

# Communication in Global Entrepreneurial Virtual Teams: A Systematic literature Review

MSc program in Entrepreneurship

Master's thesis

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Aalto University  
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### **Objective of the Study**

Global virtual team has become a commonplace in organizational structure and been widely used in entrepreneurial teams, such as born globals. Communication is recognized as a critical factor and challenge in GVT, nevertheless, researchers have merely touched the field of communication in global entrepreneurial virtual team. This study aimed to fill this research gap and found out what can global entrepreneurial teams do to achieve effective communication.

### **Methodology and the Theoretical Framework**

As very little literature existed about entrepreneurial GVT communication, this study conducted a systematic literature review on GVT communication in general and applied the synthesized findings to entrepreneurial team literature.

### **Findings and Conclusions**

The research showed that while communication plays a vital role in GVT functioning, it also specifically plays as a team performance factor, a human resource practice, a leadership practice, a trust building factor, a team member's boundary management strategy, an information delivery tool, a knowledge sharing channel and a team process facilitator. Factors that affect communication in entrepreneurial GVT include leadership, culture, technology, trust, language, communication behavior, communication channel, communication frequency/timing, training, interpersonal relations, interaction, task interdependence, communication wastes identification, degree of virtuality, coordination and awareness. Some factors depend on each other and communication is always a value that plays between these variables. To achieve effective communication in entrepreneurial GVT, the practitioners should address effective leadership practices.

**Keywords:** Global Virtual Team, Communication, Entrepreneurship, Systematic Literature Review, Leadership, Team Effectiveness, Team performance, Trust, Culture, Communication channel, Communication Behavior, Communication Technology

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## 1. INTRODUCTION

The word of virtual team is an emerging concept from around a decade ago when companies such as Motorola, Volvo Corporation, and Procter & Gamble began to export the self-managing work team concept to their foreign affiliates that creates global human resource practice (Kirkman et.al.,2001). Since then, virtual team has been served as a critical mechanism for information integration, decision making and market development of the companies seeking to leverage resources across geographic boundaries in order to face the unprecedented global competition in an ever complex business environments (Canney, Davison & Ward, 1999). Virtual team members work interdependently with shared purpose across space, time and organizational boundaries using technology to communicate and collaborate. They are typically from different cultural backgrounds and rarely have opportunity to meet face-to-face (Kirkman et.al.,2002). In a survey conducted by Forrester Consulting in 2012 with 135 senior leaders in America's Fortune 500 and large global companies, it shows that 40% of the company employees work in virtual teams nowadays and around 56% companies expect an increase in the virtual teaming in the next one to three years (Vilet,2012).

At around the same time, another concept of "born global" came out with the trend of rapid internationalization at newborn firms. A born global firm is also commonly called a global startup, is "a business organization that from inception, seeks to derive significant competitive advantage from the use of resources and the sales of outputs in multiple countries (Oviatt & McDougall,2005,pp.31)." Distinguished from gradual internationalization of firms, born globals start with borderless view of the world and develop their go-to-market strategy on Day one of, or even before the founding of the firm due to the advantage of the somewhat uniform setup of their product or service across geographic boundaries. It has become an increasingly important phenomenon in the world of entrepreneurship. While the born globals are getting their products or services across the geographic boundaries, an unprecedented number of global virtual teams have also been set up to serve the needs of their international customers. A new working concept "working anywhere, anytime and with anyone" is typically applied to the members of global virtual entrepreneurial teams (Dattner ,2013,p.31).

Fortunately, the development of Information and Communication Technology (ICT) has enabled the communication possibility and advantage in global virtual teams. However, it is



commonly understood that due to cultural and background difference, the communication has been facing challenges in different levels in many of the global virtual teams.

### **1.1 Purpose of the Study**

Global virtual team has become a commonplace organizational structure. Due to the fact that virtual team members work geographically dispersed, communication becomes a critically important factor in virtual team functioning. Leender, Engelen and Kratzer (2003) claimed, “without communication, the boundary spanning among virtual entities is impossible.” Following this trend, a number of researchers have been studying global virtual team setting and analyzing the communication therein with various methods. Virtual team managers and team members are also struggling with the situation that communication becomes a lot more challenging than working in non-virtual teams, which has been accepted as a big hurdle in team integration and achieving successful results in a company (Kayworth and Leidner,2000). According to Komi-Sirviö and Tihinen(2005), the lack of communication or poor quality of communication has contributed to 74% of the problems in distributed development.

On the other hand, entrepreneurship has become a driver of innovation, and been playing a significant role in world economies. Born global firms are also in the role of driving the trend of developing collaborative environments and networks to increase the innovation capability and global market availability (Ebrahim et.al,2009). Keyton, Ford and Smith(2008) argued that communication norms underlie all team interactions and affect all team processes. It is therefore vital for born globals to understand team communication under the fast-paced global virtual operation. Though a lot of researches in virtual team have been conducted, the studies on the specific communication side have remained scattered in different dimensions and very few of them has been specifically putting a focus on the communication within entrepreneurial virtual teams.

This study aims to contribute in filling this research gap and to analyze the role of communication in entrepreneurial GVT by means of systematic literature review on the role of communication within virtual teams, especially in the globally distributed virtual teams. Through this study, a key question of what entrepreneurial global virtual teams can learn from the existing researches in terms of team communication is sought to be answered. Following

specific research questions will be investigated and answered in order to achieve answers to this key question.

RQ1: What role does communication play in the functioning of global entrepreneurial virtual teams?

RQ2: How is communication in global virtual team measured in existing studies?

RQ3: What are the factors that affect communication in global entrepreneurial virtual team and how?

RQ4: What can global entrepreneurial virtual teams do to create effective communication?

## **1.2 Contributions of the Study**

By tackling these research questions, this study will contribute a knowledge base of entrepreneurial GVT communication for both entrepreneurial GVT practitioners and the researchers who are interested in GVT communication.

To create this contribution, the study will first conduct a narrative review on entrepreneurial teams followed with laying out the current studies on communication in global virtual team and its developmental patterns in terms of publication distribution, research methods, definition progress, advantages and challenges, affecting factors. Secondly, the study will identify the mainstream phenomena in global virtual team communication and give constructive clues and answers for practitioners to tackle their challenges. Lastly, the researcher aims to identify the research gap that has an urgent real world need to be filled in and to suggest future research paths that can guide researchers to fruitful avenues as well as being helpful to any stakeholders in born global firms who are mostly likely to use virtual teams.

### **1.3 Overview of Chapters**

This study is to find out how effective communication can be achieved in global entrepreneurial virtual teams with systematic literature review method. From pre-search, it was found out that despite a handful research resources of communication in GVT is available, very few studies have focused specifically in entrepreneurial GVT communication. To achieve this goal, the author first conducted a narrative review on entrepreneurial teams as presented at Chapter 2. The research methodology is presented in Chapter 3 which includes the introduction to systematic literature review method, the design review protocol, quality assessment criteria and the data extraction procedure. Following the methodology chapter, data synthesis results and analyses are collectively presented in Chapter 4 that can directly answer to research question (RQ1 and RQ2) as well as providing the foundation for RQ3 and RQ4 answered in the Discussion chapter. At Chapter 5, a summary of the findings from SLR was provided. Then the author discussed about communication in entrepreneurial GVT by applying entrepreneurial team literature to the findings from SLR and suggested implications from the whole study for entrepreneurial GVT practitioners and future researchers. A validity evaluation chapter followed the Discussion chapter to lay out the threats to the validity of this research study. Conclusions were presented independently at Chapter 7.

## **2. GLOBAL VIRTUAL ENTREPRENEURIAL TEAMS**

### **2.1 What are entrepreneurial teams?**

According to Eisenhardt and Schoonhoven(1990, cited by Schjoedt and Kraus 2009), the team who performs the venture creation process is regarded as the entrepreneurial team. Schjoedt and Kraus(2009) illustrates entrepreneurial team by providing the inherent link between the entrepreneurial team, its shared commitment and the performance of the venture. They defined an entrepreneurial team as “a team that consists of two or more persons who have an interest, both financial and otherwise, in and commitment to a venture’s future and success; whose work is interdependent in the pursuit of common goals and venture success; who are accountable to the entrepreneurial team and for the venture; who are considered to be at the executive level with executive responsibility in the early phases of the venture, including founding and pre-

startup; and who are seen as a social entity by themselves and by others (Schjoedt and Kraus,2009,p.515)”.

Venture creation is a novel and mostly unstructured task, as it responds to external environments and manages the internal functions with added complexity of lacking operating history and non-developed scanning capability. In both entrepreneurship research and the real world venture capital practice, it was commonly perceived that entrepreneurial teams outperform single entrepreneurs and are more valued than individuals in entrepreneurship (Lechler,2001; Schjoedt and Kraus,2009). It was argued that the combination of people with diversity in personality, knowledge, skills and abilities provide advantage as a team instead of individual in entrepreneurship. Working as a team also makes the dependence level lower on individual performance, which creates higher flexibility for the whole venture. In addition, working as a team could balance the stress in the venture creation situations. (Lechler,2001).

In a stable external environment, a heterogeneous entrepreneurial team experiences lower team performance with stronger need for communication and giving fast responses, while in a turbulent environment, a heterogeneous entrepreneurial team tends to make more comprehensive decisions that leads to superior team performance. It is in essence of how the team responds to the environments that influences their overall performance in an indirect manner. However, it also illustrates that entrepreneurial team composition is an important factor to predict the venture performance (Harrison et al.,2002).

## **2.2 Role of communication in entrepreneurial teams**

Haper (2008) examined conditions that are conducive to the formation of entrepreneurial teams and found out that how the founding entrepreneurs bear the bounded structural uncertainty of the venture creation process, how the entrepreneurs perceive the degree of game harmony in terms of common gain or scope, how much is the common interest of the entrepreneurs in a team and how strong is the interdependence, are conditions that would influence the favoring of joint entrepreneurial actions. Once the entrepreneurs decided to work together, it is crucial to find out what are the factors that influence the team performance after venture formation. Cohen and Bailey's(1997,cited by Schjoedt and Kraus,2009) research tackled this problem and identified that external environment, team composition, team process including conflict and communication are the determinant factors in an entrepreneurial team performance.

As one of the determinant factors in entrepreneurial team performance, communication is also seen as an essential part in the team functioning, through which the team members can exchange information and create new knowledge and insights. The communication interaction in entrepreneurial teams helps team members acquire useful information to anticipate and to avoid potential weaknesses in the upcoming solutions (Weimann et. al.2010). Communication is also one of the six components of social interaction for entrepreneurial teams that are found to be positively associated with the five dimensions of new venture success, including economic success, competitive position, efficiency, client satisfaction and personal success, according to Lecher's (2001) empirical study. Furthermore, communication creates channel to build up entrepreneurial team collective cognition (ETCC) on new venture strategy, which is of significant importance for venture performance (West 2007). Here the content of ETCC is referred to "the strategy constructs that guides the venture's conduct and performance" which contains two dimensions- differentiation and integration. Differentiation refers to the extent to which each strategic construct is different from each other, while integration refers to the degree of similarity of the team in perceiving the set of strategic constructs in the venture. The research found out that entrepreneurial team performance is significantly associated with the differentiation and integration among team members. Neither too much integration (high consistent views) nor too much differentiation (constantly identify different options) provides positive effect to team performance. Communication plays a vital role in influencing the balance of integration and differentiation in entrepreneurial teams.

### **2.3 What are virtual teams?**

Powell et.al(2004) defined virtual teams as groups of people who are geographically, organizationally, and/or temporally dispersed, brought together by information communication technologies to accomplish one or more organizational tasks. Virtual team members may have never worked together in the past and work together only for a brief period (Corvello and Migliarese,2007). Due to an unprecedented level of flexibility, more and more companies are adopting virtual team settings in their organizational structure (Powell et.al,2004). Researchers were also motivated by the fact that virtual teams represent as a logical step that organizational structure will transform to in the future (S9), resulting in a growing number of virtual team studies for the benefit of virtual team and its theory development.

## **2.4 Role of communication in virtual teams**

Due to the fact that virtual team members work geographically dispersed, communication becomes a critically important factor in virtual team functioning. Leender, Engelen and Kratzer (2003) claimed that “without communication, the boundary spanning among virtual entities is impossible.” Chhay and Kleiner(n.d.) pointed out that location, culture, nonverbal communication and trust are the four factors that most directly influence the team communication effectiveness and the objective fulfillment. Virtual team members work interdependently with computer-mediated communication technologies to interact with team members and to accomplish shared tasks for the company (Pitts, Wright& Harkabus,2012). Their interaction methods could include telephone, teleconference, messaging, email, skype,etc. All their computer-mediated communication technologies have the same drawback as they are lack of verbal and nonverbal cues compared to traditional face-to-face communication interaction. The verbal cues (i.e. tone of voice, verbal hesitation, volume) and non-verbal cues (i.e. facial expression, body movement, emotion) are however important sources to process information from team members for tasks (Walther,1997).

Warkentin and Beranek(1999) stated that “virtual teams are either synchronous( same time/ different place) or asynchronous( different time/ different place)”. In both settings, a virtual team would rely on computer-mediated systems to communicate with each other, which makes face-to-face contact rarely available or abandoned as a communication channel. Compared with face-to-face teams, virtual teams face problems such as “decreased social interaction, communication, and emotional expression” according to Jarvenppa and Leidner (1999), which could lead to the efficiency decrease and deficiency in trust in the virtual team. According to the research by Pitt, Wright and Harkabus(2012), team communication also serves as one mechanism through which emotional intelligence influences team viability in virtual teams. Daft and Lengel(1986) stated in media richness theory that the lack of social information in computer-mediated communication system would ultimately limit or reduce the communication quality in the virtual teams. Many research also shows that virtual teams communicate less information than face-to-face teams which makes the relationship in virtual teams develop slower than in a face-to-face team(Chidambaram,1996).From all the findings, it is obvious to see that virtual team communication faces more challenges than the communication in a face-to-face team.

In spite of the challenges in virtual team communication, there is given evidence that effective communication is of critical importance in virtual team functioning. Therefore, understanding the virtual team communication mechanisms would give great support to the team effectiveness and performance in a virtual team.

## **2.5 Adding the global dimension to the role of communication in virtual teams**

Global virtual teams are the virtual teams whose operation is in global scale and whose members are globally distributed. Compared with virtual teams whose members are sitting and working in the same country, a global virtual team faces bigger challenges in cultural difference, language barriers, information sharing, social context, etc. A global virtual team is commonly formed in high tech sector, and they are normally rapidly formed, changed and dissolved due to the dynamic changes in market ( Daim et al. 2011). Most global virtual team members are spread among several projects with competing priorities, which drives all team members to seek for effective communication with each other( Daim et al.2011).

“Cultural norms can be defined as collective expectations of appropriate behavior in a specific context”(Koehler,2009,p.6). In global virtual teams, the different cultural norms from the members make it difficult to create a common set of cultural norms in the team, thus bringing more difficulties for team members to understand the norms behind the communicative behaviors. When team members from different cultures interact, their expectation might clash due to lacking of understanding of others’ cultural values, which could result in conflicts between team members and negative effect on teamwork outcome. Many researchers also found out that the process of establishing common ground and shared meaning context is critical to the communication action (Bjørn & Hertzum 2006). A failure to do that might cause a breakdown of the teamwork (Cramton 2001). Considering the importance of establishing common ground and shared meaning context for communication actions and the characteristics of global virtual teams, it contains an increased risk of communication breakdowns for global virtual teams (Hinds&Mortensen 2005).

From a social network perspective, Sarker et. al. (2011,p.303) highlighted the importance of networks and network centrality within organizations”. The structure of context and individuals’ relationship with other elements in the context are significant to the behaviors of individual team members, given the obvious evidence that individuals are typically involved in a context but not in a vacuum. This research also found out that some team members who may

perform better than their peers typically benefit from the social network they belong to, where they are given critical resources and social supports. They conceptualized a global virtual team as “a network of linkages among its members with each member holding a structural position within that network”. Members who actively communicate with their team members are seen more positively in the team and they are perceived as a performer or contributor to the team work. This argument gives evidence on how communication is important for team members to establish their situational position in the team and make their work process more visible in especially global virtual team context.( Sarker et al. 2011,p.281-282).

## **2.6 Global virtual entrepreneurial teams**

The combination of people with diversity provides the advantage to entrepreneurial teams as they are perceived to outperform individual entrepreneurs and more valued than individuals in entrepreneurship (Lechler,2001; Schjoedt and Kraus,2009). Global virtual entrepreneurial teams share and expand this advantage to the most as they hold high level of diversity in culture, language, perception, background, knowledge, skills and abilities within the team.

