Study on Emergence of Dynamic Organization Structures Based on Social, Asynchronous and Synchronous Communication and Collaboration Patterns in IT and Educational Organizations: with Specific Reference to Organizations in Redmond, USA, and Bangalore, India

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Submitted

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Declaration of Authorship

I declare that this thesis entitled "Study on Emergence of Dynamic Organization Structures Based on Social, Asynchronous and Synchronous Communication and Collaboration Patterns in IT and Educational Organizations: with Specific Reference to Organizations in Redmond, USA, and Bangalore, India" submitted by me in fulfillment of the requirements for the award of the degree of Doctor of Philosophy of the ICFAI University Jharkhand, Ranchi is my own work. It contains no material previously published or written by another person nor material which has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

(Ramnish Singh)

Date:

Place:

Acknowledgments

"Journey is more interesting than the destination."

Completing a Ph.D. is not a simple endeavor; however, thanks to the support of a number of amazing and wonderful people I have enjoyed all of it. Firstly, I would like to thank Dr. Sukanta Chandra Swain, my Ph.D. supervisor and Dr. Susan Conway, my Ph.D. co-supervisor . They both have been inspiring, challenging and supportive in equal measure, and I consider myself very privileged to have worked under their guidance and support.

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Date: **(Ramnish Singh)**

Place:

Thesis Completion Certificate

This is to certify that the thesis on "Study on Emergence of Dynamic Organization Structures Based on Social, Asynchronous and Synchronous Communication and Collaboration Patterns in IT and Educational Organizations: with Specific Reference to Organizations in Redmond, USA, and Bangalore, India" by Mr Ramnish Singh, in Partial fulfillment of the requirements for the award of the Degree of Doctor of Philosophy is an original work carried out by him under our joint guidance. It is certified that the work has not been submitted anywhere else for the award of any other diploma or degree of this or any other University.

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Co-Supervisor

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Chapter 1: Abstract

The purpose of this research is to determine whether dynamic organization structures emerge based on social, asynchronous and synchronous communication and collaboration patterns within IT and Education Institutes in Redmond (USA) and Bangalore (INDIA). A secondary hypothesis of this research is to establish if communication and collaboration are primarily Asynchronous, Synchronous or both and whether Social are leveraged as a primary or secondary medium.

The study isolates the major concepts related to organizational development and organization structure. An exploration of some of the major paradigms for organization development is conducted through review of existing literature. The review includes an assessment of the relationship between organization structure and organization goals followed by a description of the prevailing organization structures.

This paper describes the methodologies used in the research, as well as the data analysis techniques employed and analysis of the results. The study incorporates an inter-industry multicultural analysis as well as cross-industry analysis based on results obtained from the individual studies. The analysis reveals that dynamic organization structures emerge based on social, asynchronous and synchronous communication and collaboration. The study shows the evolution of the organization structure influenced by eight factors: Availability, Accessibility, Agreeability, Acceptability, Rewards and Recognition, Quest for Knowledge, Fear Factor, and Social Power.

The study concludes by submitting recommendations and conclusions, encapsulating the research outcome, directions for future research about further expanding the role of social, communication and collaboration in dynamic organization structures.

Keywords: dynamic, organization, structures, availability, accessibility, agreeability, acceptability, rewards & recognition, quest for knowledge, fear factor, social power.

Chapter 2: Introduction

2.1. Overview

Communication is the activity of conveying information. Information, thoughts, messages, or data is transmitted through a variety of means such as speech, images, signals, written words, or behavior (body language). Collaboration is the activity of aligning together or helping others to achieve a common goal. Organizational structure is a set of activities such as task allocation, coordination, and supervision that are directed towards the achievement of the organization's aims or goals (Pugh, 1990).

The evolution of technology can be visualized as creating an organizational neuro-network similar to the human central nervous system. The developing field of communication and collaboration technology continues to extend the ability of people in organizations to leverage connectivity to improve productivity. Organizations throughout the world have realized the importance, potential and impact of electronic communication medium in their businesses.

As organizations are responding with increased investments in the growing array of communication and collaboration technology, communication becomes the epicenter of an organization interactions, new communication patterns are emerging in the forms of asynchronous[1], synchronous[2] and social[3].

[1]where the sender and receiver do not receive and / or reply instantaneously i.e. store and forward communication e.g. e-mail, missed instant messages, etc.
[2]where the sender and receiver are in direct contact and exchange information instantly i.e. real time communication e.g. active instant messaging, voice and / or video
[3]where the sender and receiver have an element of trust, credibility, reliability and responsibility in their communication

While organizations are aware of the benefits of communication, collaboration, and social patterns, there is little effort being made to help model the dynamics in the organizational structures begin driven by these changes. As communication is a prime force for organizational success, the creation of dynamic structures will allow organizations to benefit from the many merits of the combined social, asynchronous and synchronous communication patterns.

A second factor that results from this combined approach is the concept of "Validated Social Search and feedback" that was brought forward by Carmel (Carmel & et , 2009) i.e. availability of information from social sources which have a degree of credibility based on the collective experiences from social communications e.g. searching for the best method to solve a business challenge or searching for a "good" architect, etc.

2.2. Objectives and Scope

The objective of this research is to study the emergence of Dynamic Organization Structures based on Social, Asynchronous and Synchronous Communication and Collaboration Patterns using Electronic Communication Tools using examples of business challenges being resolved using collaboration and communication tools. The expected output of this research are:

- Model for creation of dynamic organization structures

- Expected time duration for the life of an organization structure

- Methods of transforming any given dynamic organization structure from one state to another when the end objectives change

- The possibility of having coexistence of multiple organization structures for a given set of diverse organization goals and objectives.

The scope of this research will be to examine the various patterns of dynamic organization structures in Information Technology (IT) and Education institutes in Redmond, Washington, USA and Bangalore, Karnataka, India who are deeply engaged in the use of communication and collaboration tools. This work will also seek to identify the following:

- For IT Industry

    - Are Communication and Collaboration primarily Asynchronous than Synchronous?

    - AreCommunication and Collaboration primarily Synchronous than Asynchronous?

    - Are Communication and Collaboration equally Asynchronous and Synchronous?

    - Is Social Communication and Collaboration leveraged as a primary medium?

- Is Social Communication and Collaboration leveraged as a secondary medium?

- For Education Institutes

  - Are Communication and Collaboration primarily Asynchronous than Synchronous?

  - Are Communication and Collaboration primarily Synchronous than Asynchronous?

  - Are Communication and Collaboration equally Asynchronous and Synchronous?

  - Is Social Communication and Collaboration leveraged as a primary medium?

