTs). A global virtual team is specified as a different entity whose members come from different global work locations, may not have a mutual background, is organizationally scattered, collaborate using asynchronous and synchronous ICTs, and frequently built on an impromptu basis. Hence, boundaries such as geographical space, time, and organizations are no longer conceived as major impediments for small teams to function together. Yet, numerous GVT work challenges remain as these teams involve in globally distributed collaborative efforts. Numerous of the complexities emerge from workplaces factors (e.g., cultural, functional, and organizational differences), team technologies usage, management approaches, leadership dilemmas, and technological impediments. The purpose of this paper is to present and synthesize the success factors generally accepted as critical in building and managing high performance GVTs. These success factors consisted of GVT (e.g., structure, member' competencies, commitment and trust, communications, goals, and collaboration), leading GVTs (e.g., leadership competencies, skills, and styles and so on), management (e.g., project, risk, team, knowledge and skills, and information managements), workplace factors (e.g., cultural, functional and organizational differences), technologies (e.g., development tools, and information communication technologies), and standards of excellence and external support. Organizational managers and practitioners from various industries who are building or managing GVTs could be of benefits with the researcher's study outcomes by implementing or developing strategies or processes that could improve GVT performance for long term sustainable development. High performances GVT outcomes include improve team overall performance, time to the market, project success rate, and a better safer and healthier organizations or society.

**Keywords:** Global Virtual Team; High Performance GVTs; Leadership; Workplace Factors

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\* Corresponding author. Tel.:317-212-9255.

E-mail address:Dan.Nguyen@waldenu.edu.

## **1. Introduction**

In today's global economy, increasing numbers of software developers are expected to function in a distributed atmosphere around the globe [21]. Successful organizations that able to use advanced ICTs to establish dynamic shape to adapt to the always changing environment and customer requirements ever increase a competitive advantage in global competition. In this environment, geographical space presents physical separation between management and team members, temporal distance barriers and confines opportunities for direct contact and cooperation and cultural distance adversely effects on the level of understanding and appreciation of the activities and efforts of remote colleagues and teams [24]. The lack of a common native language results further barriers to communication [2], [32]. These distances conglomerate in global distance, which is usually experienced in GVT atmospheres.

Currently, GVTs offer tremendous opportunities and tribulations. Despite the risks, GVTs have shapes a business necessity in today's global economy. The complexities and subtleties of dealing with widely different personalities, cultures and languages make communication far more difficult among GVT members [31]. Organizations that have successful GVTs have leaders who interpret the unique characteristics of ICTs. Adapting better technology and management or leadership style to better team workflow, communication and management accountability is critical to GVT success. GVT leaders must acknowledge that "it is vital that all GVT members jointly define the team's identity, communication, goals, building, training, processes" and so on [31]. With the technological infrastructure necessary to accompaniment GVTs now immediately available, research on issues surrounding GVTs is seasonable to provide insight or determine success factors into building and managing them effectively. If leaders of GVTs do not recognize the need to address the differences in how they structure their teams and reward them, they risk GVT members not having the clarity needed to be accountable.

Building and managing GVTs can be a challenging task due to various barriers as workplace factors such as cultural, functional and organizational differences. A project manager with effective communication and coordination skills, and be creative assuring maximum attention span of team members during GVT meetings are also some of notable success factors in managing GVTs [18]. Additionally, leaders utilize effective leadership styles depend on certain contexts can also have good effect on project outcomes.

Furthermore, critical factors commonly accepted for each team member include self-reliance, desire and experience in working virtually, good problem solving skills, honest reporting, cooperation with other team members, cultural sensitivity, ability to communicate exceedingly well using email, IM, telephone, etcetera, and goal oriented [18]. Moreover, communication tools are available, virtual is the best or only method to conduct the project, management accompaniments virtual projects, a collaboration distance is available and accessible, the project manager is competent in building and managing virtual projects, and the project completion can be documented [18]. In particular, very little has been written on GVT project success, success factors for building and managing high performance GVTs [12, 14]. Very few authors have attempted to offer sets of success factors (SFs) and even fewer empirical studies have attempted to explore the relationship between SFs and project success in GVT [12].

This paper is significant for both researchers and practitioners because it has the possible to shed light on SFs as critical in building and managing high performance GVTs. It also contributes more commonly to the evolving savvy of SFs in the specific and non-traditional mode of project management, used in GVTs [12]. The research is important for project supervisors and for national project coordinators and their project teams in that its findings, if integrated into training programs, may direct to better understanding and use of SFs. If the supervision of GVTs projects does in fact improve project success [12], then there is a lack of knowledge on SFs and their linkage to project success.

In this article, the researcher performed extensive literature review to determine the success factors (SFs) as critical in building and managing high performance GVTs. The literature review (see Figure 1) consisted of GVT (e.g., structure, member' competencies, commitment and trust, communications, goals, and collaboration), leading GVTs (e.g., leadership competencies, skills, and styles and so on), management (e.g., project, risk, team, knowledge and skills, and information managements), workplace factors (e.g., cultural, functional and organizational differences), technologies (e.g., development tools, and information communication technologies), and standards of excellence and external support. The researcher emphasized on effective communication and communication techniques, and appropriate leadership styles in managing GVTs. The researcher then provided recommendations for actions and direction for future studies. The researcher used the High Performance GVTs Research Model as shows in Figure 1 to organize and present his study findings.

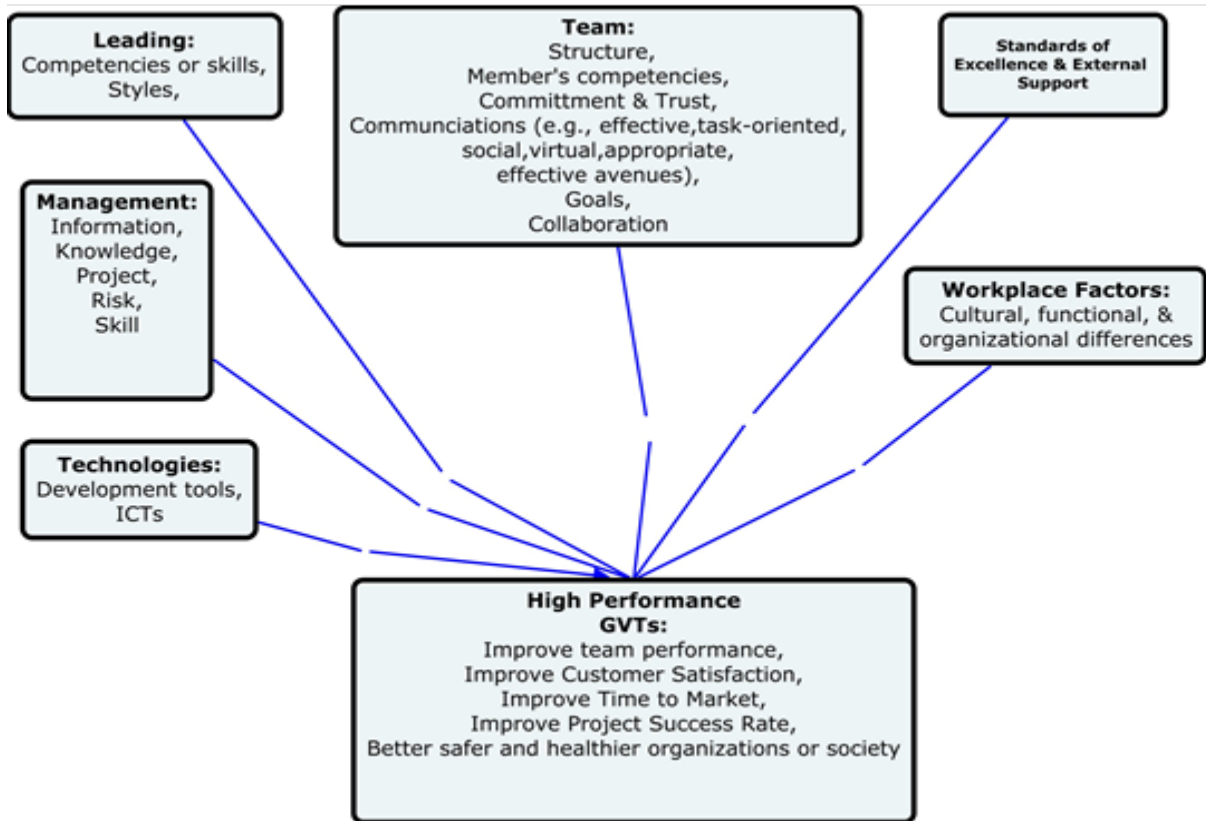


Figure 1. High Performance GVTs Research Model

### 1.1. Background of The Study

The utilization of ICTs, a multicultural workforce, and changing organizational models that gain employee participation have changed the nature of multinational corporations. One of the important developments in organizational design is the foundation of team-based structures. An example is the virtual organization, of which GVTs are the building blocks [29]. Members of these GVTs are often dispersed around the globe [21]. Progressions in technology facilitate communication and the collaboration of information among GVT members. By using GVTs, organizations can unify the best technical expertise available around the globe for task performance regardless of geographic location [29]. As a result, the utilization of GVTs offers organizations tap to a wider pool of skills and expertise, which can reduce development time to the market. Teams can gain organizational operation, lateral communication, and employee participation.