On the other hand, entrepreneurial team composition is an important factor to predict the venture performance. Entrepreneurial team heterogeneity can be divided into surface level (demographic) characteristics including tenure, age, functional experience, race, educational background, and deep level characteristics (psychological) including personality, values and attitudes according to Harrison et al.,2002. They also argued that deep level heterogeneity such as personality conflicts, disagreements about strategic goals and different level of commitments, might be more crucial to communication, team cohesion and team performance than surface level heterogeneities as it supplies more sustainable effects. In global virtual entrepreneurial teams, due to the geographical dispersion and cultural difference, the team members share high level of heterogeneity in deep level characteristics, adding more complexity to handle communication in the team than in entrepreneurial teams or virtual teams.



### **3. RESEARCH METHODOLOGY**

This research plans to conduct and report the review findings by following the systematic review process suggested by Tranfield et. al.(2003). This chapter will cover an introduction to systematic literature review method, the review protocol, quality assessment and data extraction.

#### **3.1 Systematic Literature Review**

A systematic literature review method can be traced to early 1970s in the medical field when medical researchers decided to gather, evaluate and disseminate research evidence that “are conscientious, explicit and judicious in making decisions (Sackett et al., 1996,p.1)” for individual patients. NHS center for reviews and Dissemination(University of York,2001) summarized it as “a review of evidence on a clearly formulated question that use systematic and explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review.” Following the relative success of evidence-based approaches in medicine, systematic review was adopted in other science fields as it was recognized as “an efficient technique for hypothesis testing, for summarizing results of existing studies and for assessing the consistency among previous studies (Pitticrew,2001,p.99)”. Tranfield et.al(2003) introduced the systematic review as a key tool in developing the evidence based knowledge in management research. They pointed out that systematic review identifies key contributions in the studied fields with “a replicable, scientific and transparent process that aims to minimize bias through exhaustive literature searches of published and unpublished studies and by providing an audit trail of the reviewers’ decisions, procedures and conclusions (Tranfield et,al.2003,pp.209)” .

According to Briner and Denyer(2012), conducting a systematic literature review gives a stronger focus on theory development and the advances in technologies makes it more important to keep up-to-date. The other common reasons for conducting a systematic literature review include identify knowledge gaps or incongruent findings that signify research need for future researches (Denyer&Tranfield 2009,Kitchenham,2004), provide a framework in order to offer easier and more appropriate positioning of new research activities(Kitchenham 2004).

Conducting a systematic literature review is a complex process, however many researchers in different scientific fields have been providing a list of stages that reviewers can follow for a

smooth and productive work flow. Figure 1 presents the stages of a systematic review provided by National Health Service Dissemination (2001) and Cochrane Collaboration's *Cochrane Reviewers' Handbook* (in Tranfield 2003).

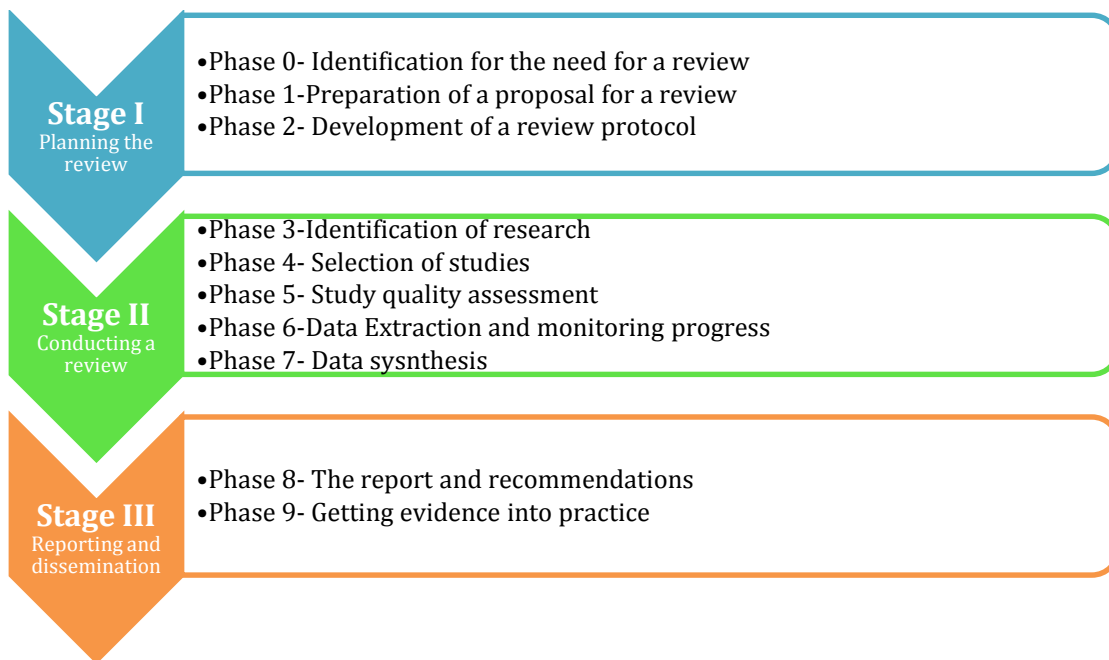


Figure 1. Stages of a systematic review (2001 NHS Centre for Reviews and Dissemination, University of York, in Tranfield et. al. 2003)

Though a number of researchers have argued that the adoption of systematic literature review method is beneficial in management search studies, Tranfield et.al(2003) have voiced the concern that the full adoption of medical field systematic review method to management review is questionable and potentially undesirable due to nature difference of the two sciences fields. They developed four principles of systematic review that are argued to fit the use in management and organization studies.

### *Transparency*

In contrast to the medical system review's replicable principle, Denyer and Tranfield(2009) pointed out that the reasons for documenting the review methods is to aid transparency in three layers. First, the reviewer are open and explicit about the review process and methods; Second, the findings from the review should be presented in a way that build the links between the evidences identified and the conclusions drew by the reviewers; Third, the transparency

requires the reviewers to clarify the assumptions and put a mindful value stance for themselves in the studied subject to eliminate or reduce the bias.

### *Inclusivity*

Pawson(2006) encourages the reviewers to include in the review scope with a wide range of studies, research types and data forms instead of adopting the hierarchy of evidence. Salipante et.al(1982, in Denyer&Tranfield2009) also argued that inclusion of a wide range of sources in a review can compensate for rich judgments and uncontrolled validity threats. Denyer&Tranfield(2009) suggested the reviewers to avoid proxies for research quality such as the quality rating of journals as exclusion criteria and justify the reasons for their inclusion/exclusion of studies as well as communicating the warrants underpinning their claims.

### *Explanatory*

In the process of data synthesis, researchers have been exploring synthesis mode as alternatives to meta-analysis. Interpretive and explanatory synthesis are regarded as “active” and “creative” methods according to Pawson(2006) compared to aggregative synthesis which seeks to avoid bias. The synthesis should be a process that involving putting the individual studies together while creating a map that is more than a summary. The body of evidences are probed, sifted, coded and cross tabulated in various ways that makes associations between the parts identified in individual studies (Denyer&Tranfield,2009).

### *Heuristic*

The heuristic principle is applied in deciding the degree to present the findings to practitioners as a management review output can be abstract. A heuristic output is helpful to practitioners in receiving suggestions, rules, guides or a prototype protocol instead of giving direct solutions to certain management problems.

## 3.2 Review Protocol

### 3.2.1 Search Strategy

To get a handful quality sources for the review, the author decided to conduct the searching in three most recognized databases - Ebsco Business Source Complete, Science Direct and ProQuest ABI/INFORM. The keyword were initially chosen on the basis of exploratory search and include: global, virtual team, communication, entrepreneurial. It was nevertheless found out that no studies were identified on the communication of entrepreneurial virtual teams, while there is a comprehensive selection of studies conducted about communication in global virtual teams. Therefore this data base search will leave out the entrepreneurial team part completely and aim to gather a handful of useful resources about global virtual team communication, from whose synthesized learnings will be applied on entrepreneurial teams to help answer the research questions. The keywords were arranged in several different search strings subsequently employed on scholarly, peer-reviewed articles naming at least two of the orientations in the abstract, keywords or title. The exact keyword strings that were tried in the database include AB “global virtual team” AND AB “communication”, AB “global” AND AB “virtual team” AND AB “communication”, AB "global virtual" AND AB "team communication". The output from the searches based on the 3 search strings are presented in Table 1.

Table 1. Source Databases and initial retrieval

Database Name	Retrieval Date	AB “global virtual team” AND AB “communication”	AB “global” AND AB “virtual team” AND AB “communication”	AB "global virtual" AND AB "team communication"
Science Direct	30 March 2015	6	44	20
EBSCO	30 March 2015	9	21	2
ProQuest	30 March 2015	8	25	1
<b>TOTAL</b>		<b>136 ( including 5 overlapped papers)</b>		

### 3.2.2 Study Selection Criteria

After finding the primary set of articles that are scholarly (peer reviewed) for the review from three most reliable and recognized databases, a title and abstract review was conducted to exclude the articles that are overlapped in databases and the ones not related to the research topic. For example, some papers talk about virtual communication in a fully school context or virtual communication in e-commerce between business and consumers which are not related to the company's team working context are excluded. The review selection was mainly evaluated based on the match between the reviewed paper and the research topic. The perfect article to include in the selection are the ones that not only cover all three key words of global, virtual team and communication at least in the abstract but also studying about team communication in professional work context. The reason for excluding the communication in non-corporate related school context is due to the understanding that the school projects which don't involve a corporate case, don't share completely the same team work rules as in the business world.

### 3.2.3 Selection Procedure

After getting an initial pool of 136 articles, the author went through all these articles by title and abstract to exclude the papers that do not match the content of this research to improve the validity of the search. This validity step resulted in overall number of 41 unique papers to be entered to full text review.

To build up the basic foundation of this review, the 41 unique papers were reviewed for the second time by full text and recorded in an MS Excel sheet with paper title, publication year, author, publication source, research question, and research method, unit of analysis, data collection methods and main results. The list of the 41 reviewed papers are presented at Appendix A. At this stage, 8 paper were left out from the pool, the main exclusion reasons include the papers are not academic research papers (S21, S39), the paper doesn't contribute to the scope of this research after further investigation (S3,S18,S40,S41), the research was designed and examined for global student group collaboration instead of corporate practical use purposes(S11,S12). The explicit exclusion reasons for each paper were also listed in the data extraction form and presented in Table 3 at Chapter 3.3.

After the Stage 3 of full text review and recording, all the 33 papers entered to the final pool of papers for research data synthesis. A search and selection process flow chart is presented as Figure 2.

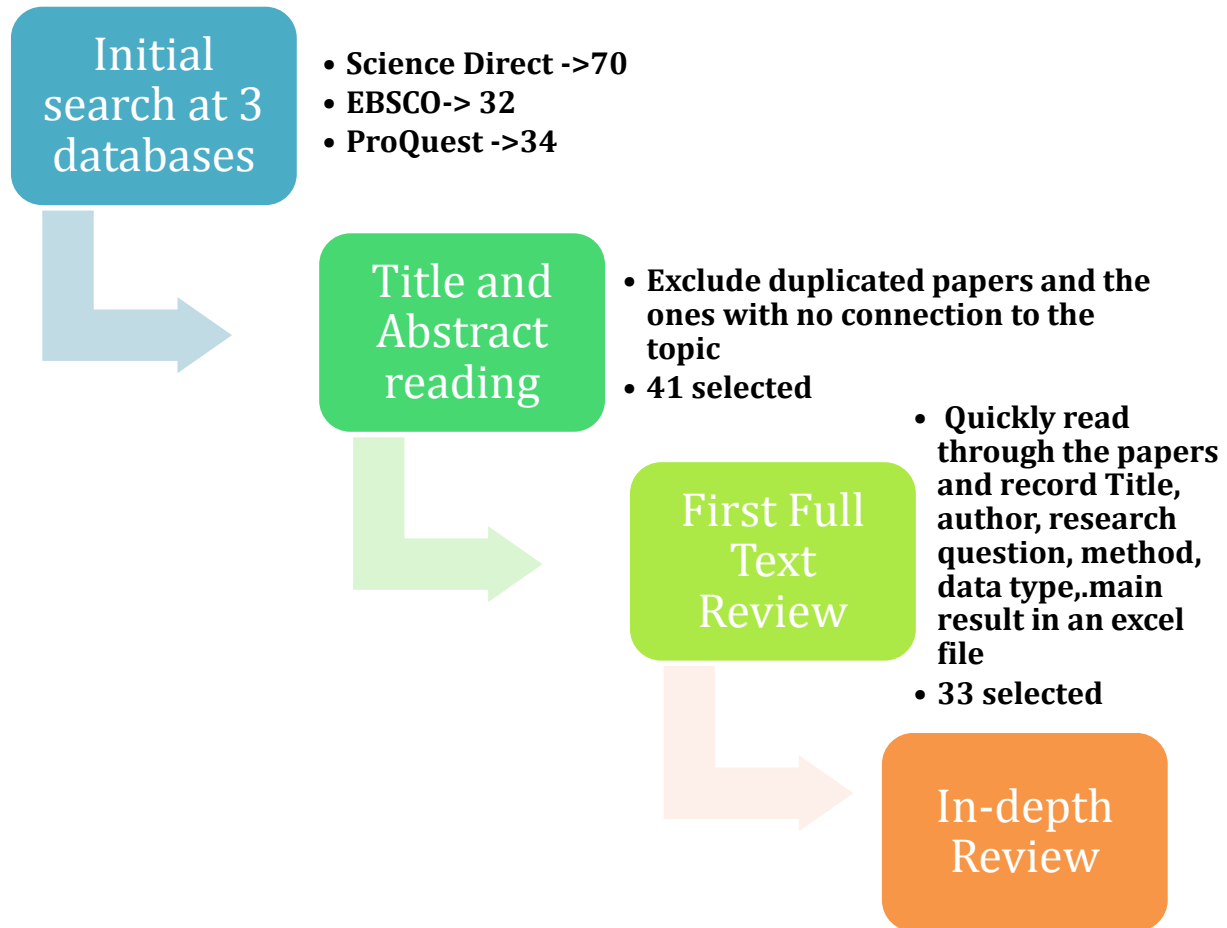


Figure 2. Primary Studies Selection Procedure

### 3.3 Study Quality Assessment

Following with a selection of papers for the research, a study quality assessment is conducted to evaluate the validity of the retrieved papers for this research area. The retrieved 41 unique papers were justified based on the inclusion/exclusion criteria specified above. Proxies for research quality such as the quality rating of journals was not considered in the study selection. A number of quality assessment questions were devised to evaluate the rigorousness, credibility and relevance of the studies, and the questions were designed based on Locke et. al(2004) and Nguyen-Duc et.al.(2015), as shown in Table 2. The assessment was then conducted during the first full text review, which helped to exclude 8 paper that fail to answer the assessment

requirement questions from the list. Table 3 shows the 8 excluded papers and the exclusion reasons.

Table 2. Quality Assessment Questions

<b>Study Quality Assessment Questions</b>
Q1. Is the research objective sufficiently explained and well-motivated?
Q2. Are the data collection and measures adequately described?
Q3. Are the measures and constructs used in the study the most relevant for answering the research questions?
Q4. How thoroughly did the paper explain the procedure for using all the instrumentation for the study?
Q5. Is the data analysis used in the study adequately described?
Q6. Is the data collected strongly relevant to this research?
Q7. Are the findings clearly stated and supported by the results?
Q8. Does the paper discuss limitations or validity?

Table 3. Paper Excluded from In-depth Review and Reasons

<b>Paper No.</b>	<b>Paper Title</b>	<b>Exclusion Reason</b>
S3	Locus of control and attitudes to working in virtual teams	Discuss about the internal-external locus of control personality of team members, not touching the pound of communication
S11	Learn to use and use to learn: Technology in virtual collaboration experience	Study different communication tools that should be used during global student project and a student project is different from a corporate team collaboration ; the study was also mainly for future course designers and students who are involved in global distributed teamwork
S12	Interpersonal trust in cross-functional, geographically distributed work: A longitudinal study	Study about trust worthies in GVT, and focus on study work group that does not involve financial stakes, with very limited expectation of working than in real corporate world
S18	How team feedback and team trust influence information processing and	The study didn't examine any aspect of communication in GVT, the focus was in the moderating role that trust could play in

S21	learning in virtual teams: A moderated mediation model Continent Divides	virtual teams' information processing and learning Doesn't provide sufficient research, and this article talks in general about global team management challenges and the best practices to cope with it. It doesn't have a construct of academic research.
S39	Virtual team going global	Not an academic research paper either
S40	Communication Behaviors and Trust in Collaborative Online Teams	This case study is to investigate the trust and communication behavior at online learning environment, doesn't fit the scope of this research to understand communication in global business team cooperation.
S41	Global teams: a network analysis	A network analysis to help understand the relationship between different determinants in global team, the study doesn't cover virtual team context and has little to contribute to communication aspect

### 3.4 Data Extraction

The papers that are remained after the selection based on the inclusion/exclusion criteria introduced in previous chapters, were collected for data extraction (Phase 6 of a systematic review in Figure 1). The data extraction was conducted in two stages. The first stage of data extraction form was designed during full article review and included properties of Article title, publication year, author, publication source, research question, research method, unit of analysis (person, team, project), data collection methods, main results, domains in communication and issues concerning communication. This first stage extraction helped the author to build a general view on the current studies in the research field. To improve the extraction result that helps answer the research questions, several properties were modified or added to the data extraction form for the in-depth review. These properties and their relationship research questions are shown in Table 4.