  - Is Social Communication and Collaboration leveraged as a secondary medium?

These additional elements are designed to add clarity to some of the disagreements seen in previous empirical research.

The additional research will aid in identifying the conditions under which dynamic organization structures emerge based on social, asynchronous and synchronous communication and collaboration.

2.3. Research Motivation

The emergence of dynamic organization structures, driven by the advances in technology, has been a subject of numerous discussions and research over the past decade. The current organizational structures are built on the requirements of the industrial era. Current research shows that in the postindustrial era, the focus has shifted from organizing human resources based on skills and not on the job being performed.

Since the idea of organizing human resources based on skills and not based on the role has been on the mind of researchers for a long time. The growth of communication and collaboration technology and the ever growing number of research papers on this broad subject of changing organizations, limited research on the use of communication and collaboration tools to derive dynamic organization structure led the researcher to select this topic and the researcher feels that the research will add additional insights to the body of knowledge on this subject and is looking forward to making this contribution.

2.4. Overview of Research Approach

The overall aim of this research and specific research questions resulted in the research involving a mixed methods study relating to factors influencing asynchronous, synchronous and social communication and collaboration within organizational contexts.

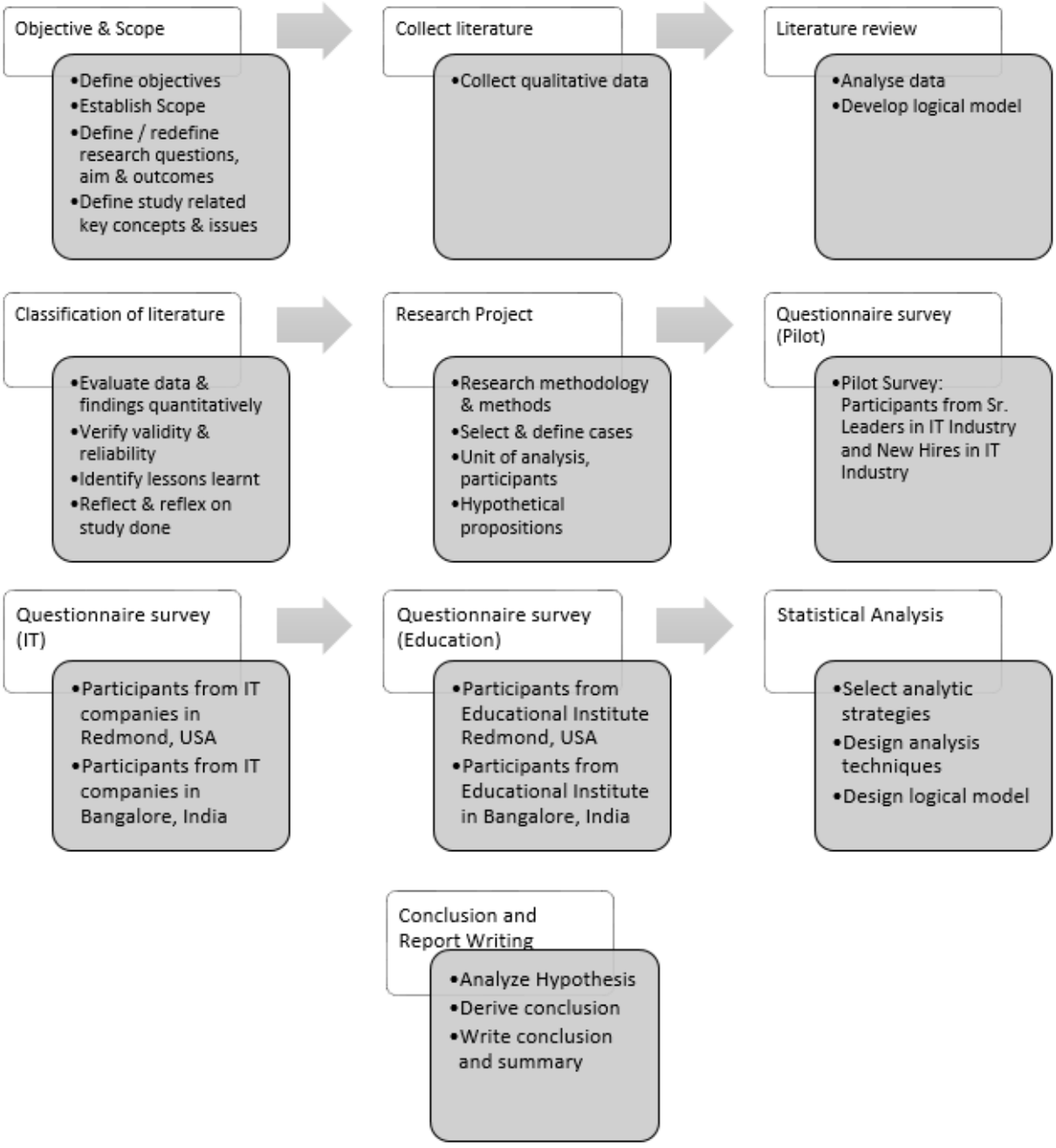


Figure 2.4-1: Research Methodology

A conceptual framework, to help explain the research concepts, was developed based on the analysis and synthesis of existing literature. The framework used to guide the research is shown in Figure 2.4-1.

In this research, a mixed methodology was adopted. The approach to allowed for the initial generation of rich data aboutin relation to the relatively unexplored area of asynchronous, synchronous and social collaboration. Additionally, the methodology provides the opportunity to expand this knowledge with the added benefits of a quantitative phase of the study.

Mixed methods studies allows the researcher to include both qualitative and quantitative methods of data collection and/or analysis. The goal of the mixed methods approach is to achieve a range of outcomes (Creswell, 2005); (Greene, Caracelli, & Graham, 1989).

Use of mixed methods as distinct from either qualitative or quantitative methodology is growing in popularity. The mixed methods approach has been more widely recognized with the release of publications dealing specifically with mixed methodologies (for example see (Creswell, 2003); (Greene & Caracelli, 1997); (Tashakkori & Teddlie, 2003).

This study was divided into two distinctly separate phases. First, the Pilot Study involving the use of qualitative methods to gain a more detailed understanding of asynchronous, synchronous and social collaboration,. The second phase involved the detailed survey building on the outcomes of Pilot Study to conduct a quantitative analysis ofn a larger number of individuals.

Senior leaders, as well as new hires from IT organizations, were surveyed during Pilot Study. As part of the main study, a range of individuals from IT and Educational institutes within the State of Washington in the USA as well as the State of Karnataka within India were interviewed. The objective of the main study was to understand further asynchronous, synchronous and social communication and collaboration.