But in spite of their advantages, GVTs face more communication challenges than face-to-face (F2F) teams; traditional communication mechanisms are lost or distorted, and vocal and nonverbal communication cues are often missed [29]. Additionally, with GVT members in various time zones, logistics are more complex. As a consequence, building trust among GVT members and overcome feelings of isolation and detachment becomes a challenge. Thus, ICT utilization in global organizations increases teamwork complexity and may affect its effectiveness. Finally, the culturally heterogeneous composition of many teams conduces to their complexity as cultural biases may distort communication.

For organizations just beginning to move from traditional hierarchical structures to team-rooted structures, neither team members nor managers may have the training and interpersonal skills to function co-operatively in GVTs [31]. Additional literature shows that leaders of GVTs must address challenges that traditional team leaders do not have to outcome. These challenges are based on the socio-spatial structure of GVTs, which perhaps results in confined F2F interaction. At the same time, the goal for leaders or managers remains unchanged: leaders must build and sustainable team members, and there is no difference with GVTs. Clearly, it can be challenging for GVT leaders to build and sustain their team when its attributes include physical dispersion and inter-organizational membership that

is traversed primarily by new ICTs. Such uncertainties operate against the development of trust and challenge the validity and longevity of GVTs. As a case in point, Panteli indicated possible benefits to GVTs such as having shared goals [19]. Just like any other team, GVTs trust on their leadership to set the stride for building a strong foundation based on clear goals and objectives.

Bunderson and Boumgarden indicated that there is a general assumption that too much management and structure is 'disempowering' and will vanquish innovation which is not ineluctably true for all cases [4]. In their study of GVTs performing stable tasks (as opposed to teams with imposed rules from the top), they found that the lack of structure more often than not resulted in squandered resources, and member frustration, inefficiency and poorly coordinated efforts while more extremely structured teams had less disputes and shared information more freely. They argue that this is because the more clearly specified (or structured) goals, procedures, authority relations, and rules make interactions more predictable and less risky, thus fostering psychological safety and a strong groundwork for intragroup trust.

GVTs are more susceptible to the dilemmas of poor structure because people are in distinct locations, cultures, and times. In terms of psychological safety, they generally start off in the hole. GVT members have fewer data with which to assess each other and less shared settings in which to establish trust. Researchers like Ruhleder and Jordan discovered that reliance on ICT implies they are more probably to misinterpret each other, and yet they have lesser chances to repair these misunderstandings [26]. Others like Bell and Kozlowski add that GVT members are less cognizant of the bigger picture and the adjustments going on that may impact their project [3]. Moreover, GVT leaders cannot coach, facilitate, and monitor GVT member operation and advance in the traditional feel to uphold everyone together, so these works must be replaced by processes and structures and permit the team to regulate and check themselves.

## **2. High Performance Global Virtual Teams**

### **2.1. Global Virtual Teams**

#### **2.1.1. Team Structure**

In addition to internal factors (e.g., leadership) and workplace factors (e.g. cultural, functional, and organizational differences), hence, organizations GVTs overall performance also depends on how GVTs initially structure [4], [13] and alignment. If leaders of GVTs do not recognize the need to address the differences in how they structure their teams and reward them, they risk GVT members not having the clarity needed to be account [4].

Johnson et al also affirmed how GVTs initially structure have consequence to team overall performance [13]. Johnson et al. findings indicated that all teams were at the beginning structurally misaligned and subsequently obtained [13] (a) no feedback, (b) one type of feedback only, or (c) both types of feedback. Johnson et al. study affirmed that structurally misaligned teams illustrated dysfunctional alter by altering process more often than structure, with damaging effects for subsequent team performance. When teams obtained the feedback interventions, however, they were more probably to alter their structure and thereby better their performance.

Hollenbeck et al. recommended that one significant issue in this respect involves team structure: the social architecture of the team that depicts how its task is organized and differentiated [13]. Functionally structured teams show an extremely differentiated division of labor, where each member specializes in a particular part of the team's work. On the contrary, divisionally structured teams represent a low degree of differentiation of labor, where each member is a generalist and can do any part of the team's work. Uniform with structural contingency theory, research has discovered that functionally structured teams do best in predictable task atmospheres, whereas divisionally structured teams do best in unpredictable or quickly altering work [13]. This is because functionally structured teams can leverage the efficiency inherent in their differentiation of personas in predictable situations, but this efficiency breaks down when the work is always altering. Divisionally structured teams can leverage the flexibility inherent in members' ability to do any of the team's works, which is specifically helpful when it is difficult to foretell what will occur next and / or the team needs to respond rapidly.

#### **2.1.2. Team Member's Competencies**

GVT member's competencies also have effect on team overall performance [18]. It is imperative for organizational managers to work with HR personnel when interviewing new candidates and / or selecting candidates or members' with appropriate competencies for the job. Not every candidate is well qualified or has the competencies or the skills required to perform the vacancy is being advertised. Hence, when managers are building and managing high performance GVTs they need to put in place appropriate procedure in order to choose the appropriate candidate for

the job. This process is also applicable when selecting GVT managers or leaders as well. Managers or leaders' competencies will be further addressed in the later leading GVTs subsection.

### **2.1.3. Team Goals**

Leaders serve the bridge between GVT members and connect them with a common goal or vision [32]. Each of new project GVT members are being work on, it is imperative for leaders to drive and work with members' goals as well as put strategies in place to help them achieve their assigned goals this in term will help improve team overall performance. Leaders need to help team member set goals and align team overall goals as well as strategy in place to work on and achieve assigned work on time as specified is also critical for team overall success. Goal alignment needs to be managed with due to divergent culturally endorsed aspirations, and a GVT atmosphere in which goal conflicts are not squarely detectible [32]. According to Earley and Mosakowski, effective teams are those that have a firm team culture (a sense of purpose and goals) and shared expectations [32]. Define clear objectives and prepare detailed plans, but have steady checkpoints and communication to create essential changes. Bell and Kozlowski also add that clear goals should be set both for the GVT as an integral and for each member. Clarity permits GVTs to monitor their own advance and to be more motivated to accomplish the goal [3].

The most usual theme when analyzing the information in this category is the challenge of multitasking [24]. Leaders noted that they are encountered with the importance of distributing tasks distinctly based on capability. This lends itself to the importance of getting to know your employees. Multitasking during team meetings appears to be a significant issue as well. Communication is very significant in GVTs; thus, having team members who are not fully aimed on a meeting might be unproductive for the team as an integral. Team overall performance success depends on how well each team members are able to achieved their assigned tasks and goals to accomplish them [18]. If GVT members lack of goals in order to help achieve their assigned tasks could lead to hinder team performances.

**Goal alignment.** The GVT manager should initiate a discussion on particular project objectives and how they link to overall organizational goals [32]. This is significant in the multinational setting because the purpose of the overall organization may be interpreted in distinct avenues, and while in traditional teams tacit knowledge about goals often evolves it is often missing in GVTs. We know that interpretations of objectives are frequently assumed to be shared, but in GVTs we cannot assume that these expectations are inevitably aligned. Managers can promote discussions on objectives and purpose in order for all to be part of the process of building a team's reality. This assists to align culturally diverse renditions of objectives, creates common savvy and trust, and beyond that also a shared vocabulary that afterward leads to a sense of ownership and shape significant for commitment and motivation.

### **2.1.4. Team Commitment and Trust**

GVT members' tasks commitment as well as trust is also vital to team overall performance success. In Joshi et al. study, teams that were more geographically scattered had greater perceptions about leadership, dedication to the team and team trust [32]. Thus, GVT members' work commitment and trust play a significant role with team overall performance success. Nguyen [18] conducted a qualitative study titled "Workplace Factors That Shape Information Technology Project Success," interviewed twenty GVT managers. Question. "What is your lived experience on how effective virtual team trust could heighten the likelihood of IT project success?"

The outcomes themes linked with this question were "an effective way to manage team members and trust is essential to project success; team dedication to user stories and task completion must be maintained; key role in effective information sharing and positive impact on knowledge sharing; bridge the psychological space between team members; effective communication and honesty is key and trust must understood; full trust in each other is significant to project success; significant to establish trust when first forming a team; and priority issues should address in timely manner and measure what to do today, tomorrow and roadblocks" [18].