Table 4. Extracted Properties

<b>ID</b>	<b>Property</b>	<b>Research Question</b>
<b>P1</b>	Publication	Demographics
<b>P2</b>	Research methods and tools	Demographics
<b>P3</b>	Definition, advantages and challenges	Background overview
<b>P4</b>	Role of communication	RQ1
<b>P5</b>	Communication measurement	RQ2
<b>P6</b>	Affecting factors	RQ3
<b>P7</b>	Relationship between affecting Factors	RQ3
<b>P8</b>	Best Practice	RQ4

The properties of P1,P2 and P4 have a set of values summarized from the full text review. P1 contains value of distribution by year and publication source, P2 is assigned with values of research method, unit of analysis, data collection method. P3 marks out the definitions given on GVT and the views on advantages and challenges on GVT. P4 includes a list of roles that communication play in GVT functioning, starting with 4 measurements that include communication as a team performance factor, as a leadership practice, as a human resource practice and as a trust building factor, and expanded with additional 4 during the review process, as of communication for information delivery, for knowledge sharing, communication facilitates teamwork process and as a boundary management strategy. P5 consists of 9 measurement values including communication technology, communication behavior, communication effectiveness, communication breakdown, communication as a performance factor, communication a leadership practice, communication a HR practice, communication as a trust building factor and communication strategies. As it was identified from full text review that there are a variety of factors influencing the communication in global virtual team settings, P6 is a categorization of these factors. A narrative collection is drawn at P7 to build a relationship model of these affecting factors as they are identified as closely associated variables. P8 investigates the key learnings from mainly the empirical studies to dig out the best learnings that a global virtual team can take and apply to their own practice. The data extraction form can be found at Appendix B.

## **4. ANALYSIS AND RESULTS**

This chapter will discuss the data extracted from the two stages of extraction. It will first cover an overview of the selected studies including the demographical and research distribution features of the studies. Following the overview, a general discussion about how global virtual team is defined and its advantages and challenges are given to provide a concrete view on global virtual team as an emerging concept in work settings for future researchers or practitioners to get a quick orientation on this topic. Analysis to address RQ1 (how communication is measured) will follow at chapter 4.3. Following the communication measurement analysis, it will present from each extracted paper of the affecting factors on GVT communication and create a synthesized analysis on each factor, which will serve as a basis for the discussion of RQ3( affecting factor of entrepreneurial GVT communication) and RQ4 ( best practices for entrepreneurial GVTs).

### **4.1 Overview of the studies**

#### **4.1.1 Distribution by publication features**

From the total 136 paper selected from the database, only 33 papers were selected to the final in-depth review for this study under rigorous selection phases. Figure 3 shows the publication year distribution of the selected paper. The papers were published between the years of 1997-2014 with a dramatic increase since the year of 2010 as researchers shifted more focus to global virtual team studies following the irreversibly growing trend of new virtual teams.

Among the 33 articles, 30 were published on a journal, 3 were published at conference and 1 article was published at the newsletter from Harvard Business Review. Some authors contributed more than 1 study: Timothy, Kayworth (2 papers with focus on leadership together with Dorothy Leidner), Dorothy Leidner together with other authors(4 papers exploring leadership, trust, communication, management of GVT), Sirkka L.Jarvenpaa(3 papers, with focus on trust and communication). This general author list should be viewed as a group of researchers that influence this systematic literature review rather than the whole research field of GVT. However, the research from these authors are recommended for future researchers to orient themselves on right literatures and researches to their studies.

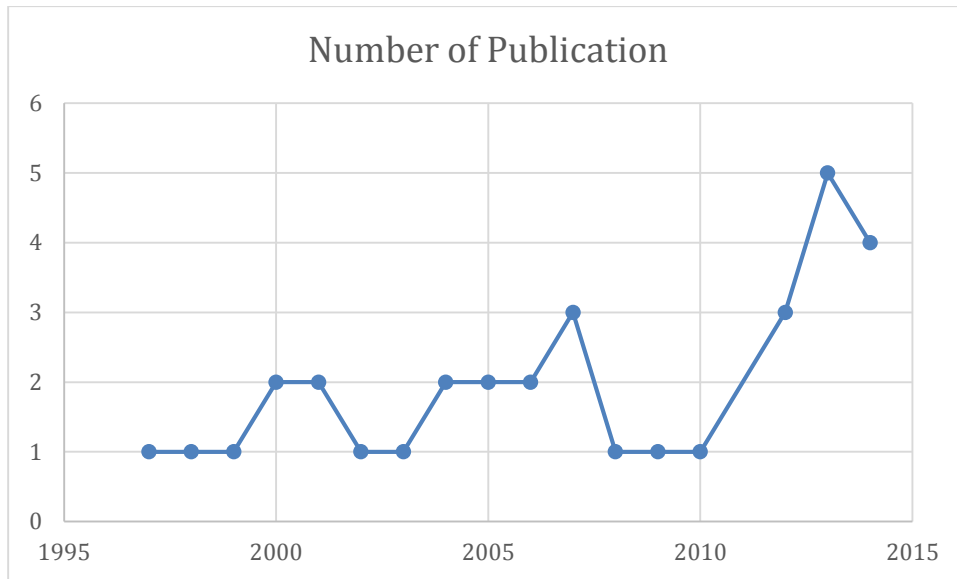


Figure 3. Distribution of Publications by year

#### 4.1.2. Distribution by research features

Both qualitative and quantitative research methods were applied to the researches. There are 20 qualitative studies mainly focusing on virtual team performance and the affecting factors whereas 13 quantitative studies were conducted to mainly test the relational hypotheses. 79% of the studies were empirical researches, with 12 measuring and analyzing results based on individuals and 14 making the analysis based on teams. Among all the studies, some focus on the general exploration of GVT operation and its dynamics, some explore one or two specific factors to address the influence of the factors on GVT operation. Within all these studies, there are a couple of studies tackling GVT operation from interesting angles, such as S29 explores artificial agents leading human virtual teams and S13 looks into using online communication content to assess team performance for GVT managers. Table 5 lists the categories of research focus of these studies. There is a cheerful phenomenon for this research that about 30% of the studies are straightly exploiting communication in global virtual teams, and 60% talks about the affecting factors of GVT operation and explores the relationship between the factors. Various data collection methods were used in the studies (see Table 6), among which the most used data collection methods were questionnaires (42%) and interviews (36%), 27% of the studies have used more than mixed methods for data collection. Two studies have used laboratory experiments to set up the research design and context in students' academic working groups. With a rigorous research experiment design, a student working group was more

favorable for researchers in this topic with an experiment method than in a real corporate setting as it is obviously hard to resemble the scenarios or set up limitations in a company's operation.

Table 5. Research question categories

<b>Research Question Categories</b>	<b>No.</b>	<b>Reference</b>
Affecting factor of GVT operation and its relationship	20	S1,S2,S4,S7,S8,S15,S17,S20,S24,S25,S26,S27,S28,S29,S31,S32,S35,S36,S37,S38
GVT communication exploration	10	S2,S4,S10,S16,S19,S22,S23,S27,S30,S33
GVT assessment	3	S9,S14,S34
GVT management practice	4	S6,S13,S16,S25

Table 6. Data collection methods

<b>Data Source</b>	<b>No.</b>	<b>References</b>
Questionnaire	14	S1,S2,S9,S13,S20,S24,S26,S27,S28,S30,S31,S34,S35,S37
Interview	12	S4,S5,S6,S7,S10,S19,S22,S23,S26,S28,S30,S36
Focus Group	2	S9,S23
Literature Review	2	S15,S16
Laboratory experiment	2	S17,S32
Observation	4	S14, S19,S23,S28
Call	1	S26
Email	3	S24,S26.S27
Other material	5	S19,S23,S26,S28,S35
Face to face meetings	1	S26
Mixed	9	S9,S19,S23,S24,S26,S27,S28,S30,S35

## 4.2 Understanding Global Virtual Team

### 4.2.1 Defining Global Virtual Team

Global virtual team arose as an emerging concept around a decade ago. Many researchers have tried to define the concept since then(S2,S9,S22,S25).

The word “virtual” differentiates global virtual teams from traditional teams, which can be simply observed from the literal meanings. To define a global virtual team, it is important to understand the concept of “virtuality” to characterize this kind of work settings. Several studies (S22,S24,S26) saw GVT as a temporary team who are globally distributed and works together for specific tasks or project while not assuming to continue the work relationship after accomplishing this task (S24). With the adoption of virtual team setting in various context, the discontinuity in work relationship after project or task is challenged by reality. Speier and Palmer(1998) proposed a more explicit model of multi-dimensions of the degrees of virtuality (Figure 4). In this proposed model, we can fit the previous view of virtuality measurement in S22, S24 and S26 to category IV as a highly decentralized dimension, thus bear in mind that these studies (S22, S24,S26) and the findings should be justified in order to apply to the further researches and practices.

Another commonly agreed characteristics of GVT is the dispersion of the teams. Shin(2005, cited by S22) defined four dimensions of dispersion of virtual teams, which are spatial, temporal, cultural and organizational. Spatial dispersion refers to the extent to which team members work in different locations, temporal dispersion is the degree of members operating work in different time, cultural dispersion pertains to the extent that team members are from different cultural background and the organizational dispersion refers to the degree to which the team members work across organizational boundaries(Shin,2005). The degree of virtuality depends on the level of dispersion that the team operates in. With these cross-dimensions, each GVT can be placed on a continuum between extreme virtual teams and low level virtual teams(S22). An example of an extreme virtual team is a cross-organizational team whose members are from different organizations and countries who seldom meets face to face, and a less extreme type of virtual team is a distributed team whose members are from single organization while being operated in different locations.

It is exactly because of the cross dimensions in virtuality and dispersion, a global virtual team is distinguished from a virtual team or a global team. A virtual team is considered global when its background is culturally diversified and members are working and thinking with the diversity in the global environment (S25). In the context of this study, we focus on the global virtual teams with relatively low virtual team dimensions whose members are normally from a single organization while being operated in different locations globally.

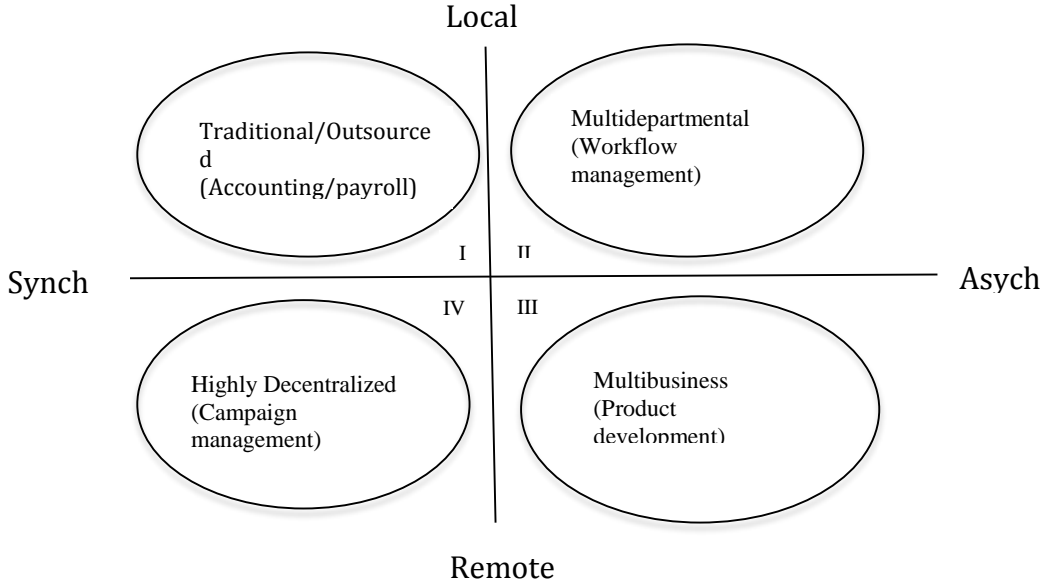


Figure 4. Multidimensional Map of Degrees of Virtualness (Speier and Palmer,1998)

4.2.2 Advantage and Challenges of using GVT

*Advantages of using a GVT*

The advances in communication technologies make the global virtual team possible to connect and collaborate on tasks cross boundaries. “Rising customer expectations -bigger, better, faster” has driven many organizations to set up teams dispersed but close to local markets and the customers (S6, Dattner 2013,5), which brings not only advantages in customer satisfaction, but also in optimizing the resource utilization of the company in aspects such as reducing procurement cost and reducing potential travel time and cost, (S2,S6,S19,S27,Gillam& Oppenheim 2006). This type of team setting also allows firms to expand their potential labor markets in a global scale which is not limited to the geographic boundaries to obtain previously unavailable expertise (S7, S9, S10, S19, S22, S27, Dattner 2013). Due to the time differences

between different locations, global virtual teams also work with benefits of a 24 hour shift with each member's 8-hour working day which enables better resource utilization and increases flexibility and responsiveness to the customers (S1,S6, S10, S19, S22, S27, S33, Dattner 2013).The variety of employees' background in the global virtual team also allows diversified perspectives on problem solving, leading to greater innovation and creativity (S10, S25, Zakaria et al.,2004). Additionally, virtual teams tend to give higher flexibility for team members in balancing personal and professional life (Gillam& Oppenheim 2006). In the virtually networked environment, power and information are hyperlinked and informal, bringing a more blurred boundaries between leaders and members, which helps with relationship building inside the company and higher independence and satisfaction for employees (S15). It also gives opportunities for handicapped people to use their expertise without considering work obstacles in a traditional team environment (Gillam & Oppenheim 2006) including reduction in possible discrimination ( Bergiel et al.2008).

#### *Challenges of using a GVT*

Due to less development of interpersonal relationship and less information sharing, geographically distributed virtual teams tend to meet bigger challenges to solve underlying conflicts. Hinds and Mortensen (2005,S8) also argued that conflicts between teams in a global virtual team tend to be “more severe, longer lasting and harder to resolve” as distance adds more barriers to communicate.

GVT communication is heavily relying on technology infrastructure and its availability in the company and the region. The heavy and sometimes over reliance might bring challenges for GVTs to expand business to regions with limited availability to the infrastructure (S2, S4, S5, S31). In a normal virtual team operation process, virtual team members deal with both communication with remote customers and with other virtual teams, which introduces a more challenging layer of collaboration to the team members (S8). Since the tasks are complex in virtual settings, it's critical and demanding for team integration, making it even more challenging to manage the leaving of an existing employee and to introduce new members into the team (S16).

Maznevski and Chudoba (2000,p.476) noted that “cultural values influence the perceptual filter through which a person interprets information needed to make decisions” as well as “

influencing members' preferences for social interaction norms". Global virtual teams are often formed with team members from different cultural background and the influence of culture value is, however, a strong source to problems in a multicultural group, especially when they are also geographically dispersed, adding difficulties to solve when conflicts occur (S2, S4, S7, S8, S10, S15, S16, S31). It is also possible that a dominating culture in the multinational teams drives the tendency of uncomfortableness and unequal power status with a strong feeling of "they" and "us" (S4,Cramton and Hinds,2005). Cultural difference in general is perceived to build challenges in knowledge sharing and affect communication effectiveness in especially complex ideas (S2,S10).

All communication is done with languages- verbal language, written language and body language. The variation in languages and how languages should be used in contexts can also lead to challenges in, including, equality, expressing ideas and building trust (S10, Zaidmann 2001). Language barriers can also exist when some global virtual team members are not native speaker of a certain language, thus bringing challenges to understand fully of the conversations in teams, especially deepened when the teams are sitting in different locations and chatting through technology based devices. Constraints on the computer-mediated communication methods are also imposed as "the lack of physical interaction with its associated verbal and nonverbal cues reduces the richness of information transmitted by GVT members and the synergies that often accompany face-to-face communication" (S2,S6,S7,Dattner 2013,S13).