The detailed survey involved the administration of instruments, which were developed, based on the outcomes of Pilot Study. The detailed study for IT Industry and Education Institutes second study are built on the foundation of Pilot Study and provides insight into the emergence of dynamic organization structures based on asynchronous, synchronous and social collaboration.

2.5. Contribution of Research

With the help of this study, the researcher would like to introduce the concept of creation of Dynamic Organization structure based on the technology-enabled social, asynchronous and synchronous communication and collaboration patterns in an organization. The resultant dynamic organization structure will help organizations in the creation of groups that are quickly assembled, to help solve critical business challenges.

The benefits derived from this model can range from economic impact, social impact and help drive and align more easily towards organization goals and objectives.

2.6. Outline of Thesis Chapters

Chapter 3 examines the extant literature that has contributed, theoretically and empirically, towards understanding the development of organizations and specifically the organization structures. It begins by considering the various organization developments and then focuses on a review of theories related to organization structures (behaviorist theories, needs theories, goal setting and expectancy). It focuses in particular on how these different perspectives explain the development of organization structures. The second half of the chapter provides a chronological order of research done by researchers and their contribution. This chapter then leads into next chapter that focuses on the development of the conceptual framework.

Chapter 4 provides a detailed overview of current models and theories of organization development followed by current models and theories of organization structure based on which the conceptual framework is derived. This chapter then outlines the need for a new model based on the recent developments in social, communication and collaboration patterns emerging due to the use of advanced computer-based tools for the same. The chapter then dives into the background as well as the layered development of the conceptual model and addresses the need for the model and how, the model, addresses the modern need for social, communication and collaboration.

Chapter 5 provides an overview of the research design and methodology. The chapter first introduces the mixed methods approach used in this study to address both qualitative as well as quantitative aspects. Next, there is a discussion about the rationale and the methods used for designing survey questionnaire as well as the entire process of instrument development. The chapter also dives deep into survey construction, scale selection, survey

questionnaire statements and coding of survey questionnaire statements. The chapter then provides background on the three studies - pilot, IT Industry in Redmond (USA) and Bangalore (INDIA) and Education institutes in Redmond (USA) and Bangalore (INDIA).

Chapter 6 provides detailed discussion and justification for the use of a mixed methodology in this research. It provides details of Pilot Study, the participants chosen for Pilot Study, data analysis of responses received from Pilot study and the findings. The aim of this chapter is to refine further the framework developed in Chapter 3 based on the results of the pilot study.

Chapter 7 presents survey examining IT Industry in Redmond (USA) and Bangalore (INDIA). It provides an overview of the industry, details of survey response rate and data preparation. The chapter provides good insight into the demographics of this industry. The chapter then dives into descriptive statistics with detailed analysis (both qualitative as well as quantitative) based on survey questionnaire results.

Chapter 8 presents survey examining Education Institutes in Redmond (USA) and Bangalore (INDIA). It provides an overview of the institutes, details of survey response rate and data preparation. The chapter provides insight into the demographics and then dives into descriptive statistics with detailed analysis (both qualitative as well as quantitative) based on survey questionnaire results.

Chapter 9 compares and contrasts the findings from IT Industry groups in Redmond (USA) and Bangalore (INDIA) and Educational Institutes groups in Redmond (USA) and

Bangalore (INDIA) and draws together the results of these findings to understand the how this research is applicable to these two distinct sectors in different cultural settings.

Finally, Chapter 10 draws together the findings of the literature review and empirical studies to address the aims of the thesis. It also discusses limitations of the research and suggestions for future research.

2.7. Summary

This chapter outlined the objectives of this dissertation, which, in summary, is to study on emergence of dynamic organization structures based on social, asynchronous and synchronous communication and collaboration patterns within IT Industry and Education Institutes in Redmond, USA and Bangalore, INDIA. The chapter also provided an introduction to the theoretical grounding of this thesis, including the contributions that it makes to research and finally to conclude with an overview of the eight remaining chapters in this dissertation, including the three studies.

Chapter 3: Background and Contributions

3.1. Overview

Organizational structures have existed and evolved from the ancient times of hunters and gathers to the structures of royal power in the Middle Ages with a focus on food production and security. As early technology changed, wealth built in the industrial-era hierarchical organizational structures evolved around the workplace. In today's post-industrial structures though the primary focus is still the workplace, it is observed that there is more peer to peer influence in the flattening organizational structure. The study of organization structure has noted these changes in numerous studies, viewpoints and research being conducted to define the intricate balance between its constituents.

Early theorists of organizational structure, Taylor (Taylor, 1911) and Fayol (Bedeian, Wren, & Breeze, 2002) to Weber (Weber, 1938)"understood the importance of structure for effectiveness and efficiency and without any question, supposed that whatever structure was needed, people could fashion accordingly. The organizational structure was considered a matter of choice. However, with the introduction of human relationship theory in 1930, there was still not a denial of the idea of structure as an artifact, but rather promotion of the creation of a different sort of structures, one in which the needs, knowledge, and opinions of employees might be given greater recognition."

The 1960s brought in a very diverse view, suggesting that the organizational structure is "an externally caused phenomenon, an outcome rather than an artifact." Current organizational theorists such as Lim, Griffiths, and Sambrook (Lim, Griffiths, & Sambrook, Organizational structure for the twenty-first century, 2010) have proposed that organizational

structure evolution is very much dependent on the expression of the strategies and behavior of the management and the workers as constrained by the power distribution between them, and influenced by their environment and the outcome.

3.2. Literature Review

3.2.1. Historical Development of Organizational Structure

As shown in Figure 3.2-1, the development of organization structure can be divided into three broad phases: Pre-bureaucratic, Bureaucratic and Post-bureaucratic. Each of these phases is driven by a unique set of guiding principles based on relevant point of view prevalent around that time.

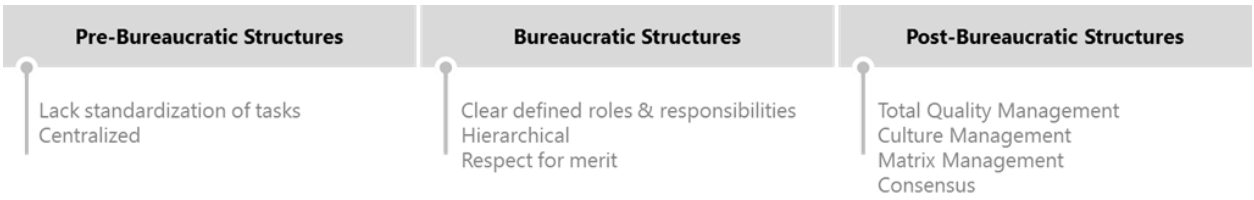


Figure 3.2-1: Phases of Development of Organization Structures

Pre-bureaucratic structures (Centralized Structures) lack standardization of responsibilities and is commonly employed for simple tasks in smaller organizations.