**Building trust.** A related factor in the successful performance of software testing teams is the formation of trust. In a GVT environment it can be hard to develop and uphold trust between distant GVT members. Many factors come into play, which include the deficiency of opportunities for the growth of human relationships between distant GVT members. These can be compounded by cultural, fear, linguistic and motivation linked issues. Through communication, GVTs must secure the trust of their distributed members before they can be recognized as being performing members of the team [18, 31]. Furthermore, gaining the trust of team members will hopefully prevent GVT members from freeloading and other deceptive behaviors, thereby increasing the productivity and effectiveness of the integral team.

A component critical to success in all teams is the ability to build trust among GVT members. In GVTs, "trust is argued to be rooted in perceptions of teammates' ability, benevolence, and integrity" [31]. The GVT's persona

transcends co-located team fixed functional personas, requiring GVT members to be prepared to adapt to an altering diversity of assignments and workloads during the life of any specific team. All of these factors impact the workplace in which the individual members of GVTs must acquire to work. GVTs, because they possess the potential to significantly shrink the amount of travel needed of team members, can dramatically gain the productive capacity of individual members. GVT membership will be considerably more dynamic than co-located teams, and GVTs will be more probably to include members from workplaces that would not traditionally have operated together. This dynamism requires GVT members to be especially adaptable to operating with a wide diverse of potential co-workers.

The challenges detailed here have the potential to make a radically distinct workplace for the GVT participant, both because of the change from F2F to some level of virtual interaction and because the GVT is expected to operate in a distinct form of organization and take new organizational roles [31]. GVT members will be required to have superior team participation skills. Because team membership will be somewhat fluid, effective teams will require members who can quickly assimilate into the team. GVT members will have to become proficient with a diverse of ICTs. In numerous organizations, GVT membership will cross national boundaries, and a diverse of cultural backgrounds will be introduced on the team. This will rarify communications and workload interactions and will need additional team member growth in the areas of communication and cultural diversity.

To tap the advantages of the new workplace fully, GVT members will require fundamental teamwork training and development and will also necessitate training to enhance their facility with the new ICTs [31]. GVTs require organizational re-structuring and the introduction of new work technologies. One of the greatest challenges in the introduction of GVTs is the successful internalization of valuable technophobic staff into the GVT environment. Organizations must be thrifty not to overextend GVT members and burden them with degrees of responsibility that they cannot moderately satisfy. One important supervisory persona will be to ensure that GVT members have sufficient private time to finish their individual tasks and get ready for their team participation.

### **2.1.5. Team Collaboration**

**Cooperation.** Teamwork is a collaborative activity and without collaboration teams cannot work effectively [18], [24]. Like so numerous other factors which are necessary for GVTs, distance adversely impacts on the degree of cooperation that occurs between distant team colleagues. The reality is that GVT members must be motivated to build effective cooperation with their distant members. Numerous issues directly palliate against the formation of collaboration in the GVT environment. In these circumstances from the project management view collaboration between team locations has to be developed, built and effectively managed. Even though progressions in ICT significantly alleviate GVT collaboration and finally heighten team operation, it is significant for GVT members to derive firm interpersonal dynamics and accompiment technical facets, as even the most progressed ITs simply partially conduce to the success of these teams [6].

**Flexible schedule.** Flexible time schedule is a benefit for members of distant teams that may be in distinct time zones and have family or other commitments [18]. Flexible work schedule also work best for local GVT members other commitments as mentioned previously. Common times need to be built for routine catch ups to discuss progress. Thus, flexible schedule benefits GVT leaders and members as well as cross-functional teams.

**Get the team together.** One of the great benefits for project managers to establish virtual team is cost reduction such as traveling cost. If it's a long and ongoing project, it's also significant to at least attempt and get the team together F2F at least once if not multiple times throughout the project [18]. This assists everyone get a sense for who they are operating with and establish firmer work relationships. Is it absolutely essential to get together? However, for those times you do interact with the other GVT members in F2F, it transforms the working relationship and truly benefits the project. It can be a very challenging task when bring all team members together for F2F interactions especial when members from multinational countries. Thus, F2F was never practical due to the significant cost to create it happen [18]. An alternative solution is to use collaboration and communication such as video and teleconferences to minimize or simplifies F2F meetings or interactions traveling cost constraints [18]. We recommend this alternative solution is another avenue for to team members to collaborate and interact.

**Knowledge transfer.** Knowledge transfer needs to be managed due to culturally based divergence in communication and trust, and the GVT environment's deficiency of a rich communication medium [32]. Effective knowledge transfer is a core activity when forming and working a GVT. Effective knowledge transfer helps leverage team members performance as well as expertise. Project manager should always promote knowledge transfer for team sustainable development [18]. For instance, a team member with the most expertise in certain functional area, he or she transfers his knowledge to junior team members. In this avenue, if he decided to leave his team a for better job opportunity, the team won't suffer. Sufficient training measures and techniques necessitated to

be carried out to assure this activity is sufficiently supported and executed. A procedure to evaluate the effectiveness of knowledge transfer activities should be made available rooted on the outcomes accomplished the provision of further training and support should be put in place, if and when needed.

**Knowledge sharing.** In virtual teamwork, due to lack of F2F interaction knowledge sharing is important and imperative team members to understand the business. Communication and knowledge sharing can be viewed as a natural bi-product of communication. Such knowledge sharing can be both intentional and serendipitous; for either to take place team members have to build trust, resolve distinct views, and make mutual savvy across the cognitive boundaries of cultural, linguistic and functional divergences amplified by distance [32]. In addition, knowledge sharing also has positive interaction effects with task programming and communication because it offers a common knowledge root that can create communication more effective and the use of task programming mechanisms better tailored to the needs of the task [9]. Knowledge sharing also helps booster team performance and trust among team members [18]. In GVTs environment this is very important due lack of F2F interaction and time zone differences. Uphold a shared GVT calendar using ICT. Shared calendars take the guesswork out of time conversions and create clear everyone's availability in case a fire needs to be put out.

Standardize communication and documentation processes (e.g., having a form for each kind of data to be exchanged), but leave open the possibility of adjusting them. This is especially significant when teams are crossing organizational boundaries, so everyone has the correct setting and data is going to the correct places. With effective documentation and knowledge sharing mechanism in place so that every team member is able to access at any time help boost team performance as well as trust. Lack of effective knowledge sharing creates mistrust and fear among other team members this in turn degrades team performance.

Nguyen [18] study on knowledge sharing identified themes linked with knowledge sharing were “use Sharepoint and we create team folders on the sites and obtain high quality decision; positively affect team performance and associated with decision and improve team operation; create knowledge transfer and transparency; effective knowledge sharing is effective through conference calls / phones, training, and online; and members guard knowledge and leaves adversely affect team performance”.

**Knowledge management.** According to Anantatmula, knowledge management is a systematic method to using information systems, business processes, best praxis, and culture to design and share knowledge within a firm. Innovation and transfer of knowledge are two facets of knowledge management [18]. Knowledge innovation and transfer can occur only when more than one individual is involved. With regard to innovation, knowledge management includes two activities: (a) preserving and employing existing knowledge and (b) producing new knowledge for effective use. Existing knowledge is comprised of both tacit and explicit knowledge. Producing new knowledge involves the interaction of stakeholders within the organization.

Nguyen [18] study on knowledge management identified themes linked with knowledge management were “use Sharepoint and to create team folders on the sites; vital to remain competitive and improve team performance; assist teams in handling with dynamic and complex situation; knowledge should be shared with all the team members; maintained a detailed project plan; and member know how to access proper persons, resources, and knowledge”.

### **2.1.6. Team Communication**

Due to lack of F2F interaction, effective communication is also the core to success for GVT members and leaders. GVTs adjust their communication patterns to the type of work, and they use F2F communications interspersed among periods of remote communication. GVT leaders with the ability to communicate exceedingly well using email, IM, telephone, etcetera, and goal oriented is considered to be a CSF in managing a GVT [18]. Communicating with GVT members is even more vital when they are separated by geography. Email, Skype and other collaboration tools (e.g., ICTs will address later section) are necessary. GVT members also have to take care with their message as there are no non-verbal clues available that can be communicating a distinct message in a F2F environment.

Given this shift in communication style, it is necessary that management has a savvy of GVT performance. Ensure communication methods are in place for the GVT to communicate on a regular basis. Have regular team meetings using conference calls. This is more viable as personal virtual communication services have become cheap for organizations. As GVT is staffed by members from distinct countries operating at distinct sites, its success trusts heavily on effective communication [16]. Additionally, their findings suggested that communication effectiveness is affected not simply by CSFs and team characteristics, but also by task characteristics (e.g., the complexity and significance of task, requirement alters, and interdependences between subtasks). GVT effective and virtual team communication and ICTs will be further addressed next two subsections.