Virtual teams are more task-oriented. Therefore traditional social control is not commonly applied to the team members, which may lead to trust issues, according to (S4, S5, S6, S8, S15, S20, S26, S33, S34, Dattner,2013). The team members in GVT tend to obtain more self-control and self-direction than being given the direction and controlled by the authorities (Dattner 2013,p.11). Work morality and self-motivation is very much addressed to be a global virtual team member. On the other side, it is a common setting that virtual team members work from home, resulting in a strongly blurred boundary between personal life and work. These bring threats to GVT members to manage their feelings of isolation and detachment with increased mental overload (S4, S6, S7, S23, S27). Hence it is a challenge for the company who has global virtual teams to monitor and motivate the team members. Trust is also a severe issue to address between virtual team members and it's seen as one of the major reasons for the failure of GVTs (S5). Ultimately it brings demands and challenges for global virtual team leaders to setup,



design, manage and financially operate virtual teams with more assumed responsibilities (S2, S5, S6, S8, S15,S17).

Challenges in global virtual teams also exist at the time difference as people sitting in different time zones (S4, S15, S16, S19). In order to set up a global team meeting, it is possible that some team members have to attend at a too early or too late work hours. Time zones also bring difficulties when one part of the team needs urgent information from another member who might be unreachable due to late day time (S4). These barriers to reach immediate information create more difficulties to generate best results to the company and its customers.

Another existing disadvantage of virtual team is that the virtual team setting is not an option for any type of employees because of an employee’s psychological make-up and other predispositions, according to Gillam and Oppenheim (2006). The virtuality of work setting also potentially brings threats to the employees’ social network building or social bonding, which is also seen as a concern for many GVT members who suffer from mental workload increasing (S4, S6, S7, S23, S27).

In spite of all these challenges, it is more important to be aware that opportunities to success are behind these challenges if they are tackled with right practices. It is also because of these challenges that differentiates a GVT from a traditional team setting, which ultimately serve as advantages to the companies who adopt global virtual team settings. Table 7 below presents a list of advantages and challenges summarized from the reviewed articles.

Table 7. Advantages and Challenges of using GVT

<b>Advantages</b>	<b>References</b>	<b>Challenges</b>	<b>References</b>
Improve cycle time	S2,S6	Manage communication	S2,S6,S6,S7,S8,S15,S31,S32,S34
Create culturally synergistic solutions	S25	Physical dispersion	S15,S16,S19
Enhance creativity	S25	Time boundary	S4,S15,S16,S19

Reduce cost	S1,S2,S6,S 19,S27	Cultural difference	S2,S4,S7,S8,S 10,S15,S16,S 31
Reduce redundancies	S2	Over-reliance on technology infrastructure	S2,S4,S5,S31
Decreased hierarchical structure	S15	Handling technological issues	S8,S30
Coordinate complex tasks	S2	Remote leadership	S2,S5,S6,S8,S 15,S17,S33,S 38
Diversity brings more novel and comprehensive ideas	S10,S25	Members' well-being issues(reduced social networking, feeling of isolation, increased mental workload)	S4,S6,S7,S23, S27
Flexibility and responsiveness to local markets	S1,S6,S10, S19,S22,S 27,S33	Trust building	S4,S5,S6,S8,S 15,S20,S26,S 33,S34
Resource utilization (local expertise, natural resources)	S7,S9,S10, S19,S22,S 27	Human Resource	S16,S27
		Team cohesion	S8,S25
		Operation process	S8,S25
		Language	S10

### 4.3 Roles of Communication (RQ1)

In order to manage communication, it is essential to understand what kind of roles does communication play in global virtual team settings. This chapter investigates from reviewed studies of the communication roles in GVT functioning.

#### 4.3.1 Results

Table 8 presents identified roles of communication play in GVT functioning from reviewed studies. The most common roles that communication plays in GVT functioning include communication as a leadership practice (21%), as a team performance factor (18%), as a trust building facilitator (18%). Besides, communication is also used for information delivery, knowledge sharing, facilitating teamwork process, boundary management as well as playing a role in human resource management.

Table 8. Roles of Communication in GVT functioning

<b>Role of communication</b>	<b>Reference</b>
Communication for information delivery	S1
Communication for knowledge sharing	S10,S25
Communication facilitates teamwork process	S5,S7
Communication media as a boundary management strategy	S23
Communication as a team performance factor	S6,S8,S9,S13,S22,S28
Communication as a leadership practice	S6,S8,S15,S16,S17 ,S31,S38
Communication as a human resource practice	S13,S25
Communication helps build trust	S20,S24,S26 S27, S32,S36

### 4.3.2 Analysis and Discussion

#### *Communication for information delivery*

Information is needed for processing tasks. Communication is the channel for information delivery. In GVT settings, technology tools carry the delivery role for information. There are three main levels of business information: strategic, tactical and operations. There is a common concern in global virtual teams to fully understand the information needs and process of all business units. Intranet technology offered opportunity to increase the efficiency of information delivery and information transparency, hence higher effectiveness in the team functioning.

#### *Communication for knowledge sharing*

Culture and language affect the effectiveness of knowledge sharing in GVT (S10,S25). Both national and organizational culture influence team dynamics. Therefore it is crucial for a GVT to have understanding of how the cultural dimensions influences team dynamics in order to develop a successful knowledge sharing base and culture for GVT (S25). For example, GVT members from high-context culture may be less direct in communication style than those from low-context cultures who are also less formal. S10 suggested that virtual knowledge sharing in general is less effective than co-located individuals. However, ICT is a facilitating tool for knowledge sharing(S25) and the choice of communication media and its richness may moderate the impact of spoken language commonality on knowledge sharing process. With lean media such as email, miscommunication is reduced as it enhances equivocal knowledge sharing and reduces uncertainty (S10).

#### *Communication facilitates teamwork process*

In GVT's project management, communication planning is a facilitating process of the planning phase, which involves determining the information and communication needs of project stakeholders (S5). Due to cultural diversity, communication in GVT tends to be more challenging than it is in traditional teams. For example, the slower pace of nonnative speakers' communication could increase the cost of interaction when using synchronous communication channels. However, the advances in ICT helps mitigate the negative impact of cultural diversity and enable its positive impact. ICT is a tool that facilitates the process of boundary-crossing and support the creation and maintenance of team identity, thus bringing increased team cohesiveness, inclusion and common ground (S7).

### *Communication media as a boundary management strategy*

Team members in global virtual teams commonly work with home office or anywhere except for a traditional office location. This phenomenon brings cost cutting for the company, higher flexibility for team members, however results in bigger challenges with blurred work life boundaries for the team members. S23 investigated how the choice of communication media could help with managing the boundary and found out choosing right communication media for specific situation could strategically improve team members' communication satisfaction and efficiency.

### *Communication as a team performance factor*

According to S6, there is a strong link between clear communication rules and fast project conduct and the value of accomplishment. In addition, open and clear communication as bringing less misunderstanding and conflicts, also contribute to fast project conduct. When communication is more efficient, the team is more likely be to aligned on issues and have shared goals. Leaders also tempted to have higher level of accomplishment as they demonstrates ability to lead fully global virtual teams. In a ranking provided by S8, reliable communication tools is ranked as No.1 critical factor to virtual team performance. An interesting study as in S13 investigated how to utilize communication contents, such as email, to monitor and assess the team performance. It found out that the automated monitoring email overtime provides useful visualization of team activities in GVT and could become a team performance indicator. S22 pointed out the lack of communication processes and standards could lead to a lower level of team effectiveness. Consistent and routine communication in a GVT contributes to develop the tams' psychological traits that potentially lead to a more effective team. Effective GVTs also match their communication patterns to the task, and generate a deep rhythm of face-to-face communication during the period of remote communication (S28).

### *Communication as a leadership practice*

While GVT faces more challenges in leading virtually working teams, communication becomes a critical practice in their management work. Studies found that leaders who engage in effective and consistent communication with team members demonstrates strong performance (S8). When a GVT miscomprehend on goals, it causes confusion on the priorities which could provide negative impact on result delivery and reduced team overall performance (S9). An effective GVT leader improves team success and organizational value creation by adapting their communication behaviors to the requirements of virtual team setting and by motivating and

inspiring the dispersed team members to engage in active, mutual, and continuous communication through socializing activities (S15). GVT leaders or managers should also work to create a psychologically safe communication climate in the team, as it moderates the negative effects of virtual characteristics (S16). Studies (S17,S38) pointed to the importance of GVT leaders to establish proper communication media through which virtual team members can most effectively communicate and collaborate to increase constructive interaction and team cohesion. Furthermore, effective leadership practice should also include providing continuous feedback, engaging in regular and prompt communication, providing clear and detailed pictures of tasks (S31). All these communication practice through leadership works as mediator to help build up GVT members' personal relationships (S38).

#### *Communication helps build trust*

Successful collaboration depends on trust in virtual teams, where members rely on ICT technologies to interact, according to Jarvenpaa and Leider (1999). Communication behaviors such as communication timing and frequency affects trust building in a GVT (S20) through the effects on level of awareness by preventing social loafing, and allowing confirmation on expectations (S32). S24 discovered communication strategies such as empathetic task communication, positive tone, task goal clarity, and frequent interaction with acknowledged and detailed responses to prior message could enhance trust in a GVT. Through actions and communicating individual roles and share goals, trust can be built for the success of the GVT (S26,S37). Operating communication at different stages of teamwork could also influence the trust building and maintenance. Early on trust can be facilitated through communication behaviors such as social communication and communication conveying enthusiasm. Face-to-face communication time is also valuable and contributes significantly to the early trust building in the team (S36). Later on, communication behaviors such as predictable communication, substantive and timely response also contribute to maintaining trust (S27,S36).

#### *Communication as a human resource practice*

Intercultural communication competency is important as working in a global virtual team. Human resource in GVT should utilize the competency as one of the selection criteria to choose proper team members. Continuous training should be also provided in the team as part of the GVT culture building in order to create common team culture and alignment to eliminate the influence of culture difference within the team (S25,S38).

## 4.4 Communication Measurement (RQ2)

In spite of all the challenges and barriers in global virtual team settings, a dramatically growing number of virtual teams are founded to take its advantages in order to outperform in the global competition. Researchers (S7,S38) have emphasized that communication has played a moderation role in the relationship between various critical factors of GVT and its effectiveness. In this chapter, we investigate and analyze how communication was measured in global virtual teams from reviewed studies. This analysis aims to help understand how communication were studied in order to help researchers tackle the further studies on communication in GVT with their preferred perspectives or develop more novel perspectives while also help practitioners take more constructive angle to set goals for communication in their organizations.

### 4.4.1 Results

Table 8 gives an overview on how communication in GVT was tackled in the reviewed studies. The property measurements included 9 categories and 28 subcategories which were summarized during the in-depth review. Some of the studies cover more than one category (such as S4). “Communication behaviors” are the most studied topic regarding communication in GVT (7 papers, 21%), followed by “Communication as a team performance behavior”, “Communication as a leadership practice”, “Communication as a trust building factor” (6 papers each category, 18% for each). “Communication Effectiveness” was specifically measured in 4 papers (12%), followed by “Communication Technology” and “Communication Strategies” with 2 papers (6%) each, “Communication Breakdown” and “Communication as a human resource practice” with 1 paper (3%) each.

Table 9. Communication Measurements in Reviewed Studies

Measurement	Description	References
<b>Communication Technology</b>	Information delivery efficiency through a green-team system	S1
	Technology training	S1
<b>Communication behavior</b>	Frequency, feedback, conduction time, efficiency, alignment, timely response	S4,S6,S7

	Boundary-management strategy	S23
	Artificial leaders design requirements	S29
	Degree of virtualness with communication behaviors	S34
	Behavior adaptation for cross-cultural virtual teams	S37
<b>Communication Effectiveness</b>	Impacting factors (culture, technology, human/project management)	S2,S4
	Media richness	S2,S10
	Set of skills of GVT members and leaders	S33
<b>Communication Breakdown</b>	Impacting factors (culture, technology, interpersonal relations, leadership, trust)	S5
<b>Communication as a team performance factor</b>	Reliable communication tool	S8
	Clarity, language barriers	S9
	Communication content evaluation tool	S13
	Communication wastes	S19
	Communication methods with team effectiveness	S22,S28
	Communication pattern with effectiveness	S28
<b>Communication as a leadership practice</b>	Enable mutual, active, open and continuous communication	S15,S16
	Media choices	S17
	Leader responsiveness, task clarity, feedback giving, speech tone, rules of communication	S6,S31
	Communication as relationship building mediator	S38
<b>Communication as a human resource practice</b>	Members' intercultural communication competency	S25
	Using self-assessment survey to evaluate and improve performance	S13



<b>Communication as a trust building factor</b>	early communication with early trust,	S20
	frequent communication with early trust and cohesiveness	
	awareness deficit affects trust	S32
	Communication behaviors affect trust	S24,S26,S27, ,S36
<b>Communication strategies</b>	Communication technology, channel, culture	S30
	Temporal coordination mechanism	S35

#### 4.4.2 Analysis and Discussion

Communication is always a factor while studying GVT functioning. Some studies(S1,S5,S7,S13,S19,S22,S23,S29,S30,S33,S34,S35,S37) directly tackle communication as a starting point of the research, while some measured communication as one of the independent variables for specific dependent factors (S2,S4,S6,S7,S8,S9,S10,S14,S15,S16,S17,S20,S24,S25,S26,S27,S28,S29,S31,S32,S36,S38).

*Communication behavior* is the most studied field and they are commonly tackled as a direct research outcome. In these studies(S4,S6,S7), certain communication behaviors such as frequency, giving feedback, alignment and response time, were either analyzed in the research design or serve as an outcome to be recommended in GVT communication. Communication behaviors were also analyzed as boundary management strategy for GVT members who work at home (S23). It is a strategy serving at the context that communication media availability is commonly high in global virtual teams who provide to their members for smooth communication possibility. However, studies (S23,S28) show that teleworkers in GVT seldom use richest media, such as face to face and video conferencing, for conducting tasks, unless rich media is necessary. This is affected by GVT members' lifestyle as they experience blurred work-life boundaries. Sometimes, using a lean media, such as conference call, would allow them to conduct private activities, such as driving, while working. Clear communication rules and policies are also found to be helpful in improving the efficiency and alignment in communication (S6). The communication frequency is a much debated topic in communication

behaviors (S4,S6,S7,S20,S34). It is commonly perceived that due to the limitation of location dispersion, virtual teams tend to communicate as much as they can. However, over-communication caused by the loads of emails and long hours spending in conference calls have triggered the feelings of unproductiveness and lack of reliance on emails as indicated in S4. Studies such as S34, compares communication frequency in teams with different degrees of virtualness- co-located, virtual teams and semi-virtual teams. The study identified significant differences exist in perception of the local members in semi-virtual teams as compared to virtual team and co-located team members. Communication behavior was also studied on behavior adaptation of GVT members in perspective of how team members adapt their behavior with regard to culture (37). S29 studied to develop the design requirements of artificial leaders of GVT whose work can substitute the human leaders in virtual teams. As the artificial leaders are different in nature from humans, the communication requirements were especially emphasized and analyzed for the design.

*Communication as a team performance factor* was evaluated in 6 reviewed studies (S8, S9, S13, S19, S22, S28). S8 covered a ranking of critical virtual team performance factors in which “reliable communication tools” was ranked as No.1 factor that affects a GVT performance. S9’s focus group approach identified the constraints in the miscomprehension of goals which includes lack of communication clarity and language barriers. S19 is a very communication focused study that identifies non-value producing communication elements as called communication wastes to provide the means for improving communication in GVT. Unless other studies (S8, S9, S19) that makes identification on communication as one of the parameters of team performance, S13 investigated how to assess the team performance with automated monitoring of email contents to provide information of team activity which serves as an indicator of team performance for team leaders to assess teamwork. When studying team effectiveness, both studies of S22 and S28 found out that the use of different communication methods affects the team effectiveness. Media richness theory indicates that a medium is rich to the extent that they provide communication along multiple channels simultaneously, and the more complex, equivocal a message, the richer the medium required to carry it effectively (S28). S22 investigated on how the richness of media choices affect team effectiveness, and it was identified that the range of media choices does not have an impact on team effectiveness, instead consistent and routine communication do the job. This is also supported in S10 and S17, as S17 pointed out that communication media choices affect certain aspects of team interactions and cohesiveness, and S10 suggested different media choice (rich or lean) for different

communication contents. More studies in media richness and range of media choices should be conducted to reach alignments and to give explicit clues for future researchers and practitioners.

*Leadership practice* is unavoidably covered with communication. From human role point of view, there are team members and leaders in a GVT. Like many organizational studies, leaders' perspectives were very much taken into account of the GVT researches. How leaders handle communication in GVTs was covered by papers such as S6, S15, S16, S17, S31, and S38. Leaders in GVT are seen to face opportunities and challenges which are quite different from traditional teams. Therefore, studies such as S15 and S16 provided guidelines for GVT leaders/managers to achieve effectiveness in the team, where communication practices serve as one of the most critical factors. Both of these two studies were taking literature review methods. Empirical studies such as S6 and S31 provided rigorous research designs that reversely examined the findings, making this a well-studied topic to serve for practitioners. As a leadership practice, how communication media choices are important for team leaders to increase constructive team interactions and cohesion was researched in S17. S38 identified the role of communication practice as mediator to help build up GVT members' personal relationships. Certain leadership practices could serve as relationship building strategies that foster effective boundary crossing work culture and practices.