Bureaucratic structures are based on the Weberian (Gerth & Mills, 1948) characteristics of bureaucracy: Well-defined roles and responsibilities, hierarchical structure and respect for merit. They are usually implemented using a tall structure, better suiting complex or larger scale organizations.

Post-bureaucratic structures are the term often used to describe a range of ideas developed since the 1980s, which contrast themselves with Weber's ideal type bureaucracy. Some examples include total quality management, culture management, and matrix management, amongst others. However, an interesting observation by Heckscher (Heckscher & Donnellon, 1994) who noted that hierarchies still existed, authorities are rational, and organization is still rule bounded, which lead him to coin the phrase “cleaned up bureaucracies”.

Figure 3.2-2 and Figure 3.2-3 depict the various type of organization structures that have evolved over time.

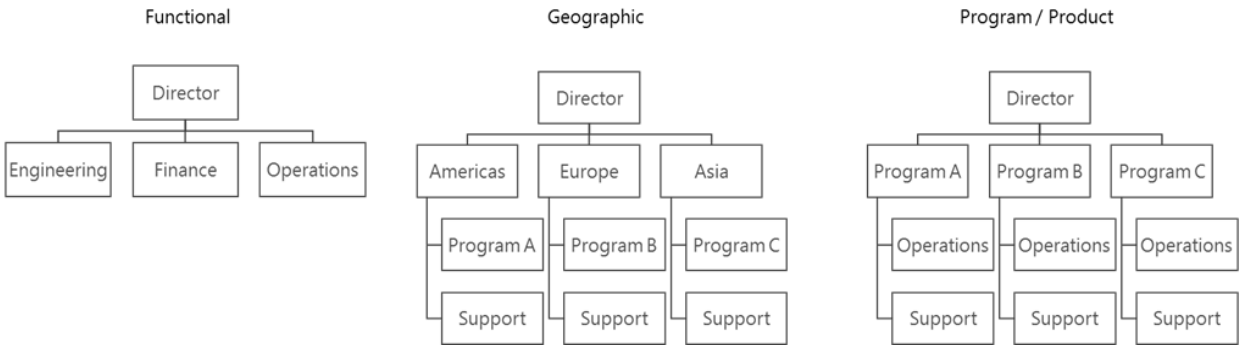


Figure 3.2-2: Types of Organization Structures: Functional, Geographic, Program / Product

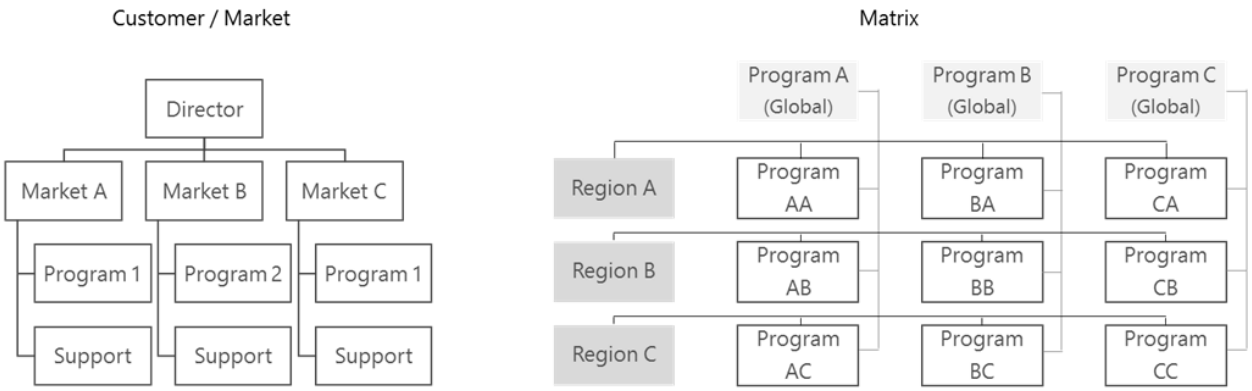


Figure 3.2-3: Types of Organization Structures: Customer/Market, Matrix

Figure 3.2-4 depicts the relation of authority concerning the various organizational structures. The three most common authority structures are centralized, decentralized and hybrid.

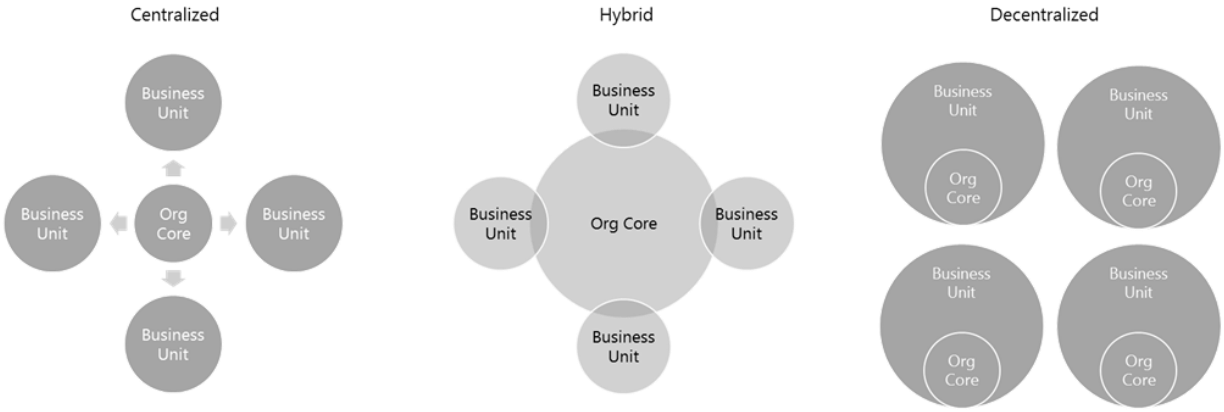


Figure 3.2-4: Authority within Organization Structures

3.2.2. Social Communication & Collaboration

The best way to develop perspective organization structure is to view it through a lens of how communication and collaboration and finally social communication and collaboration have evolved over a period. Figure 3.2-5 provides a timeline of social communication and collaboration based on the evolution of technology enablers in this space.