Although a GVT is established to achieve task, the communication among members is not inevitably constantly task-oriented. Sometimes, they may communicate beyond task, and online friendship may be built when they are working “together”. Therefore, effective GVT communication should be included from two dimensions: task-oriented communication and social communication. Min, Liu and Ji considered these two communication dimensions as some critical success factors in dealing with GVTs [16].

**Effective communication.** In layman’s term, a team member with effective communication skill is when one speaks or articulates with a clear voice so that other team members are able to hear and understand well. This is very important to GVTs due the deficiency of F2F. Ensure effective communication channels are available, open and understood by all GVT members. Wan and Li study found that 77% of managerial dilemmas in organizations are linked to communication effectiveness [16]. Additionally, Burke and Chidambaram, and McDonough et al. studies discovered that communication in GVTs was not as effective as that in collocated teams [16]. Indeed, some believe communication in GVTs as an ascertaining factor of GVTs performance. Furthermore, the deficiency of communication was an impediment to the growth of cooperation and thereof inhibited knowledge transfer [24].

**Task-oriented communication.** The superlative disadvantages of communication via ICT are the deficiency of nonverbal communication and the absence of social context cues. These disadvantages may direct to misapprehension about the tasks and influence obstacles for GVT operation [16]. Effective management is an avenue to defeat the shortcomings. For instance, efficient communication skills training and task assignment could shrink conflicts among GVT members; effective communication mechanism could alleviate members choose the most efficient ICT and assist them improve adjust to virtual context. Hence, GVT management has a positive impact on task-oriented communication.

**Social communication.** Encouraging GVT members to communicate farther work (e.g., sending cards to each other during holidays) is a good avenue to narrow spatial space and better the bonds [16]. So, it is advised that correct management measures also have a positive impact on social communication. Thus, social communication will better the alignment among GVT members and afterward enable them improve finish the tasks. Team members and leaders get together for outing such as lunch together is also a good form of social communication [18]. This in turn helps build stronger trust among team members.

**Virtual communication.** Generically, communication is the process of transferring meaning and data between two or more parties [32]. Many researchers have outlined how this procedure can be created effectively and efficiently. Communication, whether F2F or virtual, is the key to any planning or getting tasks done, as communication is the basis for which individuals collaborate or interact, create decisions, and act to accomplish organizational business objectives. Communication is also core to organizational socialization and affiliation [32]. GVTs typically use ICTs asynchronous communication (IAC). IAC typically allows for concurrent themes or multiple threads of conversation to occur from multiple people simultaneously, rather than being limited to turn taking (with communication blocking) as is usual with synchronous F2F team communication. As well as expressing ideas at the same time, team members in the GVT climate can express their ideas with no interruption by others. Team members in the GVT can also hold meetings at times personally convenient to them [32]. Information communication technologies communication also means that team members do not need to worry about political, social, or power setting cues that might occur in F2F team communication. Verbal cues like intonation, gestures,



contextual cues, and facial expression that enable receivers to read (or misread) the speaker's intent are missing in ICTs communication, and this can assist (or impede) understanding [32].

**Appropriate virtual teams communication.** The absence of F2F communication is considered by some people to be a drawback of GVTs and virtual work [32]. Some GVT members may be less satisfied or productive because they feel detached and insulated from both the tasks and the other team members. Berry (2011) studied satisfaction and motivation and pointed out that stakeholders are satisfied and motivated in part as an outcome of interactions or collaborations with colleagues. However, Berry also stated that GVT communications also decreases the likelihood of process or procedure losses caused by power, personality, stereotyping, or political disputes and cliques experienced in F2F team. Because the ICT climate is not time or workplace bound, it can enable substantive and reflective feedback, which some team members may value more so than the prompt, although less essential feedback, usually given in collocated team communication [32]. The reflective tone used in asynchronous communication can lead to increased team support and identity. Still, working on GVTs or doing virtual work may not be the best option for all people.

Most studies of GVTs stress the importance of communication to achieving team requirements for co-ordination and efficient task execution. Effective communication is a core to successful GVTs, and one of the keys to effective communication is how well team members are able to establish and uphold their personal relationships. The issue of cross-cultural differences in communication behaviors among GVTs is important due to the global nature of the teams. While a great deal of study exists on ICT and on cross-cultural communication, research on cross-cultural ICT is scarce. Many field studies indicate that it is essential to better cross-cultural communication inside GVTs.

**Effective avenues to manage GVT communication.** Effective communication is crucial in managing GVT members [18]. Those away from the "home base" frequently sense disconnected and need to sense they are still portion of the team. When they call in they want to speak about all sorts of stuffs other than the project so they can re-baseline themselves socially. They will ask if Suzie had her baby yet, how was Sam's operation, and so on. This soaps up huge amounts of the manager's time, so manager has to discover an avenue to have meaningful communication without letting it assume away his managing time. Some managers set a particular time and day each week for a call-in where team members can share status and issues and you can communicate new occurrences. It is recommended that managers are having regular home office visits is good if the travel costs are tolerable. If you do that, don't do the 'rolling office' thing where the employee has their 'personal crate' with all their personal (stuff pictures and the like) to put on the desk while they are there to make them feel at home. If that doesn't work, also, get to know the Myers-Briggs of each of your team members. That will help you cope with them effectively. A strong introvert will sense quite OK functioning at a distance, whereas the extrovert gets his or her energy from the others around them and need that personal contact. When you leave an extrovert too long in the customer's shop with no personal time at the home office and they will soon be a customer employee. Look closely at how you have set up your team and ascertain the best avenues to communicate effectively to help your team members feel 'at home' while also downplaying the impact on your management time. Use ICTs to your advantage. Have GVT teleconference meetings instead of just phone meetings. Make use of IM and organization base social media. There is lots of stuff to employ to make your management job more effective.

### **2.1.7. Team Accounting, Selection, Building, Training, Roles and Responsibilities**

**Team accounting.** Accounting for time is also more difficult for GVTs. Managers have to ensure that their team members are completing the work assigned to them in a timely fashion manner [18]. Regular status reports and feedback to / from managers is necessary. Informal project status updates discussion with team leader is also a good form of team accounting. In this manner, team leader able to provide quick recommendation for alternative ways to tackle project work activities.

**Team selection.** Select GVT members carefully. It takes a unique kind of individual to operate well on a GVT. GVT member needs to be questioning, creative and to take initiative without being asked. At the same time GVT members need to be disciplined adequate to set a work structure and rhythm that suits the needs of the GVT. During new project planning, team selection is also very important task for manager to carry out. Thus, the selection of GVT members necessitates to be rooted on the technical requirements of the project [24]. The project manager needs direct access to data respecting possible GVT members' academic, technical skills and experience. When relevant, 'linguistic capability' needs to be ascertained and given due consideration. When all GVT members have been recruited, their training requirements (irrespective of workplace) necessitated be addressed and evaluated.

**Team building.** Team building activities encompass interventions to train in social or team skills (e.g. communication, assertiveness) and can include social activities outside the workplace these activities are linked to successful project results by assisting people to operate together more effectively, boosting morale, bettering

motivation and cohesiveness, gaining dedication, addressing cultural impediments, and assisting to establish trust and relationships [24]. Team building interventions to address current team issues can assist teams accomplish their goals, by, for instance, determining and defeating any impediments to effectiveness. Post-task coaching interventions can aid teams formally review their operation and experiences, enabling members to consolidate and share lessons acquired. Team building interventions can have a greater positive impact on business firm processes than technical skills training.

**Training.** Training is required for work completion, collaboration tool utilize and the act of collaborating itself. Personal and professional growth training opportunities are linked with improved productivity and employee satisfaction [24]. Training offers opportunities for GVT members to acquire new skills or make better existing skills and derived shared mental models, and thus can better overall organizational effectiveness. Firms should be cognizant of the skills and behaviors required to do special collaborative tasks and root training on task analyses. Training activities are a vital part of handling alters within a GVT. Thus, researchers recommended that effective training programs should be in place so that GVT members are able to acquire new knowledge and skill set in order to help achieve team performances and goals [18]. This in turn also helps leverage development cycle and short time to extradite new solutions to customers.

**Defined roles and responsibilities.** It is significant that roles and duties or responsibilities for all team GVT members should be clearly defined, articulated, understood and effectively disseminated [24] especially when establishing a GVT [18]. This should be supported by a clearly defined mutual vocabulary that is understood by all GVT members. This vocabulary necessitated to provide areas such as activities, the process, tools, milestones, deliverables and artifacts. Lack of roles and responsibilities can hinder team performance as well as late in extraditing solutions to customers [18].