*Communication is perceived as an important factor in trust building*, whose significant role is recognized in GVT functioning as addressed in a few reviewed studies (S20, S24, S26, S27, S32, S36). S32 tackled communication from the awareness point of view and studied how the awareness deficit affects trust in a GVT. According to S32, awareness deficit is seen as a communication problem when team members are lacking the knowledge about the current state of distant teammates' work related to the group project, which affects the trust between the team members.

The findings also include that behaviors that affect trust through communication include the positive tone, clarity in task goals, feedback giving, interaction frequency and pattern. Furthermore, enhanced evolution of trust can be achieved through communication behaviors such as substantive and timely response, in-depth feedback, face time creating, open communication and predictable communication (S24,S26,S27,S36). Early communication was explored in a couple of studies (S20,S24) and argued to be an affecting factor in early social-

based trust building. With rich media, early communication lead to stronger trust and ultimately better performance.

*Communication effectiveness* was also studied as an independent variable in several reviewed papers, with a main focus on the impacting factors of effective communication, serving as excellent resource to answering the key question to this research paper. Another important resource is the study on *communication breakdown* (S5) that also investigated the factors that triggered the breakdowns of communication in GVT. Both measuring effective communication and communication breakdown serve to same goal of identifying the factors that should be well executed in terms of communication in GVT, though they took two polar of the concept. Knowledge sharing is perceived as a communication behavior and its effectiveness is affected by the media richness (rich and lean media), as studied by S2 and S10 on how this effect takes place. When effective communication is called for in a GVT, the skills that should be acquired by GVT members and leaders is a worth-studying topic, with S33 as an example.

*Communication technology* enabled the functioning of GVT in a fundamental way. Almost all the studies have covered technology as a factor when discussing communication as an independent variable. However, very few studies have focused fully on the technology perspective of communication technology. In the reviewed studies, S1 took a perspective of intranet system's impacts on organizational delivery of information, operations, structure, strategy, management style and employees. Some studies (S17, S30) investigated the media choices at different stages of GVT and identified certain *communication strategies* for GVT in terms of technology training, channel choices and culture. When generating strategies, studies such as S35 proposed a so-called temporal coordination mechanism for GVT to create effective communication in the team.

When working in a cross-cultural GVT, it is critical for the team members to be capable of handling intercultural communication. Therefore, studies such as S25 placed intercultural communication competency as one criterion for selecting GVT team members via giving also opportunities to be provided with cross cultural training by the organization. Another tool called self-assessment survey was proposed and examine at S13 as a useful diagnostic tool for both team members and managers to improve performance. More specific *human resource practices* relating to GVT communication should be taken into consideration by more researchers and it's worthwhile to be studied to serve as practical clues for GVT in practice.

## 4.5 Affecting factors to GVT communication

To address the main goal of this study, identifying the affecting factors of GVT communication creates a key contribution. Each paper reviewed address directly one or a list of factors and analyzed the correlations in between. In this and following chapter, we will summarize what the factors are and explain how they affect communication in a global virtual team.

### 4.5.1 What are the factors that affect communication in GVTs?

Table 9 presents the affecting factors on communication in a GVT analyzed in the reviewed papers. 17 factors were identified to show correlation with GVT communication and to some extent influence the communication. Leadership is the most mentioned and studied factor that was covered by 36% of the studied papers. Culture, trust and technology are perceived to be a significant factor for GVT communication by 21% of the studies. Communication channels adopted and the communication behaviors in the team also take big shares in researchers' GVT communication studies with an 18% study coverage. Besides, language, communication frequency and timing, training, interpersonal relationship, communication waste identification, interaction rhythm, incident structure and process, task interdependence, degree of virtuality, coordination and awareness are also factors that weigh in having effectiveness communication of a GVT.

Table 10. Affecting Factors of Communication in GVT

<b>Factors</b>	<b>No.</b>	<b>Reference</b>
<b>Communication channel/media</b>	6	S2,S13,S17,S23,S28,S38
<b>Culture</b>	7	S2,S3,S5,S7,S9,S10,S37
<b>Language</b>	5	S2,S5,S7,S9,S10
<b>Technology</b>	7	S1,S2,S5,S7,S8,S29,S33
<b>Leadership</b>	12	S2,S5,S6,S8,S15,S16,S22,S24,S29,S30,S31,S38
<b>Communication frequency/timing</b>	3	S3,S20,S32
<b>Training</b>	4	S3,S33,S37,S38

<b>Interpersonal Relations</b>	2	S5,S38
<b>Trust</b>	7	S5,S20,S24,S26,S27,S32,S36
<b>Waste identification</b>	1	S19
<b>Communication behaviors</b>	6	S5,S15,S24,S26, S27,S36
<b>Interaction rhythm</b>	1	S28
<b>Incident structure and process</b>	1	S28
<b>Task interdependence</b>	1	S32
<b>Degree of virtuality</b>	1	S34
<b>Coordination</b>	1	S35
<b>Awareness</b>	1	S32

#### 4.5.2 How do these factors affect communication in GVT?

In this chapter, each factor will be extracted out from the reviewed studies and be analyzed on how they affect communication in GVT. The synthesized analysis produces a foundation for RQ2 and RQ3- how the factors affect communication in entrepreneurial GVT, which will be discussed in Chapter 5.

##### 4.5.2.1 Leadership

Leadership is one of the five distinct areas that affect communication breakdown (S5). Table 10 displays how leadership is an independent variable to affect communication and further analysis is presented below.

Table 11. Leadership as an affecting factor

	<b>Independent factor</b>	<b>Dependent variable</b>	<b>Input</b>
<b>S2</b>	Leadership	Project success	Communicate goals, performance feedback, Cultural awareness

<b>S5</b>	Leadership	Team performance	frequent communication and give feedback, establish communication standards, choose a right delegate
<b>S6</b>	Leadership	Team efficiency and value of accomplishment, value of reputation	Open and clear communication
<b>S8</b>	Leadership	Team performance	communication strategies and effectiveness
<b>S15</b>	Leadership	Team performance	Communication practices and behaviors
<b>S16</b>	Leadership	Communication effectiveness	Create psychologically safe communication climate
<b>S22</b>	Leadership	Team effectiveness	Set up communication process and standards
<b>S24</b>	Leadership	Trust	Engage in strategies that reinforce right communication behaviors
<b>S29</b>	Leadership and technology	cross-cultural collaboration	artificial agents as leaders who is incorporated with cultural behaviors
<b>S30</b>	Leadership	Communication effectiveness	implement effective communication strategies, encourage open communication
<b>S31</b>	Leadership	Communication satisfaction	give response, task clarity, give feedback
<b>S38</b>	Leadership	Communication effectiveness	make adjustments in content and frequency of team communication

In general, it was recognized that team performance depends heavily on leadership skills and practices (S5,S8,S15,S22). GVT leaders face different challenges from traditional team leaders. Their ability to inspire and motivate team members to communicate actively and continuously, increases the cohesion and motivation, enhances team trust (S24), and ultimately leads to successful team performance.

Secondly, leadership is also playing a significant role in influencing communication effectiveness in a GVT. Due to the complexity of virtual team settings, there is a lot of potential of conflicts occurring at a GVT, which could lead to ineffective communication and a decrease in productivity and interaction. A GVT leader is suggested to create a psychologically safe communication climate that can moderate the conflicts by providing opportunities for participation and open communication; by encouraging members to speak up and giving different opinions; by engaging informal communication that builds interpersonal relationships between members; by encouraging members to be open-minded to other perspectives; and by encouraging active listening. (S16)

While trust is important in an organization, a GVT leader is also entitled to drive high trust building within the GVT. Engaging such strategies as using positive tone, rotating leadership roles, task goal clarity, role division and specificity, time management, giving feedback and the frequency and pattern of interaction would help build up high trust in a GVT (S24).

A strong leadership in GVT helps the team to move forward and be successful (S5). Due to these impacts of leadership in a GVT, it was proposed that certain leadership practices could help create effective GVT work and team building. Identified effective leadership practices include setting up communication process and standards such as consistent and routine communication, clarity of objectives and direct reporting and management that guide the team to effective work (S22). In terms communication satisfaction, a GVT leader who gives responses, clarifies tasks content and timing, constantly gives feedback and suggestions score high from team members (S31). As to team members, the leaders could set up clear communication rules about when and how to communicate certain information, such as meeting time, deliverables, code of conduct, information storing, etc. It was found out that open and clear communication contributed to the alignment of team to achieve shared goals, which resulted in high team efficiency and value of accomplishment within the team (S6). While encouraging GVT members to communicate frequently, over-communication should however be avoided as it may trigger the feelings of unproductiveness and lack of reliance on emails (S5). On the other hand, team cohesion and team belonging can be enhanced by stimulating team members on active, mutual and continuous communication through social activities, which may improve team success and value creation. When dealing with distance and time in a GVT, leaders should address the difficulties by reacting and responding quickly to the specific



needs (S15) with enabled regular communication and by enhancing feelings of closeness through social interaction and by actively applying diversified information and communication technologies to facilitate socialization that eliminates social distance between team members (S2).

Using artificial agents as a GVT leader is an innovation that incorporates both technology and leadership for a virtual team management setting. It was found out that artificial agents (computer mediated intelligence) who show cultural and linguistic flexibility can enable them to communicate with human team members using a diverse array of languages and cultural displays. The adoption of an artificial agent is an opportunity to customize and to simplify the communication in a GVT that can make cross-cultural collaboration easier and more efficient. (S29)

4.5.2.2 Culture

Cultural heterogeneity in global virtual teams adds to their complexity as cultural biases may distort communication (S7). It is also identified as one of the five distinct factors for communication breakdown (S5). Table 11 below presents the distribution of culture as an independent factor that affects communication in a GVT.

Table 12. Culture as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S2</b>	Culture	Communication effectiveness	Language, Degree of culture formality, ethnicity
<b>S5</b>	Cultural difference	Team performance	language barriers, and differences in cultural understanding and expectation
<b>S7</b>	Cultural diversity	Team effectiveness	intercultural communication( culture and language barriers)
<b>S9</b>	Culture	Team performance comprehension	Religion, holidays and customs

<b>S10</b>	Culture	Knowledge sharing effectiveness	Intercultural communication
<b>S25</b>	Culture	Team dynamics	national cultural dimensions of power distance, uncertainty avoidance, individualism vs. collectivism, career success vs. quality of life; organizational culture
<b>S37</b>	Culture	Communication efficiency	Behavior adaption

Culture diversity or difference exists in various aspects in a global distributed virtual team. Some studies (S2, S5, S7) include language difference as one of the culture aspect and challenge in GVT functioning. The diversity in culture is not only reflected on language difference in a GVT, it lies more on the aspect of cultural behaviors, religion, holidays, customs(S9), power distance, uncertainty avoidance, individualism vs. collectivism, career success vs. quality of life (S25), degree of culture formality and ethnicity (S2). Besides the national cultural dimensions, culture differences also are manifested in two other different categories: the functional disciplines of the GVT members who have different knowledge base and reasoning abilities and the organizational structure which has shaped the team members' values and behaviors (S5).

Culture diversity affects the way GVT members convey and receive information, which leads to a pivotal factor that affects the effectiveness of communication and team performance (S2, S5). Challenges associated with intercultural communication brings negative effects of heterogeneity and dispersion in a GVT. These challenges include higher cost of interaction between team members and the effects of miscommunication due to intercultural misunderstanding. The higher interaction cost results from the lacking of accuracy in both written and spoken language and the slower pace of nonnative speakers' communication in particularly when using synchronous communication channels. Due to cultural diversity, members from different countries or regions also show different dimensions of communication styles: direct/indirect, succinct/elaborate, contextual/personal, and instrumental/affective. (S7)

To deal with these identified challenges to communication effectiveness, media richness and its choice is recognized to be able to moderate the impact of language barrier in knowledge/ info sharing process (S10). Rich media such as face to face communication is examined to be more effective for equivocal knowledge sharing than virtual communication, especially in situations with high cultural differences, while lean media is more effective for canonical knowledge sharing. In situation with low language commonality, lead media is more effective for equivocal knowledge sharing than rich media, who is however preferred to communicate for canonical knowledge. These relationships do echo the complexity of intercultural communication (S10). As to GVT members, to achieve efficient communication and overcome the challenges with team members, it is essential to be aware of the cultural difference and adapt the behaviors when interacting with people from a different cultural background. During the team formation period, the team members should develop trusting relationship based on collaboratively negotiated communication protocols (S25). For the company, providing training for team members about the cultural difference is also a useful practice to boost communication efficiency (S37).

#### 4.5.2.3 Technology

Technology in communication creates the initial feasibility for communication in a global virtual team. Therefore, technology serves as a fundamental factor in the functioning of virtual working. Table 12 presents the relationships between technology and team/ communication effectiveness identified in some reviewed studies.

Table 13. Technology as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S1</b>	Communication technology	Team effectiveness	Using green team information system
<b>S2</b>	Technology	Communication effectiveness	level of technical expertise
<b>S5</b>	Technology	Team effectiveness	channel choice

<b>S7</b>	Technology	Team effectiveness	channel choice
<b>S8</b>	Leadership	Team performance	communication strategies and effectiveness
<b>S29</b>	Leadership and technology	cross-cultural collaboration	artificial agents as leaders who is incorporated with cultural behaviors
<b>S33</b>	Communication technology	Team Effectiveness	Access to appropriate communication equipment
	Training	Communication effectiveness	Communication skills training

Information communication technology (ICT) works as a mediator on the impact of team effectiveness made by cultural diversity. The channels helped to bridge space and time difference for GVT members. Email enables encoding and decoding which helps overcome the differences in verbal and nonverbal communication styles. The virtual team rooms on ICT channels helped build team identity (S7). From this sense, ICT helps mitigate the negative effects of cultural diversity and facilitates team effectiveness. Therefore, having access to appropriate communication equipment is the fundamental thing in a GVT functioning. The adoption of technology as a communication channel enables teamwork and making effective team performance possible. As GVT differentiates from traditional teams, GVT members and leaders both should acquire specific skills in order to conduct effective communication and teamwork. In a long term, the company should provide communication and work skills training to their members. (S33)

On the other hand, communication technology has limits in transferring the social, emotional, and non-verbal information compared to face-to-face communication. However, a comprehensive channel choice, as compared to very limited channel usage, provides more satisfaction for GVT members, resulting in positive project outcomes. Rich media such as web-based communication tools (e.g. PowWow) shows preference from GVT members as it boosts interaction and management of information. Effective global virtual teams can draw from a variety of communication technologies contingent on the given needs (e.g. need for immediate feedback, formality of information delivery, volume of information) (S2). Using technology such as social networking integrated e-collaboration tools- community platform tool, offers opportunity to connect team members and information regardless of location and can

considerably improve productivity and responsiveness in a GVT. This tool can help build social cues which are common with face-to-face communication but poor in communication channels such as emails and phones. (S5)

Technology innovation also helps in creating more possibility in effective communication. Teleworking in GVT requires technology to enable communication and the knowledge/info sharing across different functions and locations in the organization (S1). A comprehensive Green team IT system enables not only the communication between members in different locations, but also embody flexible dynamic teleworking that enables members' access to up-to-date external and internal information and knowledge with outcome of improved process flow, coordinated performance measurement, attitude change and improved communication. As GVT members are location-wise dispersed, the communication technology and system helps reduce time and cost while giving opportunities and access for GVT members to work with sufficient information as well as eliminating unnecessary communication time for information. In this way, a higher team efficiency can be expected as information is easily accessible, while giving higher satisfaction to team members as they experience less frustration from receiving information. A comprehensive communication system also offers advantages for globally distributed management to monitor and to evaluate the business process and performance by giving evidence based statistics and information in order to provide target control actions and continuous improvement. (S1)

Technology also enables computer mediated intelligence to become artificial agents who show cultural and linguistic flexibility to lead a global virtual team. An artificial agent can communicate with human team members using a variety of languages and display intercultural understanding. The adoption of an artificial agent is an opportunity to customize and to simplify the communication in a GVT that can make cross-cultural collaboration easier and more efficient (S29).

#### *4.5.2.4 Trust*

Technology enables distant communication in a GVT, nevertheless, it doesn't do much to create relationship (S24). Trust is the glue of global workspace (S24) and regarded as one of the five distinct factors that causes communication breakdown (S5). Table 13 below shows how the selected studies found trust as an affecting factor to communication.