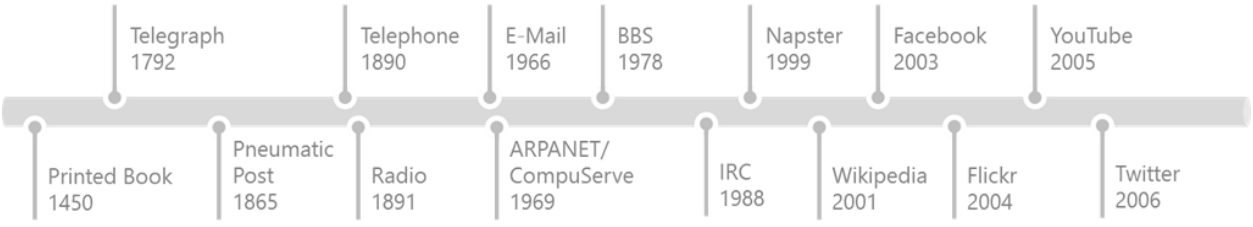


Figure 3.2-5: Timeline of Social Media (not to scale)

3.2.3. Electronic Communication & Collaboration

It is 21st century and organization structures are still evolving as evident from the recent research work that has been carried out on this topic. Recent literature study emphasized the significance of communication technology for collaboration and information sharing across organizational boundaries. The Recent literature survey suggests that off late scholars have been arguing for and supporting the concept of organic organizational structures that support dynamic and uncertain environments.

Hinds and Kiesler (Hinds & Kiesler, 1995) hypothesized that due to the collaborative nature of technology work and the way technical employees are organized into work groups, technical employees, as compared with administrative employees, prefer cross-boundary communications.They also uncovered an interesting fact that half of the employees' communication was extra-departmental and not intra-departmental (referred in OD text as organic or systemic communications).

Powell (Powell, 1990), Barley (Barley, 1994) and others argued that the rise of technical work and the horizontal organization of technical workers increases collaboration and nonhierarchical communication. Organizations can encourage communication flows across organizational boundaries by strengthening horizontal structures and supporting technology use by all employees. Shirani, Tafti and Affisco (Shirani, Tafti, & Affisco, 1999) suggested that with the increasing use of emerging communication technologies for collaborative work and group communication, organizations must recognize the benefits as well as the limitations of these technologies for communication effectiveness i.e. can the electronic enablers of communications actually take the place of face:face communications in the human need to communicate? Their controlled experiment suggested that synchronous

communication generated fundamental ideas to resolve problems; however, using asynchronous communication resulted in much deeper problem analysis.

Let us now examine the social aspect. Butler's (Butler, 2001) resource-based theory of sustainable social structures suggested that members contribute time, energy, and other resources, enabling a social structure to provide benefits for individuals. These benefits could include information, influence, and social support, are the basis for a social structure's ability to attract and retain members. The model focused on the system of opposing forces that link membership size as a component of resource availability and communication activity as an aspect of benefits provision to the sustainability of the social structure. Butler found that communication activity and size had both positive and negative effects on a structure's sustainability. He suggested that while the use of networked communication technologies may alter the form of communication, balancing the opposing impacts of membership size and communication activity in order to maintain resource availability and provide benefits for current member remains a fundamental problem underlying the development of sustainable online social structures.

When the same is applied to Sundararajan's (Sundararajan, 2009) research, the emergence of Respect (whether real or perceived and not very different from esteem) as a social factor, is observed. In a respect driven environment, it is important to people to validate themselves and the skills they bring to the table, in collaborative work situations. Workgroup influence and motivation to actively collaborate and not be a free rider are bound up with the concept of respect that the individual gets from the group. This respect may be there as a result of past achievements or may be earned by the individual during

collaboration. He suggested that respect and its companion, influence in a group and are important dimensions in collaboration among members of a group.

Hinds and McGrath (Hinds & McGrath, 2006) in their correlational study of 33 Research and Development (R&D) teams, found that in contrast to smooth coordination in collocated teams, the opposite is true for geographically distributed teams. An informal hierarchical structure was associated with more smooth coordination on distributed teams. These results add to the literature on networks in teams and provide insight into significant differences in the structure of geographically distributed and collocated teams.

Lim and Benbasat (Lim & Benbasat, 1991) in their paper presented a framework to guide researchers in examining the communication needs of groups and their members in computer-supported collaborative work. Their analysis consisted of four aspects: concurrency, content, path, and channel to help understand communication flows. Their framework was intended to encourage a detailed focus on the main aspects of the group interface, to provide a scheme for categorizing the contributions of empirical work, and to identify factors worthy of empirical scrutiny.

Raymond (Raymond, et al., 2005) proposed a new model called CCMS (Content and Communication Management System) for synchronous collaboration activities within a group of distributed learners where asynchronous collaboration would have prevailed. Their model is however contrasted with the model proposed by Kordaki and Daradoumis (Kordaki & Thanasis, 2009) which supported structuring synchronous and asynchronous communications. The result is a framework that can be used for development of cognitive skills. Tirado, Aguaded and Hernando (Tirado, Aguaded, & Hernando, 2011) hypothesized

that many-to-many communication is more important in collective knowledge generation processes than dyadic or triadic communication. They strongly suggested that further research is needed to establish a link between social relations and positive interdependence or to the creation of meaning and the properties of the social network.

Akoumianakis (Akoumianakis, et al., 2011) elaborated on the design and use of cross-organization virtual community spaces facilitating knowledge based collaborative engagement in the practice of a boundary spanning alliance, which explores social dynamics of cross-organizational virtual groups and their emergent behavioral patterns. Walker and Stohl (Walker & Stohl, 2012) suggested that organizations are entering into multiple collaborative relationships across sectors and nations. These collaborations are more complex than typical organizational structures. Their research examined the emergent task communication and resource dependency networks, and their results provided general support for the hypothesized collaborative dynamics that distinguish collaborations from more traditional organizational forms. As a next step, they suggested that collaborative organizing is a complex, unique, and rapidly growing phenomenon that practitioners and researchers need to investigate further.

Choi (Choi, Seongkook, Geehyuk, & Song, 2013) performed a study to find useful indicators for inferring social relationship types among people in contact with each other during their daily lives, using their communication patterns within an organization. They showed that there was a high possibility of inferring social relationship type with a small amount of readily obtainable data. There is a possibility using the inferred social relationship types of building an intelligent system that can comprehend the status of an organization or enhance communication between each member of that organization.

Lim, Griffiths, and Sambrook (Lim, Griffiths, & Sambrook, 2010) developed the Hierarchy-Community Phenotype Model of Organizational Structure borrowing from the concept of Phenotype from genetics. In their paper, they traced the emergence of the bureaucratic organizational structure, noting its compatibility to the industrialization period.