**Coordination.** The global distance, which encompasses cultural and linguistic distance, geographical, temporal, introduces impediments and complexity into the GVT environment. Effective coordination and closely monitor team performance is very important to team overall success [18]. Effective coordination and visibility, communication and cooperation between workplaces are necessary in a GVT team [24], but these are adversely affected by global distance. Improving coordination and visibility, communication and cooperation can aid to shrink the impediments and complexities. Such improvements must be achieved under the technical and financial constraints of the project and with GVT members from geographically scattered groups. Finally, this is not an easy work, and study has exhibited that numerous other factors come into act during the execution of global projects.

Distance directly adversely effects on the effective coordination of GVTs. Particular measures are needed to address the issues this raises [24]. Effective coordination assures that sufficient planning and the needed resources are offered to undertake the essential assignments. This encompasses assuring that desirable infrastructure and processes are available to execute the tasks. Successful coordination also needs that accomplishable milestones are planned and agreed. There is the necessitated for effective monitoring to be available to manage ongoing progress with reference to costs, quality, productivity, time and risk.

**Effective partitioning.** The effective partitioning of tasks across GVT members and sites is a very significant facet of an efficient GVT performance [24]. In these circumstances three strategies may be conceived to effectively partition tasks. They are modularized, phased or an integrated approach. Each has their own different advantages and disadvantages, but their option is frequently dependent on the nature of the tasks being undertaken or and the physical workplace of tools or particular skill sets. Ineffective partitioning tasks to appropriate team members can impede team performance as well as cause delay in delivering solutions to customers [18]. The researcher has witnessed this numerous times at his organization. This was resulted from ineffective leadership or management team in partitioning tasks or workload among team members.

**Visibility.** Due to the loss of informal contact and temporal and geographical space visibility is directly hindered by the performance of GVTs [24]. There are two facets to visibility. The first is that roles and responsibilities necessitated be clearly articulating and empathizing by all the pertinent team members. As outlined when discussing the defined roles and responsibilities factor this is better accompaniment by the use of a mutual vocabulary. The second facet is to assure there is sufficient visibility into the process to monitor team effort and operation and to ascertain project status.

## **2.2. Leading GVTs**

The virtual context has enabled teams to finish works more quickly and efficiently than ever before, and access the best people and resources and in workplaces around the world. Not surprisingly, these positive facets are coupled with challenges [32]. Given the virtual context that GVTs operate in, members' distinct cultural backgrounds, the interface of technology and the fact that members are frequently not in synch because of distinct time zones, the persona of leading GVTs is riddled with complexity. Because GVT members frequently cannot see their leader, one might get the feel that GVT leaders necessitate to have special cognition or qualities or exhibit certain types of behaviors to be effective. GVT members frequently trust on team leaders to offer inspiration and direction from a remote. Davis and Bryant argued GVT leaders must have excellent asynchronous communication skills, and must be particularly effective in synchronous and F2F communication since there are frequently limited chances for such interaction [32]. GVT leaders should also be technologically understanding and have an ability to match the technology to the particular prerequisites of the team and its works (e.g., rich versus lean communication media); they must be engaging, culturally approachable and sensitive, by communicating often with all team members [32].

### **2.2.1. Leadership Style**

An IT manager's lack of proper leadership style and inadequate leadership skills may also contribute to project failure. For example, inefficient leadership leads to an increased risk of project failure. The IT manager's leadership style plays a role in the outcome of the project [15]. To effectively lead in a virtual climate, the managers of GVTs need to be able to establish effective leadership and technical skills. Managers of GVTs must also have the ability to alleviate the frustrations of GVT members [25].

In highly geographically scattered teams, a deficiency of shared context can endanger a shared team identity. Inspirational leaders serve as the span between GVT members and relate them with a mutual goal or vision. Joshi et al. study, teams that were more geographically scattered had more positive sensing about inspirational leadership, dedication to the team and team trust [18]. Similarly Davis and Bryant discovered that transformational leadership had positive effects on GVT results, whereas laissez-faire leadership and team results exhibited a negative relationship [32]. As Davis and Bryant articulated, the leader must lead with "both the head and the heart" [18]. Leader must constantly drive and motivate GVT members work well and achieve team overall goals and objectives.

### **2.2.2. The Skills Needed for Effective Virtual Leadership**

To effectively lead in a virtual climate, the managers of GVTs need to be able to establish effective leadership and technical skills. Managers of GVTs must also have the ability to alleviate the frustrations of GVT members [25]. Team-building skills encompass the ability to build trust, espouse diversity, nurture a team spirit, and incite team members. Technical skills include the ability to use avatars, communication skills, e-mail, instant messaging, video conferencing software, and virtual worlds. Leadership skills required by managers in virtual climates include emotional intelligence, the ability to establish a supportive and open climate, and to lead by example.

### **2.2.3. The Need for Virtual Leadership Skills**

Numerous business firms are using GVTs because they have the ability to cross geographical boundaries, are cost effective, and they are independent of space and time [25]. Other benefits of GVTs include better communication, more innovation, improved decision-making, and more efficiency than F2F meetings [25]. The use of GVTs by firms is growing; therefore, management is now required to have virtual leadership skills. Leading in a virtual environment can be more challenging than in a F2F environment because of the lack of nonverbal communication.

### **2.2.4. Identifying Virtual Team Leaders**

GVT leaders should be ascribed to teams with care. Sadri and Condia suggested that an efficient team leader should possess the following characteristics: (a) have an ability to effectively maintain team engagement in the process, offering solutions for modifying and implementing changes as needed; (b) have an ability to foster a climate of collaboration through establishing trust with informal communication channels, and promoting open communication among team members and handling disputes effectively; (c) have an ability to convey team direction and goals so that all team members are focused on the same targets; (d) have solid interpersonal communication

skills to informal and formal communication channels so that team members obtain information for the job and feel involved; and (e) have an ability to empower and delegate team members to ensure team success [27]. Passionate, technologically-understanding team members and a competent leader who can handle the work form the basis of a high performing GVT.

Hirsch (2011) analyzed a leader's effectiveness within a GVT climate by analyzing one, exemplary GVT leader. According to Malhotra, Majchrzak, and Rosen, leaders of successful GVTs: (a) build and keep trust through the use of communication technology; (b) ensure that a variety of employee skills are understood and appreciated; (c) handle virtual work-life cycle (meetings); (d) track team progress using technology; (e) heighten visibility of virtual members within the team and outside in the firm; and (f) enable individual members of the GVT to benefit from the team [18]. Malhotra et al. discovered that these leadership practices were conceptually accepted and practically applied [18].

### **2.2.5. Leadership of GVTs**

Team leaders also need to be able to change the ways they interact or collaborate with team members on both interpersonal and professional levels. Effective GVT leaders must demonstrate empathy with the rules of team dynamics and accountability. Virtual spaces are real to the individuals who inhabit them, and common workplace dynamics are still in play. Constructing efficient GVTs is difficult because both members and leaders of GVTs, even if experienced with F2F teams, need good communication skills to be efficient. Leadership is central to the team developmental process [32]. Leaders should present organizational goals and structure and explain how the team's operations assist in achieving these goals, keeping the team on task, and handling the logistics that could interfere with work culmination [32]. GVTs possess great membership diversity, so GVTs leaders must make sure that all team members get the training they need to enable them to mitigate problems using and nontechnical and technical methods. Effective managers in GVTs need systems for tracking behavior and should have recognized protocols for intervening early when technical or other dilemmas arise. Thus, training in mitigation skills is also an important part of development for GVT leaders and team members.

Not every leadership style can be use will work for any situation when leading GVT. Thus, it is imperative for GVT leaders to recognize and use appropriate leadership style that work best for the project they are leading or driving their GVT project goals objectives, and outcomes. Nguyen [18] study outcomes on GVT leadership style use the themes connected with leadership style were "allow members use creativity and talent; and a managerial style use depends on a situation delegating, engaging and empowering; a democratic style". The following subsections we will be further addressed or discussed leadership competencies and various leadership styles leaders could learn to use and adapt when leading high performance GVTs.

### **2.2.6. Leadership Competencies**

There are four competencies in efficient GVTs: effective communication, allocating resources, building expectations, and modeling desired behaviors [5]. These are all important competencies in team leaders and these competencies need to be shown to demonstrate that team members and the organization see the virtual work itself as important. GVT leaders need to discover ways to demonstrate that the tasks of the team are a top priority, what Berry termed as seizing a team member's mind-share. Seizing mind-share is problem in both F2F teams and GVTs, and even on F2F teams, there is frequently a gap between time available to work on team activities and the time needed to achieve all of the team projects. This challenge is more discouraging in GVTs because of the physical distance between team members and the out of sight, out of mind syndrome.

An efficient virtual team addresses a team's satisfaction level and performance. Leadership effectiveness, communication, and trust can effect on the effectiveness of a virtual team. Chen et al. found that trust is an influential factor in improving the effectiveness of GVTs [18]. To cultivate the trust of team members, it is important to assess their trustfulness. Chen et al. found that communication frequency does not have a connection with trust and team satisfaction. However, communication can improve team performance.