Table 14. Trust as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S5</b>	Trust	Team success	Communication behaviors such as social and predictable communication, timely responses, choose best possible media for initial communication
<b>S20</b>	Communication timing and frequency	Trust	Early communication, frequent communication
<b>S24</b>	Leadership	Trust	Engage in strategies that reinforce right communication behaviors
<b>S26</b>	Trust	Team development and effectiveness	technology-mediated relational communication behaviors (technology and behavior)
<b>S27</b>	Communication behaviors	Trust	social communication, conveying enthusiasm, predictable communication, individual initiative, substantive and timely response
<b>S32</b>	Awareness	Trust	equal and transparent channel to monitor each other's progress
<b>S36</b>	Communication behaviors	Trust	Create face time, set goals, feedback

Trust is essential to a GVT functioning and determines its success as indicated in many researches (S5, S36). It is a mechanism to increase potential benefits of collaboration and perceived as the most important component of team development and effectiveness (S26).

Despite the findings presented by most studies that trust is dependent on communication behaviors, leadership or awareness, few studies have looked into how trust in a GVT affects communication.

Communication behavior facilitates trust. In early stage of a GVT building, social exchanges appears to foster trust (S27). Face to face communication at early stage helps create social based early trust which can further enhance relationship building in a GVT (S26). Swift trust in a GVT is maintained by high level of actions within the team and studies have shown that choosing best possible media for initial communication has to build initial trust. Communication behaviors such as social, predictable and substantial communication and timely responses facilitate trust early in a GVT (S5). Conveying message with enthusiasm and optimism could move a team from low trust to high trust. Unpredictable communication such as some members disappearing without communicating what they are working on and how they are available, shows to hurdle the trust building in a team. Initiatives appear to strengthen and unify the team, while the responses to the initiatives is more important as a response in an endorsement that another member is willing to take the risk of interpreting the first person's message (S27). Communication behaviors and practices such as creating face time, set goals and expectations from team leaders, making work visible, providing ongoing feedback, showcasing team members' competence and fostering cultural understanding are the six steps that can boost trust in a GVT (S36). Besides, other behaviors such as positive tone, rotating leadership roles, time management, setting frequency and pattern of interaction also contribute in differentiating high trust teams from low trust teams (S24).

In fact, the level of trust and trust behaviors are changing during the process of teamwork (S27). As virtual team work goes forward, trust and other aspects are developing in the team, so is the communication patterns. When trust level is fostered higher in a GVT, the communication efficiency is also boosted higher as the team members receive and process information or message faster with perceived trust to the other team members.

#### *4.5.2.5 Communication behaviors*

Communication behaviors are empirically analyzed as closely associated to trust. They work as a facilitator to build and foster trust. Through managing communication behaviors, GVT

leaders foster trust building in the team. Table 14 below demonstrates how communication behaviors affect GVT success through trust and leadership.

Table 15. Communication behavior as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S5</b>	Trust	Team success	Communication behaviors such as social and predictable communication, timely responses, choose best possible media for initial communication
<b>S15</b>	Leadership	Team performance	Communication practices and behaviors
<b>S24</b>	Leadership	Trust	Engage in strategies that reinforce right communication behaviors
<b>S26</b>	Trust	Team development and effectiveness	technology-mediated relational communication behaviors (technology and behavior)
<b>S27</b>	Communication behaviors	Trust	social communication, conveying enthusiasm, predictable communication, individual initiative, substantive and timely response
<b>S36</b>	Communication behaviors	Trust	Create face time, set goals, feedback

One dimension of Communication behaviors is the verbal communication, of which four such stylistic modes (S7, cited from Gudykunst and Ting-Tomey,1988) were proposed as direct/indirect, succinct/elaborate, contextual/personal and instrumental/ affective. Communication behavior facilitates trust (S5,S27). Social, predictable and substantial communication and timely responses facilitate early trust in a GVT (S5). Therefore, fostering



trust through regulating communication behaviors and practices such as clarifying task goals, role specifications, creating face time, time management, making work visible, giving feedback and interaction patterns, has become a leadership practice in GVT management (S24,S36). Socially interactive communication between GVT members can be achieved through diversified information and communication technologies to enhance the feelings of closeness in spite of the distance barrier.

#### 4.5.2.6 Communication media/ channel

In a GVT, communication is typically technology mediated. However, even in a globally distributed team, communication channel is not limited. With technology developing in an unprecedented speed, a GVT has a wide range of communication channels and medias to choose to facilitate their communication. The choice of selecting certain media to use for specific situations or information sharing drew attention of many researchers. Table 15 presents how communication channel or media choice plays an affecting role in GVT communication.

Table 16. Communication media as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S2</b>	Communication channel choice	Member satisfaction and project outcome	channel chosen contingent with given needs
<b>S13</b>	Communication channel	Team performance	Automated assessment tool
<b>S17</b>	Communication media	Team interaction style and performance	Establish right media choice to create effective communication
<b>S23</b>	Communication media choice	Team member performance	Choose different media to balance life-work boundaries for team members from domestic workplace
<b>S28</b>	Interaction incidents	Team dynamics and effectiveness	Incident process and structure, communication media choice, structural characteristics

<b>S38</b>	Communication channel	Communication effectiveness	Selection and use of communication channels
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Due to geographical dispersion, a GVT has more challenges to create face-to-face communication interactions. However, face-to-face communication can help build social interaction and help establish interpersonal relationship between GVT members. Therefore, GVTs should utilize opportunities to create face-to-face meetings for team members, especially in the beginning phase of the teamwork.

It is also recognized that communication technology has limits in transferring the social, emotional, and non-verbal information compared to face-to-face communication. However, a comprehensive channel choice, as compared to very limited channel usage, provides more satisfaction for GVT members, resulting in positive project outcomes. Rich media such as web-based communication tools show preference from GVT members as it boosts interaction and management of information. Effective global virtual teams can draw from a variety of communication technologies contingent on the given needs (e.g. need for immediate feedback, formality of information delivery, volume of information) (S2).

Furthermore, information transferred through communication channel, such as email, can be assessed through automated means to evaluate team performance (S13).

Overall, face-to-face and videoconference as communication media demonstrates better effects on creating team cohesion than group chat; It is important for virtual leaders to establish effective communication media to increase constructive interactions and cohesion (S17).

#### 4.5.2.7 Language

In many of the studies (S2,S5,S7,S9), language barrier is perceived as part of cultural diversity that affects communication in GVT. In Table 16, it demonstrates how language affects communication either through language itself or as a cultural feature, as studied in selected papers.

Table 17. Language as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S2</b>	Culture	Communication effectiveness	Language, Degree of culture formality, ethnicity
<b>S5</b>	Cultural difference	Team performance	language barriers, and differences in cultural understanding and expectation
<b>S7</b>	Cultural diversity	Team effectiveness	intercultural communication( culture and language barriers)
<b>S9</b>	Language	Team performance comprehension	Difference in languages and the need to communicate in same language
<b>S10</b>	Language	Knowledge sharing effectiveness	Intercultural communication

Language difference creates barriers and challenges in cultural expectation and understanding (S5). These challenges include higher cost of interaction between team members and the effects of miscommunication due to intercultural misunderstanding. The higher interaction cost results from the lacking of accuracy in both written and spoken language and the slower pace of nonnative speakers' communication in particularly when using synchronous communication channels (S7). Through these challenges in cultural differences brought by language barriers, team performance and communication effectiveness are affected negatively with heterogeneity and dispersion.

It was found out that media choice may moderate the impact of language barrier in knowledge sharing process. With this background, rich media such as face-to-face communication is examined to be more effective for equivocal knowledge sharing than virtual communication, especially in situations with high cultural differences, while lean media is more effective for canonical knowledge sharing. In situation with low language commonality, lead media is more effective for equivocal knowledge sharing than rich media, who is however preferred to

communicate for canonical knowledge. These relationships do echo the complexity of intercultural communication. (S10)

#### 4.5.2.8 Communication frequency/timing

As communication is challenged in a GVT environment, it is as important to manage the frequency and timing of the communication within the team. Table 17 shows how communication frequency and timing are affecting or affected by other variables.

Table 18. Communication frequency and timing as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S3</b>	Communication frequency	Team effectiveness	over-communication through email and conference calls
<b>S20</b>	Communication timing and frequency	Trust	Early communication, frequent communication
<b>S32</b>	Task interdependence	Communication frequency	pooled, sequential, and reciprocal interdependence, among task units

On contrary to the expected poor communication in GVTs, over-communication with huge volumes of emails or conference calls has been identified as unmanageable for GVT members (S3). Frequent communication helps ensure members' attendance to tasks and increases early trust in a team that builds up team cohesiveness. Early communication helps build early trust in a team. However within a high trust team, frequent communication could potentially decrease members' satisfaction as they might feel like being monitored (S20). Communication frequency is also associated to task interdependence, which is the extent to which group members are dependent on one another to conduct their individual tasks. The higher task interdependence is, the more frequent communication is needed to acquire awareness information(S32).

#### 4.5.2.9 Training

With a variety of available communication media and recognized cultural differences in a GVT, it is an important step for the company to provide training to their team members. Table 18 below shows how training affects communication in a global virtual team.

Table 19. Training as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S3</b>	Training	Communication effectiveness	technical usage and cultural understanding
<b>S33</b>	Training	Communication effectiveness	Communication skills training
<b>S37</b>	Training	Communication efficiency	About different cross cultural knowledge
<b>S38</b>	Training	Communication effectiveness	Virtual team communication, virtual process, ICT selection and use, cross-cultural communication, relationship building and networking skills

Training at a GVT includes technical training of using communication technology, cultural training to improve multicultural awareness (S3), virtual process, media choice, relationship building and network skills (S38).

Cultural diversity brings challenges for GVT members to communicate efficiently. To overcome this challenge, it is important for team members and leaders to be aware of the cultural difference and adapt their behaviors when interacting with people from a different cultural background (S33,S37,S38). For the company, providing training for team members about the cultural difference is also a useful practice to boost communication efficiency (S37).

#### 4.5.2.10 Interpersonal relations

Interpersonal relation is also among the five distinct areas that could cause communication breakdown (S5). It affects innovation and communication effectiveness as shown in Table 19.

Table 20. Interpersonal relations as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S5</b>	Interpersonal relations	Innovation	Guidelines for voice and email communication, open discussion, utilize FTF communication
<b>S38</b>	Interpersonal relationship	Communication effectiveness	Use various and appropriate communication channel

Social interaction within a team could lead to radical innovation, as team members use connective thinking and share more openly of ideas (S5). Face-to-face communication allows to derive accurate information and meanings of message through facial expression and tone of voice even if the words contradict to the meanings. Though distance between GVT members creates challenges for social interactions, the interpersonal relations which can boost creativity and innovation for the team, are possible to be developed through open discussion of diverse viewpoints and utilizing unique opportunities of face-to-face meetings to establish common goals and resolving project specifications (S5).

The selection of communication channels in GVT is a critical factor to build interpersonal relationship between team members and leaders. Satisfied virtual teams are more likely the ones who have adopted multiple computer mediated communication systems to accommodate a variety of communication needs. Supportive organizational policies that help recognize value of virtual teamwork and reward team members' contributions are expected to help build relationships (S38).

#### 4.5.2.11 Communication waste identification

Communication is recognized as a challenging issue in a GVT. It is also critical for a GVT to identify the wastes that do not bring values to GVT communication. Table 20 below shows the correlation between waste identification and communication effectiveness.

Table 21. Waste identification as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S19</b>	Waste identification	Communication effectiveness	Developing waste identification process

To provide GVTs with the means to analyze and improve communication in their teams, a communication waste identification approach was proposed and tested. With a structured identification, non-value producing elements can be mitigated, which can improve the communication effectiveness and team performance in the end. Five identified common wastes in a GVT are lack of involvement, lack of shared understanding, outdated information, restricted access to information and scattered information (S19).

#### 4.5.2.12 Interaction incidents and rhythm

A series of effective interaction in a GVT, also can be called communication incidents, formed global virtual team dynamics. Table 21 presents how the interaction incident is an affecting factor.

Table 22. Interaction incidents and rhythm as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
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<b>S28</b>	Interaction incidents	Team dynamics and effectiveness	Incident process and structure, communication media choice, structural characteristics
	Temporal rhythms	Team effectiveness	strong repeating temporal pattern on communication rhythm

Each communication incident incorporates a set of decision processes using one particular medium while being shaped by structural characteristics. In an effective GVT, the higher the level of decision processes served by an incident or the more complex the message content of an incident, the richer the medium appropriated and the longer the incident duration. In addition, an effective GVT also initiates more communication incidents when the tasks require higher level of interdependence. The incidents' messages are also more complex if the task is more complex. (S28)

Individual face-to-face coordination meetings generate opportunity for effective decision-making and relationship building and serve as a heartbeat pumping new energy and life to the teamwork processes before members circulate to different parts of the world. The rhythm of the meetings over time provided continuity and long term stability that enables the team members to work efficiently and confidently alone or subgroups in their own locations. This kind of structured communication rhythm should be structured for the most difficult performance challenges, and the identified most difficult challenge in a GVT is the social interaction and relationship building. (S28)

#### *4.5.2.13 Awareness and task interdependence*

One specific communication problem that virtual team face is awareness deficit- the lack of knowledge about the current state of distant teammates' work related to the common project or task (S32). Awareness is however found to be strongly associated with task interdependence. Table 22 shows how awareness and task interdependence become affecting factors on communication in a GVT.



Table 23. Awareness and task interdependence as affecting factors

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S32</b>	Awareness	Trust	equal and transparent channel to monitor each other's progress
	Task interdependence	Communication frequency	pooled, sequential, and reciprocal interdependence, among task units

Task interdependence is the extent to which group members are dependent on one another to conduct their individual tasks. The higher task interdependence is, the more frequent communication is needed to acquire awareness information. The higher awareness there is among the distant team members, the higher trust is built in the team. Therefore, perceived task interdependence works as a motivator for both acquiring awareness information and developing trust in a GVT. (S32)

4.5.2.14 Degree of virtuality

The degree of virtuality of a GVT- co-located, semi-virtual and virtual, has an impact on team functioning. The more dispersed of a team, the more frequent communication is needed for team functioning.

Table 24. Degree of virtuality as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S34</b>	Degree of virtuality	team functioning	semi-virtual, virtual and co-located

#### 4.5.2.15 Coordination

Time matters in a global virtual team. When communication is challenged by geographical dispersion and cultural differences, coordination of interaction incidents help to get things organized and to improve the efficiency of teamwork. Table 24 is a proposed temporal coordination mechanism as an identified effective method to improve communication effectiveness and create better GVT performance.

Table 25. Coordination as an affecting factor

	<b>Independent factors</b>	<b>Dependent variables</b>	<b>Input Values</b>
<b>S35</b>	temporal coordination mechanism	Team performance	mechanism that direct the pattern, timing and content of interaction incidents in a team

Asynchronous communication is a common form in a GVT communication. A temporal coordination mechanism is to provide a structure for organizing team communication and a sequence for work and problem-solving activities. By influencing temporal workflow patterns and GVT interaction, temporal coordination mechanism can enable synchronization of effort, makes more predictable response time and help in decision-making. It is the influence of coordination on interaction behaviors of temporal coordination mechanism that affects performance. (S35)

## **5. DISCUSSION AND CONCLUSION**

From studies presented above, the paper achieved to synthesize the findings on what roles communication play in the functioning of GVT (RQ1), how communication in GVT was measured (RQ2) and the affecting factors on communication in GVTs (RQ3). At this chapter, these findings are summarized and applied to entrepreneurial team theories in order to generate learnings and conclusions about entrepreneurial GVT communication.

### **5.1 Summary of findings from SLR**

Communication plays a vital role in the functioning of a global virtual team while it is also a great challenge for GVT to manage. The learnings summarized at this sub-chapter covers mainly the findings of the overall systematic literature review about communication in global virtual teams, which will be applied to entrepreneurial team literature for answering the research goals. The research uses this approach because there was none literature found in communication in entrepreneurial GVT, hence not possible to directly achieve entrepreneurial GVT communication learnings through SLR.

The main contribution of this study was to investigate the dynamic roles that communication play in the dynamic environment of entrepreneurial global virtual teams and how they are shaped by other factors and what are the most effective practices of communication that would be beneficial to entrepreneurial GVTs. Through the systematic literature review process, the study identified 33 unique papers that tackled communication in GVT. Data was extracted from the retrieved unique papers that were categorized into 8 different properties in order to help answer the research questions, including publication feature(P1), research methods and tools(P2), definition, advantages and challenges(P3), role of communication(P4), communication measurement(P5), affecting factors(P6), relationship between affecting factors(P7) and best practice(P8).

*P1, P2:* Most publications were distributed between 1997- 2014, with growing trend since 2010. When studying communication in GVT, 60% of the papers tackled the exploration of affecting factors of GVT functioning and its relationship, giving a great support to this study. Questionnaire and interview are two most used data collection methods.

*P3:* Global virtual team should be defined with its unique characteristics of cross dimensions in terms of degree of virtuality and dispersion dimensions. GVT is trended with its advantage in high flexibility and diversity. However, it is also generally challenged by communication barriers in cultural diversity and lack of social interactions.