As stated in their paper, "A phenotype refers to the observable characteristics of an organism. It results from the expression of an organism's genes and the influence of the environment. Pairs of alleles usually determine the expression of an organism's genes. Alleles are different forms of a gene. In our model, each employee's formal, hierarchical participation and informal, community participation within the organization, as influenced by his or her environment, contributes to the overall observable characteristics (phenotype) of the organization.In other words, just as all the pair of alleles within the genetic material of an organism determines the physical characteristics of the organism, the combined expressions of all the employees' formal hierarchical and informal community participation within an organization give rise to the organizational structure. Due to the vast potentially different combination of the employees' formal hierarchical and informal community participation, each organization is therefore a unique phenotype along a spectrum between a pure hierarchy and a pure community (flat) organizational structure."

They developed the EMWSO framework (Environment-Management-Workers-Customers-Structure-Outcome) framework of organizational structure development and used it to argue that the bureaucratic structure is inadequate for coping with current expectations.

Michinov, Michinov, and Toczek-Capelle (Michinov, Michinov, & Toczek-Capelle, 2004) examined group processes in a synchronous context and their effects on performance

leading to suggestions to invite more thorough examination of the impact of social identity on the building of a sense of online community at the early stage of a learning process within education.

Similary Ocker and Yaverbaum (Ocker & Yaverbaum, 1999) found in their research that using asynchronous computer conferencing technology as a means of collaboration was as effective as face-to-face collaboration in terms of learning, quality of solution, solution content, and satisfaction with the solution quality. However, the participants were significantly less satisfied with the asynchronous learning experience, both in terms of the group interaction process and the quality of group discussions.

Paul (Adams, 2007) in his paper on how Google designs successful user experiences for its communications products emphasized the important of understanding the user's communication behaviors beyond what they do with the product itself. In his research paper, he further described a technique for building an understanding of human social networks and communication tools. His technique involved only spending 60 minutes each with a small number of research participants and described examples of the type of insights the technique can yield.

Teece (Teece, 2007) in his paper on Dynamic Capabilities and their Micro-foundations discusses the idea that Dynamic Capabilities of organization is the ability to determine whether the organization is performing the right activities, and then effectuate necessary change that can be in modification of resource base, etc. He also suggested that it also relates to the speed with which the organization aligns/realigns with requirements of and opportunities in the business environment. According to him the micro-foundations of

dynamic capabilities are routes/methodologies and individual acts and actions. He also suggested that these micro-foundations are made up of the three clusters – Sensing, Seizing, and Transforming. As an example at IBM (Harreld & Tushman, 2009) dozens of new business ideas are considered twice yearly, and the most promising are vetted through multiple stages. A few are launched with high-level support and protected resources, and if milestones are met, the new business joins an existing business unit. He also developed the Dynamic Capabilities Framework, which is shown in Figure 3.2-6.

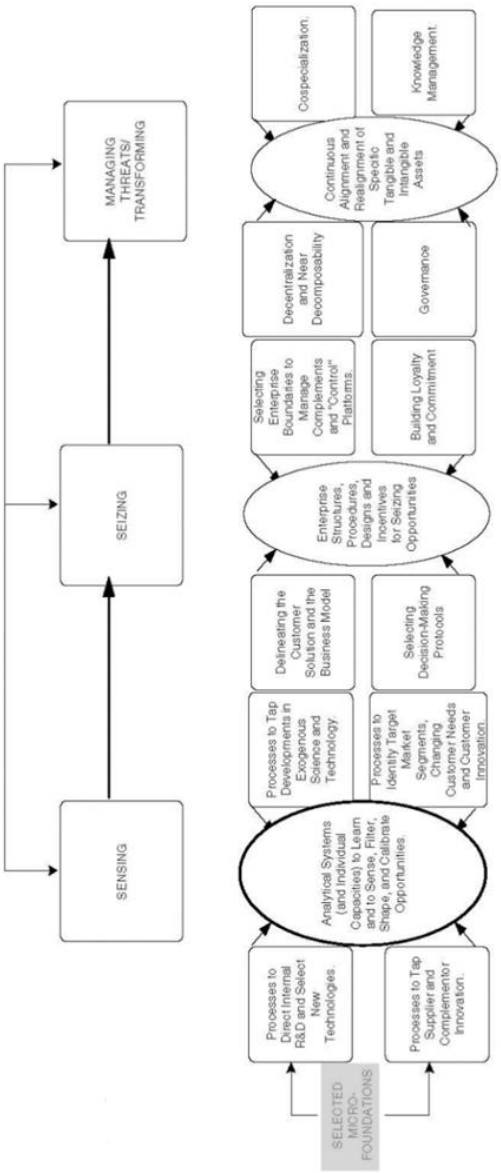


Figure 3.2-6: David Teece "Dynamic Capabilities and Strategic Management: Organization for Innovation and Growth."

Organization development and organization structure is, to date, frequently conceptualized as the effect of the dynamic process of interaction between strategic activities and environmental boundaries. Breslin (Breslin, 2014) argued that balancing the competing needs for exploitation and exploration, involves understanding how evolutionary systems at the different hierarchical levels of the organization interact. He suggested that when the organization's behavior is dominated by the exploitation of existing knowledge, the resultant socio-political situation leads to variations coming from lower levels within the organization being suppressed. Exploitation thus involves shifting selective pressures further up the hierarchy to the level of the organization. In these instances, individuals and groups evolve to conform to and fit within collective organization practices and associated socio-political status quo.

During times of exploration, a shift in emphasis towards evolutionary processes at the level of the individual and group is needed. Individuals thus learn to evolve through the mechanisms of variation-selection-retention [25, 73]. Variation is promoted by encouraging individuals at all levels to experiment and innovate [25], and this variation is the fuel of the evolutionary process, and the more innovation occurs, the greater the possibility more fit solutions to customer needs will be found. It was observed that shifting the emphasis from an all-powerful management [55, 56, 57] towards multi-level interactions throughout the organization's hierarchy.

In this manner, it was seen that, incremental, punctuated and chaotic change patterns were found, and crucially all of these were developed through the mechanisms of variation-selection-retention working at different hierarchical levels (individual, group and organization). These patterns were captured by the multi-level nature of the simulations

performed, which arguably would be missed with a focus on one level only [7]. By examining the interrelationship between managers and employees in this way, key aspects of managerial behavior are explored, complimenting research on the effects of management characteristics on organizational adaptation [6]. In brief, this study points to the need for management control both during times of stability AND transformational change.