### **2.2.7. Shared Leadership**

GVTs are continuing to gain in prevalence in the workplace; therefore, understanding how levels of virtuality and distribution (VAD) can impact the success of leadership is vital. One area where further study would be especially

beneficial is in the training of leaders and team members in virtual climates. Developing GVT leadership is not an easy feat. However, organizing leaders for GVTs is an even greater challenge when determining and addressing the type of problems rooted in VAD. Furthermore, GVTs may assemble team members with varying levels of leader expertise, with little to no experience on how to address multiple leader functions. Leaders must focus on the different types of VAD that may impact the success of leader operations in GVTs; training programs can be constructed that focus on a specific firm or type of GVT such as high distribution, moderate virtuality. Shared leadership training programs can also be used to formulate efficient GVT leaders, as they can encourage not the singular leader growth that numerous firms currently favor, but a more team-rooted approach that makes better leadership integral across the team.

### **2.2.8. Leadership Dynamics**

Ocker, Huang, Fich, and Hiltz examined leadership in partially distributed teams (PDTs) that can be extended to other types of GVT configurations [18]. Employing three dimensions of virtual distance (cultural, geographic, and temporal), Ocker et al. examined how the configuration of GVTs interacts with leadership dynamics. Ocker et al. analyzed the effects of distance and configuration on leadership in PDTs. Ocker et al. found significant divergences in leadership dynamics (i.e., leader emergence versus leader retention), which affected team performance. From these outcomes, Ocker et al. developed propositions on leadership and PDTs. A power paradox puts a GVT leader in a difficult position with far reaching implications for the dynamics of the GVT process, GVT member dedication and motivation, and in the worst of scenarios the team project will come to a deadlock [32]. Thus, it is imperative for leader to constantly help drive and monitor team daily development activities as well as team overall goals and objectives.

### **2.2.9. Strong Leadership**

Strong leadership is vital for GVTs to drive forward and be successful. It is the duty of leaders to promote honest communication and feedback among the GVT members and put particular stress on building standards for communicating contextual cues with each message to shrink the possible for misinterpretations. Thus, leaders need to "think globally" while communicating with the GVT members. The idea that leadership is essential in GVTs has already received some accompaniment in case studies of GVTs. For instance, Armstrong & Cole reported that good leadership distinguished successful from unsuccessful GVTs [18]. Specifically, leaders who rendered discussion among GVT members, strove to reach agreement, modeled group norms, coached team members, recognized difficulties posed by space and virtual communication, made concrete expectations and goals, and rewarded performance led more successful GVTs. A study by Purvanova and Bono discovered that transformational leadership had a firmer effect on team operation in virtual than in F2F teams [18]. Their outcomes indicate that transformational leadership behaviors are particularly instrumental to team operation under the more ambiguous communication conditions made by ICT. Transformational leadership will be further addressed in the next subsection.

Leaders must clearly institute expectations that the success of works is the duty of all involved irrespective of their workplace. Delegation of duties to GVTs depends upon firm and clear communication. There is invariably a risk for misinterpretation or miscommunication when works are virtually assigned to the GVT members. Ownership at all levels of the project should be explicitly communicated. Delegation should include communicating well in advance the evaluation criteria to be used in order to clarify the intended results. Zhang et al recommended that delegation is the significant GVT management strategy and that firms should train GVT leaders on the significance and effects of delegation [34]. Zhang et al., however, claim that the real world position impacts this delegation with a push and pull effect, that is, leadership team will want to delegate more because the work of handling a GVT implies more communication, odd hours of tasks scheduled for communication and precaution needed to invalidate miscommunications. This is the push to delegate. However, the pull effect is that if a GVT leader deficiencies "global thinking" stemming from the deficiency of cognition on language, cultural differences and so forth, he or she will be hesitant to effectively delegate to the team. When the pressure is on, it is usual to see GVT members' conflict with their personas. Individuals will question the ability of others team members and do what they can to safeguard themselves from the possibility of failures caused by others. Therefore, it is significant to define and clearly interpret who has the authority and duty over assigned works, especially in a GVT.

### **2.2.10. Transformational Leadership**

Transformational leaders render cognizance and espousal among followers toward group goals. According to Burns, transformational leadership subsists when leaders drive their followers to go farther their own self-interests for the good of the group [18]. Transformational leadership enables information systems (IS) development for competitive advantage by rendering an innovative IS environment and by conducting to business-IS alignment thus gaining organizational operation [18]. Transformational leadership also motivates team members to work on a common goal and vision for sustainable development.

Eseryel and Eseryel findings indicate that transformational GVT leaders reportedly render cognizance and espousal among team members of the group goals. Individuals emerge as leaders through their systematically notable contributions to their team over prolonged periods of time and through the aspiration they offer other GVT members [8]. Most transformational leaders in traditional organizational contexts perform managerial work such as deriving strategies and plans, communicating grand vision, and aligning others. Followers of these leaders typically carry out the work in line with the vision of the leaders. Transformational leadership stresses performing tasks, most frequently used instruments to measure transformational leadership used in IS measure idealized influence, intellectual stimulation, inspirational motivation, individualized consideration and contingent rewards [8].

GVT transformational leadership dissents from hierarchical IS leadership as follows: First, GVT transformational leadership is emergent and thus fluid in that individuals increase or loses leadership through their actions over time. Second, transformational GVT leaders do not begin off by communicating grand visions. Instead, they achieve vision by operating towards it and context an example to others to join in. This may be linked to not having a formal persona that makes expectancies for such grand visions.

Third, while contributions matter for all GVT members, transformational leaders' contributions dissent from those of others: Indeed as suspected earlier all technical contributions are not the same [8]. Those individuals whose work enables others to perceive that they concern about the project's welfare, they are knowledgeable, and those who can be seen as persona models as an outcome of their contributions are considered as transformational leaders. Transformational leaders operate over prolong periods of time and their contributions strategically conduce to achieving a strategic team vision. Moreover, transformational GVT leaders' action-oriented leadership motivates others to unite in on building the same vision and operating toward the same goals.

### **2.2.11. Leader Action in GVT Teamwork Dynamics**

In the discussion of three highly salient GVT leadership challenges; goal alignment, knowledge transfer, and motivation, the researcher ended up by developing the following critical questions: (1) In what avenues can a GVT manager align GVT members' divergent aspirations and manage goal conflicts? (2) How can team managers alleviate knowledge transfer and the innovation of common savvy virtually, when the richness of the communication setting is by necessity compromised? and (3) What can GVT managers do to motivate and promote dedication among members in virtual multicultural and globally scattered teams?

To address these questions, and circumferent issues, the researcher mapped the GVT work process in some detail. While recognizing GVT member expectations and input in an avenue that is people-oriented, the recommendations are by necessity fluid and agile so that they can be used for differing types of GVTs [32]. Navigating from a 'welcoming' phase, through the 'working' phase and to the 'wrapping-up' phase, the researcher identify aim areas, personas and tasks for GVTs and develop suggestions as to what GVT managers can do to lead their teams to success, and what GVT members need to conceive.

**Welcoming phase.** In the welcoming phase, it is significant to aim on goal alignment, relationship and task definition [32]. The team managers have a core persona in leading these trust-building success-vital processes, but their significance must also be understood by all GVT members who need to actively participate in these processes. If possible it is recommended all GVTs to meet at the same place at once during the inception of the project [18]. In this manner good rules are setup as well as expectations from each team members how team development activities or tasks should be assigned. Let each team member to have the opportunity introduce themselves and learn from other members' work background as well as culture. This in turn will help team members to build strong trust at the beginning as well as work together better throughout of the project.

**Working phase.** In the working phase, the stress is on personas and processes, and the effective innovation of 'infrastructure' systems, and alignment of operations [32]. GVT managers must know who has what capabilities or

what technical expertise and match those with the avenue in which decision-making and communication occur. GVT members play a vital persona in conducting not just their particular knowledge and capabilities but also in terms of enabling alignment and collaboration.

**Wrapping-up phase.** In the wrapping-up phase, GVTs finalize and debrief the GVT project and make closure by reviewing both the process and the result [32]. Analyzing learning, both from the views of the GVT members' own capability growth and that of team leadership, turns significant. Furthermore, project post-mortem such lessons learned should be documented and archive.

## **2.3. Management**

### **2.3.1. Information Management**

A core constituent in successful GVT performance is the dissemination of relevant data between GVT members. As with the other factors outlined in this section data dissemination is adversely affected by space. The loss of F2F contact and the necessitated to trust on asynchronous communication all affected on the degree and caliber of data that is available and transmitted between sites [24]. There is the particular requirement for the accessibility of pertinent data respecting GVT members, distant workplaces (i.e., activities and project status, public holidays and project procedures).