*P4:* While generally recognizing the vital role that communication play in GVT functioning, the study also identified more specific roles that communication facilitates. Leadership and human resources commonly utilize communication as one of their effective practices, which helps enhance trust building in the team, and delivers higher team performance. As a basic yet crucial function, communication works to deliver information and enable knowledge sharing between team members. It also works to mitigate the obstacles caused by blurred life-work boundaries for GVT members. With ICT, the process of boundary-crossing are facilitated.

*P5:* Existing studies have been tackling GVT communication in various measurements. *Communication behaviors* in GVT is the most studied topic. Communication behaviors such as giving feedback, frequency and timing, alignment and response time were found to be critical in building and fostering trust in a GVT. Regulating communication behaviors also becomes a leadership practice in a GVT to achieve effective team communication and performance. Communication was also studied as a specific *team performance factor*. Using reliable communication tools is identified to be a critical factor in GVT performance. Identifying specific communication elements in a GVT work process that do not produce value can help improve communication in a GVT. Automated monitoring of team email contents is identified as an effective tool to assess team performance. Communication media choice affects team performance as media richness affects the information transferring, however not the range of media choices. For different communication contents, choosing rich or lean media to communicate creates difference in team interaction and cohesiveness. By implementing communication practices, such as choosing right communication media, setting up communication rules, *leaders in GVTs* can facilitate team interactions and cohesion that help build up personal relationships in the team. When *building trust*, studies also found out that communication behaviors facilitates trust, hence placing communication as a critical factor in trust building in a GVT. Early communication creates early trust and frequent communication in early stage also creates early trust and team cohesiveness. In terms of measuring communication, studies also focused on the factors that have an impact on *communication effectiveness*, both positively and negatively. Positive factors identified contribute to create

effective communication in a GVT, while negative factors give hints for GVT to navigate and to eliminate the wastes that hurdle communication. As communication technology enables the functioning of GVTs, studies have put weight on analyzing how technology has impacted the GVT communication, and what kind of technological set-up should a GVT have in order to create an effective work environment. This kind of the proposals on effective technological set-up serves as one of the communication strategies that were collectively studied by some researchers. Other *communication strategies* include areas of communication channel choices, cultural behavior adaption and temporal coordination mechanism. Due to the challenges that GVT members face, it is critical for human resource in a GVT to apply certain practices that accelerate the communication effectiveness in the overall team. Studies proposed such *human resource practices* as selecting members who are capable in handling intercultural communication, providing trainings, using self-assessment survey to create understanding for team synergy, using system to assess email contents that generate a communication effectiveness measurement, etc.

*P6:* As communication was measured by researchers from a variety of perspectives, this paper managed to identify from each measurement of the factors that affect communication in GVT. Cultural diversity and language are the only two objective factors that are imbedded to the nature of global virtual team settings, hence taking advantage of these two factors while overcoming their negative effects creates a starting point to achieve effective communication in GVT. Culture diversity in languages and cultural behaviors (such as religion, customs, holidays, power distance) affects team members' communication styles, hence influencing their ways to convey and receive information.

*P6, P7:* Besides, subjective factors such as leadership, communication frequency and timing, interpersonal relationships, trust, communication behaviors, waste identification, interaction incidents and rhythm, awareness and task interdependence, degree of virtuality, and coordination, are all playing significant roles in the communication within GVTs. Leadership guides how the communication is run in the team, hence leadership practices influence communication effectiveness through managing communication strategies, and practicing effective communication rules on leaders themselves and on the team members. When communicate, the members should pay attention to how often and when to communicate. It was found out that neither over-communication nor short-of-communication is helpful in a GVT, except for the beginning phase of a GVT founding, such as a startup formation early phase,

early and frequent communication fosters early trust in the team, which is eventually beneficial to team effectiveness. Communication helps build up interpersonal relationship between humans, while on the other side, interpersonal relations develop as people communicate. In a GVT work settings, good interpersonal relationship helps enhance message conveyance and the satisfaction among the team members and leaders. Researchers found out that GVTs who accommodate various communication needs by adopting multiple computer mediated communication systems are more satisfied with the teamwork, giving a hint to conclude that the communication channel selection affects interpersonal relationship in a GVT. Through communication behaviors such as social communication, predictable communication and verbal communication, trust in GVTs can be built and fostered. For this reason, GVT leaders engage in implementing strategies that reinforce right communication behaviors to boost trust in the team in order to achieve effective team performance. When lacking communication, team members are not aware of each other's activities related to work, causing awareness deficit in the team. Studied revealed that awareness is strongly associated with task interdependence. The higher task interdependence, the higher awareness there exists in a GVT as the more frequent communication is needed, which also potentially brings in higher trust. More frequent communication is also needed in GVTs with higher degree of virtuality. GVT dynamics are formed by a series of interaction incidents. The incident rhythms in the interaction process and how it is structured directly affect team dynamics, hence team effectiveness. Therefore, coordination is needed in GVT to manage the rhythms. A temporal coordination mechanism was proposed to help direct the pattern, timing and content of interaction incidents in a team in order to achieve effective team performance.

## **5.2 Communication in global entrepreneurial virtual teams (RQ3)**

In this chapter, the synthesized learning of communication in GVT from the SLR will be applied to literature about entrepreneurial teams in chapter 2. Specific findings aim to get entrepreneurial GVTs the understanding of major communication issues in the team and how these factors work on each other to influence the communication within the team.

### *The two sides of diversity*

In venture creation, entrepreneurial teams provide more advantages of diversity in personality, knowledge, skills and abilities than individuals (Lechler,2001; Schjoedt and Kraus,2009). In a virtual entrepreneurial teams, diversity is a key feature that serves as a significant advantage to the venture development in terms of availability in expertise, creativity and productivity. However, as cultural diversity in a GVT could lead to communication misunderstanding and hurdles, it is more challenging for an entrepreneurial GVT to balance between taking advantages of the diversity in the team and eliminating problems caused by diversity, such as language barriers and cultural misunderstanding.

### *The challenge of reaching consensus*

An entrepreneurial team is a team who performs venture creation process (Eisenhardt and Schoonhoven 1990, cited by Schjoedt and Kraus 2009); the shared commitment and common goals are two of the main prerequisites that drive the development. When the entrepreneurial team members are geographically dispersed, it brings a lot more challenges for the team members to reach consensus as communication channel is limited to computer mediated systems where social cues and interpersonal interaction opportunities are strongly constrained. If the entrepreneurial GVT members are also from different cultural backgrounds, challenges are strengthened as the members have to communicate through technological media and overcome the barriers in language and culture differences. In order to overcome these challenges, it may take longer time for the team to communicate to generate consensus on issues as found in SLR. In this situations, rich communication channel such as face-to-face communication is significantly important (S6). The team should do their best to create the face-to-face time for deciding on critical issues (S23,S28,S36). Videoconference, one of the best available technology options that can be counted as a rich communication channel, is also highly recommended for entrepreneurial GVT communication as identified from the SLR.

### *Task interdependence and Individual independent working style*

It is conducive to understand the degree of interdependence of individuals before joining an entrepreneurial GVT (Haper 2008). As found out in S32, task interdependence is positively associated with communication frequency. The higher task interdependence is, the more frequent communication is needed to acquire information and raise awareness. And the higher awareness of info, the higher trust there will be in the team. As GVT members also vary in their expectation and capability of independent working, it is therefore recommended to create

a balance of individual independent working capability and task interdependence requirement by communicating with the team member about their independent working skills and expectation and assessing the individual task interdependence requirements in order to help allocate tasks accordingly to avoid dramatically contradictory decisions. On the other hand, as entrepreneurial teams are generally involved in competitive and turbulent business environments, the virtual entrepreneurial team members are commonly perceived to have high interdependence to conduct tasks with low level of supervision. However, the remote team members receiving and offering support through proper communication can enhance team cohesion, hence better team performance and success.

#### *Respond to external environment*

Entrepreneurial GVT communication is influenced by the external environments. As venture creation is heavily involved in a turbulent environment, how the team responses to the environment influences their performance. Entrepreneurial GVTs tend to make more comprehensive decisions in response of the external environment through internal frequent and effective communication that leads to superior team performance (Eisenhardt et.al, 1997). The SLR indicates that due to the diversity in entrepreneurial GVTs, they attain more advantages in giving responses to the environments, both intellectually and geographically.

#### *Team composition*

Entrepreneurial team composition is an important factor to predict the venture performance, which serves as a vital criterion in venture capital's investment decisions (Lechler,2001). Though the surface level heterogeneity such as age, gender, functional background, and race were not found to be strongly associated to entrepreneurial team effectiveness, the effect does exist in the beginning of venture formation and fades away as the team engages in problem solving and decision making (Chowdhury,2004). It was obviously indicated from the SLR that global virtual teams' surface level heterogeneity is stronger than teams who are co-located. To erase the surface-level differences and the challenged triggered, an entrepreneurial GVT should be very aware of the existing heterogeneity and provide training, social interaction opportunities through leadership and human resource practices as supported by SLR findings in chapter4.5. As to deep-level heterogeneity such as personality conflicts, disagreement about strategic goals, different level of commitments, they are even more crucial to communication, team cohesion and entrepreneurial team performance accordint o Harrison et.al (2002). SLR suggests that entrepreneurial GVT can eliminate the effects from deep-level heterogeneity by creating social



interaction mediated by a wide range of ICT channels for different communication needs and offering supportive organizational policies to encourage open discussion.

#### *Manage conflicts through communication behaviors*

Cohen and Bailey (1997) and the SLR indicate that team process of conflict and communication management mediates effects of global entrepreneurial virtual team heterogeneity. Constructed conflicts drive the team to develop more comprehensive decisions while destructive conflicts such as personal attacks do vice versa (Eisenhardt et.al,1997). Managing conflicts in entrepreneurial GVT is challenging as personal contacts are limited when communication is only enabled via ICT. However, virtual team leaders can help avoid these conflicts by encouraging open and clear communication, adopting rich communication media (such as video conference), implementing effective communication strategies, setting up effective communication rule, using computer mediated social platform for the team to interact socially in order to build up trust. Destructive conflicts are extraordinarily harmful in an entrepreneurial team (Eisenhardt et.al, 1997), especially when the team is globally distributed, which would make the members find it more challenging to face each other and to resolve the conflicts. As destructive conflict was found correlated to the power structure (Eisenhardt and Bourgeois,1998), it is thereby recommended to have balanced power structure in an entrepreneurial GVT where leadership role can be rotated or people in the team all lead and follow for some tasks in order to create higher satisfaction, motivation and productivity within the team. For destructive conflicts, strategies suggested in SLR that foster high trust in the team such as task goal clarity, role division and specificity, time management, giving feedback and managing interaction frequency and timing, can also be useful.

#### *Rotating leadership*

Through better utilizing the expertise of one person and getting supports from others, rotating leadership builds high trust as according to SLR. This especially fits well to early stage entrepreneurial teams. It is also important for entrepreneurial GVT leaders to be aware of the motivation, expectations and individual perspectives of the team members in order to create a homogeneous team in spite of the diversity.

#### *Social interaction*

In entrepreneurial teams, the quality of social interaction is positively associated with the venture success in terms of economic success, competitive position, efficiency, client

satisfaction and personal success (Lecher,2001). Social interaction also tends to bring in radical innovation in an entrepreneurial GVT as the team members are more open to create connective thinking and to share ideas. The social interaction includes communication, cohesion, work norms, mutual support, coordination and conflict resolution. This emphasized the vital role of communication in an entrepreneurial GVT's success. These social interactions can potentially help translate individual team member perspectives about venture's strategic issues into collective understanding and idea sharing, where radical innovation arise from (S5). Both dimensions of differentiation and integration to perceive the strategy constructs among team members are significantly associated with entrepreneurial GVT's performance (West 2007). Hence, in an entrepreneurial GVT, strategic issues and opportunities should be discussed and communicated openly to receive various opinions as well as concluding with collective understanding within the whole team.

### **5.3 Implication for entrepreneurial GVT practitioners (RQ4)**

*This chapter will give constructive clues based on the learnings from SLR for entrepreneurial GVT practitioners to manage effective communication in the team.*

Due to high possibility of cultural heterogeneity in an entrepreneurial GVT, leaders themselves should be very aware of the culture difference, including the team members' language, religions, customs, holidays, power distance perception, life style, perception on individualism and collectivism. To react to these difference, leaders should demonstrate to the whole team of the openness to diversity, listen and learn from team members and create adapted common understanding of team culture. Actions taken by the leaders such as giving feedback, making routine time to create information alignment, responding quickly, can help build trust. Leaders should also take actions in the team to manage the communication behaviors of team members. Team members should deliver the awareness of their activities to other team members and leaders, especially when they are working on tasks with high interdependence. Entrepreneurial GVTs deal with strategic developments that differentiates themselves from other players in the market. Strategic issues in an entrepreneurial GVT determines the success of the team, thus should be well decided. While entrepreneurial GVTs hold advantage in team diversity, strategic issues should be well and openly communicated within the team to receive various opinions and conclude with collective understanding instead of individual decisions.

IT support is fundamental for communication in an entrepreneurial GVT. The company should have professional and dedicated IT team or members to help solve technological issues, provide technology trainings to members that ensures all members are able to use the technologies efficiently. The IT team should also identify best communication technology and information sharing platform, provide a range of available communication channels to be used by team members and provide guidelines and suggestions on which communication channel to be used in which circumstances.

During team member recruitment process, human resource should include the evaluation of the potential candidates' intercultural communication competency by arranging reliable evaluation tools. After recruitment, HR should continue provide constant training in cultural understanding and arrange team integration activities to help the new team members integrate into the new virtual teams. Human resource can also use tools such as self-assessment survey to help understand each team member in order to create team synergy. Evaluating email contents with information tools is another efficient way to measure team communication effectiveness. Besides those tools, the best way to understand team members' need is to take rich media contact with the remote team members and listen to their feedback on work and even personal issues that matters to the work performance. Human resource should also work with team leaders to promote interpersonal relationship building within the team by encouraging unofficial discussion between team members, encouraging face-to-face meetings arranged by team members, creating the whole team face-to-face get-together time at least once per year. The valuable face-to-face time should be utilized to decide on strategic issues that create collective understanding and alignment, and to build up interpersonal relationships. When the entrepreneurial GVT is newly established, HR should work with team leaders to provide guidelines of communication in especially the early phase of the team building which could help build early trust in the team. In the early phase, frequent communication is needed for knowledge sharing and team cohesion. Rich media, such as video conference, should be especially utilized in early phase of trust building. Furthermore, as entrepreneurial teams work intensively to achieve success while competing with big players, power structure in an entrepreneurial GVT should be desalted to create a power balance within the team that brings higher focus on team performance and higher motivation of individual team members. It is also recommended to create teamwork style when each members could lead some part of the project as well as follow to support other parts.

Language is an important part of culture. It is critical to have one official common language to be used in a GVT, especially an entrepreneurial GVT who is demanded to work and react fast. Entrepreneurial GVTs bear the nature of high language diversity, hence clarity should be created in the team about the official work language from Day one of the team building and Day one of each team members' accession. It is also recommended for the team to use official work language in any circumstances when there are other team members who don't understand the communication language from some team members. This is important to help eliminate the feelings of exclusion to discussion or undesired to be involved and help create higher team satisfaction and team cohesiveness. Besides the use of common official language, the team can encourage team members to learn local languages at the location where their work is seated, or the language which is the mother tongue of the majority of team members. This could help team members to create deeper understanding of other parts of the team's culture, which could benefit the team with more effective communication.

#### **5.4 Implication for future researchers**

This review found out very limited number of empirical researches in communication in global virtual teams which were conducted in real-world corporate settings. Many of the researches have resembled the student group global project for corporates for the study, as the process might be easy to manage and follow for researchers who are involved in this kind of projects, mostly as project instructors. However, as corporate communication in GVT has different team member commitment level required from student project communication, the results found out from student GVT communication might not rigorously argue for the corporate GVT communication. Furthermore, among the few empirical corporate case researches, none of the studies have been found to target to entrepreneurial GVT communication, though some of them mentioned about startup phase or early phases communication of GVT. More entrepreneurial GVT studies in communication, technology, behaviors, M&A should bring variety to the GVT literature and contribute to the practices of entrepreneurial teams who commonly have limited resources to cope with challenges.