Similarly, Hodgson (Hodgson, 2013) discussed that organization science has been keen to address processes of change in organizations and organizational populations. Terms such as ‘evolution’ and ‘co-evolution’ are common place but signify little. It is often unclear whether they refer to single entities or populations. With the development of the conceptual categories of generalized Darwinism, researchers into organizations are obliged to either adopt this framework or clarify the alternative type of evolutionary process involved. As yet, no adequate alternative framework exists for populations or organizations. In a situation, where it is required to explain the processes of competitive selection, the sources of variation, and the manner of replication of critical strategic information.

Moreover, in the past decade, scholars have highlighted that for organizational development and organization structure, their studies have taken heterogeneous directions of analysis for both applied and conceptual research (Baum, 2002); (Dosi, Levinthal, & Marengo, 2003); (Durand, 2006); (Lewin & Koza, 2001); (Lewin & Volberda, 2005). Similarly, Abatecola et al (Belussi, Abatecola, Breslin, & Filatotchev, 2015) in their paper on Darwinismdiscuss how do social organizations progress? How do they acclimatize to environmental requirements? What resources and capabilities are required for their survival? How they cope up with dynamic competition?

In general, it has become increasingly apparent that organizations continue to search for more optimized models as technology helps enables organic social change. The current OD models work best for the industrial and post-industrial era organizations they were designed around. Based on the literature surveyed, the following observations surface:

- There is no perfect model. Every structure has its pros and cons.

- Analysis of existing structure will always result in more optimized structure based on parameters that need to be measured or impacted.

- There will always be a need for accommodating inherent weaknesses of adopted structure.

- Each structure will require modification based on organizations strengths and weaknesses.

3.3. Summary of literature survey conducted in chronological order of research articles relevant to this research

Literature Reviewed	Literature Type	Author/s	Published Year	Contribution
Neither Market nor Hierarchy: Network Forms of Organization	Research Paper: Research in Organizational Behavior, 12, 295-336	Powell, W. W	1990	• The rise of technical work and the horizontal organization of technical workers increases collaboration and nonhierarchical communication.
A communication-based framework for group interfaces in computer-supported collaboration	Research Paper: System Sciences, Proceedings of the Twenty-Fourth Annual Hawaii International Conference. Vol. 3. IEEE,	Lim, Francis J., and Izak Benbasat	1991	• Framework to guide researchers in examining the communication needs of groups and their members in computer supported collaborative work • Their analysis consisted of four aspects: concurrency, content, path, and channel to help understand communication flows • Their Framework was intended to encourage a detailed focus on key aspects of the group interface, to provide a scheme for categorizing the contributions of empirical work.

Literature Reviewed	Literature Type	Author/s	Published Year	Contribution
The Turn to a Horizontal Division of Labor: On the Occupationalization of Firms and the Technization of Work	Research Paper: National Center for the Educational Quality of the Workforce, University of Pennsylvania	Barley, S	1994	• The rise of technical work and the horizontal organization of technical workers increases collaboration and nonhierarchical communication.
Communication across boundaries: Work, structure, and use of communication technologies in a large organization	Research Paper: Organization Science 6.4 (Page 373-393)	Hinds, Pamela, and Sara Kiesler	1995	• Collaborative nature of work and the way employees are organizedin work groups • Technical employees, as compared with administrative employees, prefer cross-boundary communications
Asynchronous computer-mediated communication versus face-to-face collaboration: Results on student learning, quality, and satisfaction	Research Paper: Group Decision and Negotiation 8.5: 427-440.	Ocker, Rosalie J., and Gayle J. Yaverbaum	1999	• Found out that using asynchronous computer conferencing technology as a means of collaboration was as effective as face-to-face collaboration in terms of learning, quality of the solution, solution content, and satisfaction with the solution quality.

Literature Reviewed	Literature Type	Author/s	Published Year	Contribution
Task and technology fit: a comparison of two technologies for synchronous and asynchronous group communication	Research Paper: Information & Management 36.3: 139-150.	Shirani, Ashraf I., Mohammed HA Tafti, and John F. Affisco	1999	• Increasing use of emerging communication technologies for collaborative work and group communication • Organizations must recognize the benefits as well as the limitations of these technologies for communication effectiveness • Their controlled experiment suggested that synchronous communication generated more total and basic ideas to resolve the problem, however, using asynchronous communication resulted in much deeper problem analysis.
Membership size, communication activity, and sustainability: A resource-based model of online social structures	Research Paper: Information systems research 12.4 (): 346-362.	Butler, Brian S	2001	• Members contribute time, energy, and other resources, enabling a social structure to provide benefits for individuals • These benefits could include information, influence, & social support, are the basis for a social structure's ability to attract & retain members.

Literature Reviewed	Literature Type	Author/s	Published Year	Contribution
Social identity, group processes, and performance in synchronous computer-mediated communication	Research Paper: Group Dynamics 8 (): 27-39.	Michinov, Nicolas, Estelle Michinov, and Marie-Christine Toczek-Capelle	2004	• Examined group processes in a synchronous context and their effects on performance leading to suggestions to invite more thorough examination of the impact of social identity on the building of a sense of online community at the early stage of a learning process within education.
A model for content and communication management in synchronous learning	Research Paper: Journal of Educational Technology and Society 8.3: 187-205.	Raymond, D., Kanenishi, K., Matsuura, K., Baudin, V., Gayraud, T., Yano, Y., & Diaz, M.	2005	• Proposed a new model called CCMS (Content and Communication Management System) for synchronous collaboration activities within a group of distributed learners where asynchronous collaboration would have prevailed.

Literature Reviewed	Literature Type	Author/s	Published Year	Contribution
Structures that work: social structure, work structure and coordination ease in geographically distributed teams	Proceedings of the 2006 20th anniversary conference on Computer supported cooperative work. ACM	Hinds, Pamela, and Cathleen McGrath	2006	• Correlational study of 33 Research and Development (R&D) teams, found that in contrast to smooth coordination in collocated teams, the opposite is true for geographically distributed teams • An informal hierarchical structure was associated with more smooth coordination on distributed teams.
Communication mapping: understanding anyone's social network in 60 minutes	Research Paper: Proceedings of the 2007 conference on Designing for User Experiences. ACM	Adams, Paul	2007	• How Google designs successful user experiences for its communication products emphasized on the importance to understand users' communication behaviors beyond what they do with the product itself • In his research paper he described a technique for building an understanding of people's social networks and communication tools by only spending 60 minutes each with a small number of research participants and described examples of the type of insights the technique can yield.