### **2.3.2. Knowledge Management**

GVT members should have access to the knowledge required in order to perform their job. By the same token they need the accompaniment and motivation systems to preserve and make available their own knowledge. Managing and using knowledge well will enable GVT members to gain a better understanding of past or current activities and their results, and get better future performance [18].

A core component in successful GVT performance is the dissemination of pertinent data between GVT members. As with the other factors outlined in this section data dissemination is adversely affected by distance. The loss of F2F contact and the need to rely on asynchronous communication all impact on the level and caliber of data that is available and transmitted between sites. There is the specific requirement for the availability of relevant data respecting GVT members, distant workplaces (i.e., activities, project status, public holidays, and project procedures).

According to Anantamula, knowledge management is a systematic method to using information systems, business processes, best praxis, and culture to design and share knowledge within a firm [18]. Innovation and transfer of knowledge are two facets of knowledge management. Knowledge innovation and transfer can occur only when more than one individual is involved. With regard to innovation, knowledge management includes two activities: (a) preserving and employing existing knowledge and (b) producing new knowledge for effective use. Existing knowledge is comprised of both tacit and explicit knowledge. Producing new knowledge involves the interaction of stakeholders within the organization.

### **2.3.3. Project Management**

Effective software project management (SPM) in a single location is a complex effort [24]. There is the need to be an arbiter between diverse stakeholders with distinct expectations and agendas, to handle the operation of the team effectively within the constraints of usable resources, both financial and technological, and to handle the available personnel and technical capabilities. Therefore, successful SPM is a difficult undertaking which can simply be accomplished through the effective "planning, organizing, staffing, leading, controlling, coordinating and day-to-day management" of the project [24]. To design a successful GVT strategy, all the factors that impact on the operation of collocated software projects come into play and need to be addressed by effective project management. There are also additional GVT factors which require specific attention. In these circumstances it is clear that a collocated project management approach is not sufficient and the growth of a GVT project management strategy is required. Ensure micro management is to invalidated or, at least, minimized.

### **2.3.4. Risk management**

The execution of a GVT software development strategy to undertake organizational mission vital activities is a risky endeavor [24]. There are micro- and macro-risk elements which necessitate be carefully assessing and

addressing. Micro-risks can frequently be correctly ascertained and substitute strategies available to extenuate their possible impact. Macro-risks on the other hand may not even be considered. These encompass political risk and the implications of an insufficient savvy of the culture of personnel at other workplaces and the negative impact of carry out unfitting strategies which can outcome.

### **2.3.5. Skills Management**

To alleviate effective GVT performance the technical capability and skill level of all GVT members necessitates to be created in place to the project manager [24]. This data should be introduced in a format that can be understood, well upheld and efficiently accessed. There is also the requirement for an effective operating procedure for all GVT members to be able to access and determine relevant technical and subject matter experts. During any new project planning, it is vital for project manager to determine what skill sets each of GVT members possess [18]. In this manner, the manager will able to determine whether or not additional skill set is needed for the team.

## **2.4. Technologies and Development Tools**

GVT overall project success or team performance outcomes also depends on how and what technologies and development tools are being use to help team members daily development activities or tasks assigned [18]. Thus, it is imperative for organizational managers to consider what technologies (e.g., ICTs) and development tools are needed when establishing GVTs and how these technologies and development tools will be utilized by GVT members to perform their daily work.

### **2.4.1. Information Communication Technologies**

Technology is at the core of GVTs. Without email, internet, audio bridges and video conference, GVTs can't even exist. The competitive collaborative atmosphere support and ascertain GVT high speed to function and extradite solutions; these characteristics are made rooted on new ICT and Internet technologies by offering progressively richer collaboration tools (advancing from the fax machine and the telephone and to specialized “software tools, video conferencing and virtual workspaces platforms” [1]. Technologies offer some mechanisms for collaborating when people are co-located but are the medium for collaboration when they operate virtually, separated by distance or time. Technologies (e.g., email, conferencing, scheduling tools, and knowledge management tools) can permit teams to function towards a mutual purpose by conveying information and aligning across distinct time workplaces, zones, organizational contexts and cultural backgrounds. A distinction necessitates to be created between technologies for pure collaboration (where the simpler the improved is frequently the key) and those task-linked technologies such as may be needed to modify and share 3D engineering models where more complexity is required. A sufficient selection of synchronous and asynchronous communication tools should be to permit effective communication to occur between GVT members regardless of workplace. A significant facet of the provision of such tools is to assure personnel are trained and motivated to leverage their capabilities. A substantial characteristic of GVTs is that members dispersed at distinct workplaces. Therefore, ICT is the essential channel for GVT members to bridge distance gap. Min, Liu and Li argued that the improved the technologies suit the communication needs, the more likely such technologies will be used. Meanwhile, studies also suggested that technologies were not the just factor affecting effective communication [16]. Some other factors such as workplace factors (e.g., cultural, functional, and organizational differences), spatial and temporal also shape the communication.

As with all types of communication, ICT communication carries a tone [27]. Since people tend to be less inhibited when communication technologically, GVT communication can turn harsh and lead to disputes. Sadri and Condia stated that GVT leadership should model helpful and positive communication to assist team members in properly responding to team members [27]. This type of communication downplays nonproductive team disputes. Team leadership can acknowledge and reward supportive interpersonal communications to promote civility and effectiveness in the GVT climate.

### **2.4.2. Development Tools**

By 2014, citizen developers will build at least 25 percent of new business application. IT Organizations that depends on business automation process either both build and main systems or build and maintain Micro-applications (MA).



Thus, it is important that GVT leaders to determine ahead which development technologies or toolset meet their project requirements. Since no customer issues can be solved by one set of development toolset or platform. For example, Oracle APEX and Quest Software Sharepoint for business automation process using MA approach will be further addressed.

**Oracle APEX.** APEX is a strong complement to the Oracle DBMS and APEX offers an economical approach to quickly authoring Oracle DBMS-centric Web applications, and it provides for centralized distribution and governance. Oracle APEX shines in ease of use for citizen developers building a more complex system but has some programming knowledge. Oracle APEX would be more suitable solution as a core enterprise level platform. Oracle APEX offers an interactive report capability which is great feature for organizational leaders who heavily depend on metrics and reporting. Additional strengths of Oracle APEX consist of hardware, vendor, software independent, and database just to name a few. The drawback with Oracle APEX is that it can be hard to find developers and the skill set availability is limited versus Access or Excel. APEX is not Java, it's written in SQL and PL/SQL and it can't be extensible [18]. SQL inject is the biggest weakness or flaw of Oracle APEX. There are procedures available can be used to address this weakness such as input validation and limit account access.

**Quest Software Sharepoint.** Quest Software Sharepoint (QSSP) offers a scalable, cloud-based collaboration capability that renders mission partners to share data through independently handled community and mission-aimed sites. Built on the integral capabilities consist of renders site customization and content management to leverage standard taxonomy and templates. QSSP is very nice for easy configuration and zero programming - so it has a great use there. Utilizing a common platform, QSSP gains enterprise-level collaboration and gains operational effectiveness and efficiency through (QSSP, 2013). The drawback with QSSP is too costly to maintain especially for enterprise licensing as well as it is hard to find developers and skill set availability is way less than Access or Excel.

## **2.5. Workplace Factors**

Espinosa et al., Reed and Knight, Remus and Wiener, and Sharma et al. argued that workplace factors that may impact IT project success such as cultural, functional, and organizational differences between teams have not been explored thoroughly compared to internal factors of leadership and project management [18].

### **2.5.1. Cultural Differences**

Dispersed work groups in which members are located in distinct countries encounter unique cultural differences that can impact the overall success of the group's performance. Numerous of the organizations experience difficulties caused by cultural differences between GVT members, affecting their ability to interact and communicate. Cultural differences that bestow to communication issues lean to attest themselves in three major categories: the functional disciplines of the members of the team, the organizational construction of the firm and, the nationalities of the team members and/or the nation in which the teams exist. Additionally, language barriers in divergences in cultural understandings and expectations can have a heavy impact on the team's overall performance. Nguyen [18] study findings on culture differences the identified themes linked with culture differences were "to appreciate other cultures, to create a more trusted working environment, and allow time for each member to speak; concurrent engineering reduce time to market; leverage diverse knowledge and skills; level of proficiency can affect project success; and ICTs use (teleconferencing and videoconferencing) extensively".

### **2.5.2. Functional Differences**

Functional differences, for instance, can guide to GVT members with distinct cognition bases, motivations, reasoning abilities, and like-minded thinking approaches. Engineers, for instance, reason distinctly, react distinctly, and are motivated distinctly than marketers. Any inherent divergences have been strengthened over time through training and exposure to other like-minded individuals.