Leadership, culture, language, trust, communication behavior and communication channel, are the topics that have been covered by around 15%-36% of the reviewed studies. Communication frequency and timing, which is also very relevant to coordination, nevertheless has been

covered in total 4 papers (S3,S20,S32,s35) among 33. As GVT settings make things more complex than traditional teams, besides the certain behaviors that should be applied to GVT leaders and team members, coordination role, the process and the mechanism are interesting and useful topics to be looked into. Awareness deficit in a GVT is a very commonplace problem, however only one reviewed paper (S32) researched into awareness topic. This review revealed only two studies(S5,S38) on interpersonal relations building for GVT communication and tackled mainly on communication behaviors and communication channel choices, further studies can investigate into what degree of interpersonal relationship in GVT is optimal for effective communication. Four papers ( S3,S33,S37,S38) were found to emphasize training as an important factor on communication effectiveness. Future studies that explores training to help build a GVT culture, and training to be given at different stages of entrepreneurial GVT development can bring practical inputs to the literature. Though many researches have focused on cultural diversity in GVT, most of them discussed about the national culture impact on team dynamics. Future studies can explore the dominating culture set up mechanism or culture balance in a GVT formed with a variety of national and organizational culture backgrounds.

## **6. LIMITATIONS**

### **6.1 Limitations to the search of publications**

The search was conducted in three most recognized databases and used very strict search strings of the keywords- global virtual team, communication or team communication with quotation mark. This search strategy aimed to get the author directly to the most relevant paper to this study. It could be optional to use more keywords involved in this searching in order to retrieve more comprehensive selection of papers to extract from. However, as the author tried with broader keyword searching and found out that most of the additional ones are not quite relevant to the studied discipline, it would be not quite meaningful to search for more papers for the sake of being comprehensive. The initial search ended with 136 papers, which was not a big pool of studies in initial searching stage. This is due to the fact that global virtual team communication is a study topic that has emerged about a decade ago and has not received tremendous amount of researches to dig into it.

## **6.2 Limitations to selection of publications**

The selection of publications were conducted with two phases and resulted in 33 selected papers for this review. The overall selection pool is relatively small, that create a threat to the comprehensiveness and validity of the results. Selection during the title and abstract reading is based on the inclusion and exclusion criteria, followed with a more rigorous round of full text reading evaluated with quality assessment criteria (as shown in Table 2) when information started to be recorded in data extraction form. A couple of the reviewed papers were empirical researches conducted with student teams where rewards are study credits based. Though most of the research design resembles the real global virtual team situations quite well, the motives of the group members are likely to be different from entrepreneurial virtual teams, hence limiting the validity of applying the developed theory to entrepreneurial virtual teams. It is also surprising to find out during the review process that very limited number of empirical researches in global virtual team were studied based on real corporate cases. The reason might be, communication involves a range of complex constructs and it takes long time to evaluate and monitor, hence bringing more difficulties to design researches in a busy corporate environment.

## **6.3 Limitations to extraction and synthesis of publication**

The needed data was first recorded on the data extraction form with pre-set extraction properties (shown at Table 4). As the study evolves, the exact property contents varied, thus extraction was not purely based on the information recorded on the extraction form. Instead, the extraction and synthesis involved four rounds of in-depth full text reading for specific research data from each paper. The initial data and properties recorded at data extraction form served as a base to find answers to each research question, while through each additional round of in-depth review, more specific data was extracted to create synthesis for various findings. This process might not be the most efficient for a systematic literature review, as it takes a lot of time for the author to review all 33 selected papers each time for specific data extraction. However, as the paper construction journey takes long time, the initial data extracted on the form might not able to provide most recently needed information to answer particular questions.

## **6.4 Limitations to methodology**

This paper used systematic literature review method to help answer such a main research question as what an entrepreneurial GVT can learn from existing studies in terms of team

communication. As there was not much GVT research found specifically for entrepreneurial team context, the author decided to conduct a systematic literature review on GVT communication and to apply the synthesized learnings to entrepreneurial teams. This indirect application of methodology may create a threat to the validity of research findings. However, effective communication is a shared value desired by all organizations, and many aspects of communication share same characteristics regardless of the organizational type. Therefore, this methodology applied is argued as capable to deliver reliable learnings and results for research goal.

## **7. CONCLUSIONS**

Global virtual team emerged around a decades ago and became a trendy organizational structure which has been adopted by a great number of organizations in the world. Entrepreneurial teams, as players who drive innovation, have also taken part in utilizing the globally distributed virtual team setting to develop collaborative environment in order to outstand in the global competition. It is commonly recognized that due to virtual team members are geographically dispersed, communication has been challenged and become a critical factor in virtual team functioning. In spite of the unprecedented trend of entrepreneurial GVTs, researchers haven't been sufficiently giving attention to entrepreneurial GVT communication or entrepreneurial GVT in general. This study aims to contribute to this research gap to find out what entrepreneurial global virtual teams should do to achieve effective communication.

In order to achieve this research goal, the study conducted a systematic literature review from existing studies. The literature searching with keywords- "global, virtual team, communication, entrepreneurial" has surprisingly resulted in zero paper from three most recognized databases- Ebsco Business Source Complete, Science Direct and ProQuest ABI/INFORM. However, leaving out completely the keyword of "entrepreneurial", the search resulted in a comprehensive selection of studies about communication in GVT. Due to this fact, this study decided to conduct the SLR about communication in GVT and apply the synthesized learnings to entrepreneurial teams.

In order to reach the research goal of understanding communication in entrepreneurial GVT, specific research questions were designed to provide clear answers. The review first aimed to understand what kind of roles did communication play in the functioning of global entrepreneurial virtual teams. Secondly, the review created a synthesis on how communication was tackled in existing studies as this gave clues to practitioners and researchers about the facts around communication and especially provided insight and knowledge base for future researchers who will continue with the exploration on this topic. The third research question is to find out the factors that affect communication in global entrepreneurial virtual team and how do they work to impact on. This research question served as a key to unlock the main research goal by providing a clear picture of variables around communication in entrepreneurial GVT. The last research question was to provide practical clues to entrepreneurial GVT practitioners on how to create effective communication in the team.

This review first provided a general view to understand global virtual team and its advantage and challenges. Then in order to create a synthesis of understanding on how to tackle communication in GVT studies for both future researchers and practitioners, it revealed a variety of roles that communication play in GVT and how it had been measured in existing reviewed studies. The result showed that in GVT functioning, communication plays roles of team performance factor, leadership practice, human resource practice, trust building factor, boundary management strategy, teamwork process facilitator, knowledge sharing and information delivery. Communication behavior is the most studied topic in regard to communication in GVT. Besides, researches also measured communication as a team performance behavior, as a leadership practice, as a trust building factor, as a human resource practice in addition to measuring communication effectiveness, communication strategies, communication breakdown and communication technology.

Through the review, it found out a list of factors that affect communication in global virtual team and provided analysis on how they affect communication in GVTs. Leadership, culture, technology, behaviors, trust, communication channel, language are factors that involved in most studies and also serve as important factors that directly affect communication effectiveness. Furthermore, communication frequency and timing, training, waste identification, interaction rhythm, task interdependence, degree of team virtuality are also factors that affect communication and team effectiveness. Interpersonal relations and awareness are two distinguished critical factors that should be raised with more focus to study on. All



these factors apply their effects on entrepreneurial GVT communication. Entrepreneurial team leaders should be aware of culture difference and demonstrate cultural understanding and openness to the team, execute communication behaviors that bring effective communication. Open, clear, effective communication should be achieved through leadership, human resource practices and strong IT support.

## APPENDICES

### APPENDIX A. A LIST OF SELECTED PAPERS

Code	References
S01	Wright,D.T. and Burns, N.D.1997. Cellular Green-Teams in global network organisations. <i>International Journal of Production Economics</i> . Vol.52.pp.291-303
S02	Kayworth,T. Leidner,D.2000. The Global Virtual Manager: A prescription for Success. <i>European Management Journal</i> .Vo.18,No.2,pp.183-194
S03	Lee-Kelley,L..2006.Locus of Control and Attitudes to Working in Virtual Teams. <i>International Journal of Project Management</i> . Vol.24,pp.234-243
S04	Lee-Kelley,L. and Sankey.T.2008. Global Virtual Teams for Value Creation and Project Success: A case study. <i>International Journal of Project Management</i> . Vol.26.pp.51-62
S05	Daim,T.U.,Ha,A. Reutiman,S., Hughes,B.,Pathak,U.,Bynum,W. and Bhatla,A.2012. Exploring the Communication Breakdown in Global Virtual Teams. <i>International Journal of Project Management</i> . Vol.30.199-212
S06	Verberg,R.M.,Sijtsema,P.B. and Vartiainen,M.2013. Getting it done:Critical success factors for project managers in virtual work settings. <i>International Journal of Project Management</i> .Vol.31,pp.68-79
S07	Shachaf,P.2008. Cultural Diversity and Information and Communication Technology Impacts on Global Virtual Teams: An Exploratory Study. <i>Information &amp; Management</i> . Vol.45.pp.131-142
S08	Saafein,O. and Shaykhian,G. Factors Affecting Virtual Team Performance in Telecommunication Support Environment. <i>Telematics and Informatics</i> . 2014.Vol.31.pp.459-462
S09	Ferreira,P.G.S.,Lima,E.P.and Costa,S.E.G.2012.Perception of Virtual Team's Performance: A Multinational Exercise.

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- International Journal of Production Economics*. Vol.140,pp.416-430
- S10** Klitmøller,A. and Luring, J.2013. When Global Virtual Teams Share Knowledge:Media Richness, Cultural Difference and Language Commonality, *Journal of World Business*, Vol.48,pp.398-406
- S11** Karpova,E.Correia,A.P. and Baran,E.2009. Learn to Use and Use to Learn: Technology in Virtual Collaboration experience. *Internet and Higher Education*. Vol.12,pp.45-52
- S12** Zolin,R., Hinds,P.J.Fruchter,R. and Levitt,R.E.2004. Interpersonal Trust in Cross-functional, Geographically Distributed Work: A Longitudinal Study. *Information and Organization*.Vol.14,pp.1-26
- S13** Gluesing,J.C.and Rippelle,K.R.2010. Correlating Survey Data and Network Data to Understand Performance in Global Virtual Teams. *Procedia Social and Behavioral Sciences*. Vol.2010,pp.6551-6560
- S14** Cicei,C.C.2012. Assessing Members' Satisfaction in Virtual and Face-to-face Learning Teams. *Procedia-Social and Behavior Sciences*. Vol.46,pp.4466-4470
- S15** Lilian,S.C.2014.Virtual Teams: Opportunities and Challenges for E-leaders. *Procedia-Social and Behavioral Sciences*.Vol.110,pp.1251-1261
- S16** Schlenkrich, L. and Upfold, C. 2009.A Guideline for Virtual Team Managers: The Key to Effective Social Interaction and Communication.” *The Electronic Journal Information Systems Evaluation* Vol. 12, pp.109 - 118,
- S17** Hambley,L.A.O'Neill,T.A.and Kline,T.J.B.2007. Virtual Team Leadership:The Effects of Leadership Style and Communication Medium on Team Interaction Styles and Outcomes. *Organizational Behavior and Human Decision Processes*. Vol.103,pp.1-20
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- S18** Penarroja, V. Orengo, V. Zornoza, A. Sanchez, J. and Ripoll, P. 2015. How Team Feedback and Team Trust Influence Information Processing and Learning in Virtual Teams: A Moderated Mediation Model. *Computers in human Behavior*. Vol.48. pp.9-16
- S19** Korkala, M. and Maurer, F. 2014. Waste Identification as the Means for Improving Communication in Globally Distributed Agile Software Development. *The Journal of Systems and Software*. Vol.95. pp.122-140
- S20** Jarvenpaa, S.L. Shaw, T.R. and Staples, D.S. Toward Contextualized Theories of Trust: The Role of Trust in Global Virtual Teams. *Information System Research*. Vol.15.No.3, pp.250-267
- S21** Pastore, R. 2008. Continent Divides. Forum Global Team Management. The CIO Executive Council.
- S22** Morgan, L. Paucar-Caceres, A. and Wright, G. 2014. Leading Effective Global Virtual Teams: The Consequences of Methods of Communication. *System Practice Action Research*. Vol.27. pp.607-624
- S23** Ruppel, C.P. Gong, B. and Tworoger, L.C. 2013. Using Communication Choices as a Boundary-Management Strategy: How Choices of Communication Media Affect the Work-Life Balance of Teleworkers in a Global Virtual Team. *Journal of Business and Technical Communication*. Vol.27.No.4. pp.436-471
- S24** Jarvenpaa, S.L. Knoll, K. and Leidner, D. 1998. Is Anybody Out There? Antecedents of Trust in Global Virtual Teams. *Journal of Management Information Systems*. Vol.14.No.4, pp.29-64
- S25** Zakaria, N. Amlinkckx, A. and Wilemon, D. 2004. Working Together Apart? Building a Knowledge-Sharing Culture for Global Virtual Teams. *Creativity and Innovation Management*. Vol.13.No.1.
- S26** Henttonen, K. and Blomqvist, K. 2005. Managing Distance in a Global Virtual Team: The Evolution of Trust through
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- Technology-mediated Relational Communication. *Strategic Change*. Vol.14.pp.107-119
- S27** Jarvenpaa,S.L. and Leidner.D.1999. Communication and Trust in Global Virtual Teams. *Organization Science*. Vol.10.No.6.pp.791-815
- S28** Maznevski,M.L. and Chudoba,K.M.2000. Bridging Space Over Time: Global Virtual Team Dynamics and Effectiveness. *Organization Science*. Vol.11.No.5,pp.473-492
- S29** Gladden,M. 2014. Leveraging the Cross-Cultural Capacities of Artificial Agents as Leaders of Human Virtual Teams. Proceedings of the European Conference on Management, Leadership,2014.p428
- S30** Grosse,C.U. 2002.Managing Communication within Virtual Intercultural Teams. *Business Communication Quarterly*. Vol.65.No.4,pp.22-38
- S31** Kayworth,T.R. and Leidner,D.E. 2002. Leadership Effectiveness in Global Virtual Teams. *Journal of Management Information Systems*. Vol.18.No.3,pp.7-40
- S32** Jang.C.Y.2013. Facilitating Trust in Virtual Teams:The Role of Awareness. *Advances in Competitiveness Research*. Vol.21.No.1/2.
- S33** Tavcar,J. Zavbi,R. Verlinden,J and Duhovnik,J.2005. Skills for Effective Communication and Work in Global Product Development Teams. *Journal of Engineering Design*. Vol.16.,No.6. pp.557-576.
- S34** Webster,J. and Wong,W.K.P. 2008. Comparing Traditional and Virtual Group Forms: Identity, Communication and Trust in Naturally Occurring Project Teams. *The International Journal of Human Resource Management*, Vol.19.No.1.pp.41-62
- S35** Massey,A.P. Montoya-Weiss,M.M. and Hung,Y-T. 2003. Because Time Matters:Temporal Coordination in Global Virtual Project Teams. *Journal of Management Information Systems*. Vol.19. No.4.pp.129-155
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- S36** Ross,J.A.2008. Trust Makes the TEAM Go Round. Harvard Management Update. Harvard Business Review.
- S37** Anawati,D. and Craig,A. 2006. Behavioral Adaptation Within Cross-Cultural Virtual Teams. Vol.49.No.1. *The IEEE Transactions on Professional Communication*. Vol.49.No.1.pp.44-56
- S38** Pauleen,D.J. and Yoong,P. 2001. Relationship Building and the Use of ICT in Boundary-crossing Virtual Teams: A Facilitator's Perspective. *Journal of Information Technology*. Vol.16.pp.205-220
- S39** Alexander,S.2000. Virtual Team Going Global. Management&Careers.November.2013.InfoWorld.pp.55-56
- S40** Bulu,S.T. and Yildirim,Z. 2008. Communication Behaviors and Trust in Collaborative Online Teams. *Educational Technology&Society*. Vol.111.No.1.pp.132-147
- S41** Berg,N. and Holtbrugge,D.2010.Global Teams: A Network Analysis. *Team Performance Management*. Vol.16.No.3/4.pp.187-211
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\*On this list, S3, S11, S12,S18,S21,S39,S40,S41 were excluded from full-text review.

## APPENDIX B DATA EXTRACTION FORM

<b>P1. Publication Feature</b>	
Title	Narrative
Author(s)	Narrative
Year	Narrative
Publication Source	Journal/website/book/conference
<b>P2. Research Feature</b>	
Research Question	Narrative
Research Method	Qualitative / Quantitative
Unit of Analysis	Person/Team
Data Collection Methods	Interview/Survey/Observation/lab experiment/Data Achieve/calls/email
<b>P3. Definition, Advantages and Challenges</b>	Narrative
<b>P4. Role of Communication</b>	Narrative
<b>P5. Communication Measurement</b>	Narrative
<b>P6. Affecting Factors</b>	L/CT/CD/T/CM/CO*
Dependent factors	
Independent factors	
Output	Narrative
Relationship between the factors	Narrative
<b>P7. Relationship findings</b>	Narrative
<b>P8. Best Practice</b>	Narrative

\*L=leadership, CT= communication technology, CD=cultural difference, T= trust, CM=conflict management, CO=coordination

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