Nguyen [18] study findings on functional differences the identified themes linked with functional differences were "to boost team overall performance and outcome; right expertise or people at the table is critical to project success; diverse skills so knowledge can be shared; multiple functional expertise control whole project and other members have limited input; gain conflict among team members and lower team commitment; less attraction and trust of peers and less frequent communication; and difficult to establish trust and assess teammates' trustworthiness".

### **2.5.3. Organizational Differences**

Organizational differences attest themselves as acquired behaviors within organization cultures. Each organization has its own unique style. Apple and IBM, for instance, might develop similar computers, but their employees have developed quite distinct behaviors and values. An IBM employee would likely be uncomfortable at Apple, and vice versa. Nguyen [18] study findings on organizational differences the identified themes linked with organizational differences were “reduce project risks, gain and diversify skill sets; create competition that leads to improve project performance; vendors’ processes or tools are uniform, alignment, and thoroughly tested; hidden agenda and remind them main goals; invite vendors to teleconference meetings; and minimum affect when leaders and team members remotely work well together”.

### **2.5.4. Workplace Factors Summary Discussion**

Numerous researchers there more advantages with functional and organizational differences compared to disadvantages (e.g., [9]). But the advantages out weight the disadvantages. For instance, where GVT with more than one functional expertise within the team, it can help leverage other team members’ technical skills as well as boost team overall performance [18].

Thus it is recommended when establishing GVTs, organizational leaders and HR personnel work together to institute cultural training programs in place. These cultural training programs can be used to train new GVT members to be aware and learn other cultural ways of doing business as well as the way other cultural celebrate holidays. The more GVT members cognizance and understand other members culture avenue of doing business [18]. The more they appreciate, trust, and work well with other team members different cultural.

## **2.6. Standards of Excellence and External Support**

GVT members frequently work as the point of contact for their immediate physical group [1]. The presence of a true invisible team is also a unique element of a GVT. Standards of excellence and external accompaniment intersect on numerous levels. Time and energy is well spent at the outset of a GVT to measure the degree of excellence the team will accomplish. This is particularly true when financial contributions require resources and / or funding outside or beyond the control of the GVT. Organizational managers or leaders of GVT need to understand the feasibility of their requests given the setting of their members’ management.

## **3. Conclusion**

This paper is significant for both researchers and practitioners because it has the possible to shed light on SFs as critical in building and managing high performance GVTs. It also contributes more commonly to the evolving savvy of SFs in the specific and non-traditional mode of project management, used in GVTs [11]. The research is important for project supervisors and for national project coordinators and their project teams in that its findings, if integrated into training programs, may direct to better understanding and use of SFs. If the supervision of GVTs projects does in fact improve project success, then there is a lack of knowledge on SFs and their linkage to project success.

In this paper the researcher performed extensive literature review, determined, synthesized, and presented the success factors in building and managing high performance GVTs. This paper is significant for both researchers and practitioners because it has the potential to shed light on SFs as vital in building and managing high performance GVTs. It also conduces more generally to the evolving savvy of SFs in the specific and non-traditional mode of project management, used in GVTs [11]. The research is important for project supervisors and for national project coordinators and their project teams in that its findings, if incorporated into training programs, may lead to better understanding and use of SFs. If the supervision of GVTs projects does in fact improve project success, then there is a deficiency of knowledge on SFs and their linkage to project success.

These findings offer a significant step in studying how success factors as vital in building and managing high performance GVTs. Organizational managers and practitioners from various industries who are managing GVTs could be of benefits with our study outcomes by implementing or developing strategies or processes that could

improve GVT performance for long term sustainable development. High performances GVT outcomes include improve team overall performance, time to the market, project success rate, and a better safer and healthier organizations or society.

### **3.1. Recommendations for Actions**

In order for IT organizations to stay competitive advantage, software quality, employee satisfaction, safer and healthier organization as well as to help reduce the current project cancellation and failure rates; project managers need to proactively implementing new GVT practices. To help accomplish this, the following recommendations or strategies for organizational managers and HR personnel work together to build an effective virtual project team: (a) Establish cultural awareness and training programs in place to help train new team members; (b) Select new candidates with good communication skills as well as prior or current experience virtual team practices; (c) Institute continuous training programs to encourage team members to improve their technical skills as well as communication skills; (d) Routinely conduct risk assessment on current project and its team members technical skills; (e) Closely monitor and track current project; (f) Select new manager with appropriate leadership style and technical skill for the job; (g) Create an effective domain knowledge transfer and sharing, and knowledge management repository that can be accessible to all team members at any time; (h) Select vendors that have good reputation and trusted as well as common development processes with your organization; (i) Embrace and appreciate other team members' culture relate to work; (j) Establish strong trust with other team members at the beginning of a new project inception; (k) Encourage team members to work with Sr. engineers and learn from their expertise; (l) Promote team members to do cross-functional training or learning; (m) identify potential threats and put secure design in place to countermeasure these threats; (n) Use open source software to leverage new development time; (o) Invite key stakeholders to attend meetings right at the beginning of project inception; (p) Encourage team members to utilize communication tools; (q) Sr. managers need to provide realistic expectations for all team members to achieve; (r) Establish clear definition of roles and responsibilities; (s) Ensure code sharing and knowledge sharing and requires that all parties empathize and uphold to their contractual agreements relating to IP, while keeping the overall business objectives; (t) Encourage team members responsibility and accountability for their actions; (u) Manager needs to facilitate, plan, implement and monitor global communication, alignment and related activities with effective procedures and policies; (v) Effective partitioning and allocation of work across the GVT must be addressed. This can be accomplished by implementing one or more distinct approaches for task allocation. Partitioning can be lifecycle based or component based [24]; (w) Manager must build an effective cooperation procedure within the global to reduce or countermeasure threats to the project; (x) Managers must acknowledge and empathize the cultural needs of the global software team; (y) Manager needs to be cognizant of how the project is progressing. Without designing formal reporting structures, there is a risk that the distant team members may not report properly, due to misunderstandings and cultural differences. The linked threat here is that GVT members may accept tasks which they are badly equipped to perform; and (z) Risk management should be integrated into all well planned GVT software projects. GVT projects bring additional exposure to risks which are linked with dealing a culturally diverse global team.

### **3.2. Recommendation for Future Research Direction**

IT organizational GVT managers are endlessly searching for the root causes of project failure. The findings from the research study provide the ground for future studies to explore the affect of success factors in building and leading high performance GVTs. The following factors, if included, may increase the opportunity of achieving a positive and generalized result. Failure to conceive and leverage the findings may outcome in GVT project failure. The factors to be considered are: (a) employ a larger sample size, (b) employ quantitative methodologies to corroborate the outcomes obtained from the current study, (c) encompass IT professionals from various firms and GVT workplaces, and (d) conduct a mixed research study on the affect of success factors in building and leading high performance GVTs.

There are several recommendations to future studies. The first recommendation is with the same sample size and method, further studies should encompass: (a) participants work location based in China or other country, (b) participants consist of GVT leaders instead of managers, (c) participants consist of GVT members instead of managers, and (d) participants consist of GVT members work for IT industry. The second recommendation is with a

larger sample size and same method; further studies should encompass participants as mentioned in (a) to (d) above. The third recommendation is with a very large sample size and quantitative, further studies should encompass participants as indicated in (a) to (d) above.

### **Author Biography**

Dr. Dan S. Nguyen, obtained his Bachelor of Science in Electrical Engineering, a Master Science in Computer Science, and a Ph.D in Management with specialization in Information Systems Management from the Illinois Institute of Technology, Northeastern Illinois University, and Walden University respectively. Currently Dr. Nguyen teaches courses in Computer Information Systems at Mt Washington College National Online Program. Dr. Nguyen's research interest includes Global Virtual Teams, Computer Security, Information Assurance, Software Engineering, and Artificial Intelligent. Dr. Dan can be reached via email: dan.nguyen@waldenu.edu

Dr. Dan S. Nguyen  
Mt Washington College National Online Program  
1015 Windward Ridge Parkway, Alpharetta, GA 30005  
Dan.Nguyen@waldenu.edu

### **Dedication**

First, the researcher would like to dedicate this research study to God who saved me three times from drowning at sea; and another time while he was on a kayak fishing at lake in Texas. Secondly, the researcher would also like to dedicate this research study to my blood parents Do Nguyen and Tai Thi Dang; and my American parents Raymond L. Schilling and Lucille M. Schilling who raised and influenced me since seventh grade and throughout high school and my sponsors (Ms. Alinda, Ms. Hildegard, and Ms. Renata Weiss). Third, the researcher would like to dedicate this research to my wife, Hồng Nhung Truong, and my sons (Bill Lê and Jacob Schilling). Finally, this research study would not have been possible and successful without those American soldiers (58,226) and South Vietnamese soldiers (1,250,000) who fought and died for the war.

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