Literature Reviewed	Literature Type	Author/s	Published Year	Contribution
Explicating Dynamic Capabilities: The Nature and Micro foundations of (Sustainable) Enterprise Performance	Strategic Management Journal	Teece, D J	2007	• Discussed the idea that Dynamic Capabilities of the organization is the ability to determine whether the organization is performing the right activities, and then effectuate necessary change that can be in modification of the resource base.
Impact of Communication Patterns, Network Positions, and Social Dynamics Factors on Learning among Students in a CSCL Environment."	Electronic Journal of e-Learning Volume 7 Issue 1, 71 - 84.	Sundararajan, B.	2009	• Emergence of Respect (whether real or perceived and not very different from esteem) as a social factor, which is important to people to validate themselves and the skills they bring to the table in collaborative work situations • Influence of a group and motivation to actively collaborate and not be a free rider, follow from the respect that the individual gets from the group.

Literature Reviewed	Literature Type	Author/s	Published Year	Contribution
Organizational structure for the twenty-first century	Research Paper: Presented at the annual meeting of The Institute for Operations Research and Management Sciences, Austin.	Lim, M., G. Griffiths, and S. Sambrook	2010	• Developed the EMWSO framework (Environment-Management-Workers-Customers-Structure-Outcome) framework of organizational structure development, and used it to argue that the bureaucratic structure is inadequate for coping with current expectations.
Collaborative learning processes in an asynchronous environment: an analysis through discourse and social networks	Research Paper: Journal of Latin American Communication Research 2.1: 115-146.	Tirado, Ramón, Ignacio Aguaded, and Angel Hernando	2011	• Hypothesized that many-to-many communication is more important in collective knowledge generation processes than dyadic or triadic communication but strongly suggested that further research is needed to establish link between social relations and positive interdependence or to the creation of meaning and the properties of the social network.

Literature Reviewed	Literature Type	Author/s	Published Year	Contribution
Transformable boundary artifacts for knowledge-based work in cross-organization virtual communities spaces	Research Paper: Intelligent Decision Technologies 5.1: 65-82.	D.Akoumianakis, N. Vidakis, G. Vellis, D. Kotsalis, G. Milolidakis, A. Plemenos, A. Akrivos and D. Stefanakis.	2011	• Elaborated on the design and use of cross-organization virtual community spaces facilitating knowledge based collaborative engagement in the practice of a boundary spanning alliance, which explores social dynamics of cross-organizational virtual groups and their emergent behavioral patterns.
Communicating in a Collaborating Group: A Longitudinal Network Analysis	Research Paper: Communication Monographs 79.4: 448-474.	Walker, Kasey L., and Cynthia Stohl	2012	• Their research examined the emergent task communication and resource dependency networks, and their results provided general support for the hypothesized collaborative dynamics that distinguish collaborations from more traditional organizational forms. • Organizations are entering into multiple collaborative relationships across sectors and nations.

Literature Reviewed	Literature Type	Author/s	Published Year	Contribution
Mining social relationship types in an organization using communication patterns	Research Paper: Proceedings of the 2013 conference on Computer supported cooperative work. ACM	Choi, Jinhyuk, Seongkook, Jaehyun Han, Geehyuk Lee and Junehwa Song	2013	• Study to find useful indicators for inferring social relationship types among people in contact with each other during their daily lives, using their communication patterns within an organization • They showed that there was a high possibility of inferring social relationship type with a small amount of easily obtainable data. • Using the inferred social relationship types, there is a possibility of building an intelligent system that can enhance communication.
Understanding organizational evolution: Toward a research agenda using generalized Darwinism	Organization Studies, 34(7)	Hodgson, G M	2013	• Discussed that organization science has been keen to address processes of change in organizations and organizational populations.

Literature Reviewed	Literature Type	Author/s	Published Year	Contribution
Calm in the storm: Simulating the management of organizational co-evolution	Futures, 57(1)	Breslin, D	2014	• Argued that balancing the competing needs for exploitation and exploration, involves understanding how evolutionary systems at the different hierarchical levels of the organization interact.
Research in organizational evolution. What comes next?	European Management Journal, 32(3)	Abatecola, G	2014	• Organization development and organization structure has been associated with different facets regarding competition, such as strategic renewal, technological innovation, industrial dynamics, absorptive capacity, or networks' formation
Darwinism, organizational evolution, and survival: key challenges for future research	Springer Science+Business Media	Belussi, F; Abatecola, G; Breslin, D; Filatotchev, I	2015	• Discussed how do social organizations evolve? How do they adapt to environmental pressures? What resources and capabilities determine their survival within dynamic competition?

Table 3.3-1: Chronological order of research done, researcher, and contribution

3.4. Summary

This chapter provided an overview of the existing research on organizational development and organization structures. Literature survey conducted has helped this research to establish the historical development that has taken place and the areas in which future research is required. The next chapter will develop this background and the future direction of research to develop the conceptual framework that will guide the rest of the research.

Chapter 4: Development of Conceptual Framework

4.1. Overview

The previous chapter provided a background of the literature in the broader areas of organizational development, social impact on organization development as well as various factors contributing to changing landscape of modern organization structure. This chapter develops the literature review further by focusing specifically social, synchronous and asynchronous communication and collaboration tools with the help of existing publications in this area. Through reviewing this literature, and referring to the key literature identified in the previous chapter, a conceptual framework is built to guide this research project.

4.2. Current Models and Theories of Organization Development

According to Jones and Brazzel (Jones & Brazzel, 2005), "organization development has been around since the late 1950's and early 1960's" (p.13). French and Bell (French & Bell Jr., 1999)confirm this time frame; however, they suggest that Organizational Development (OD) is "a field that offers an integrated framework capable of solving more of the important problems confronting the human side of organisations" (Ibid, p.1). As such, one might question what took place in these years to spark a need to deal with the human side of organizations. A primary societal response that drove the need for further OD evolution was the increased action of civil rights activities during 1960's in the United States. Changes in the discrimination laws in the United States resulted in a shifting of organizational structures to meet the new regulations. It is observed through this evolution of this directional change on how OD models have evolved from a focus on the structure to focus on the individual.

4.2.1. Kurt Lewin and Followers

One applicable and active theory of organizational development and change is the equilibrium theory as developed primarily by Lewin. In essence, this theory finds the balance point between desirable and non-desirable behaviors that OD practitioners and industrial/organizational psychologists use to move the equilibrium point to one side or the other to gain ideal results. As an initial concept from the early 1940's today's practitioners will find that Lewin's "concept is useful for thinking about the dynamics of change situations" (French & Bell Jr., 1999). Finally, Lewin's second idea mirrors the first in the basic idea that the behavior can be moved by unfreezing, moving, and freezing behavioral traits found within the change process. Ronald Lippitt, Jeanne Watson, and Bruce Westley later introduced Lewin's second theory broken down into seven stages that afford practitioners the ability to narrow in better on the consulting process of organizational development. Lewin's Three-Step Change Model is shown below in Figure 4.2-1.

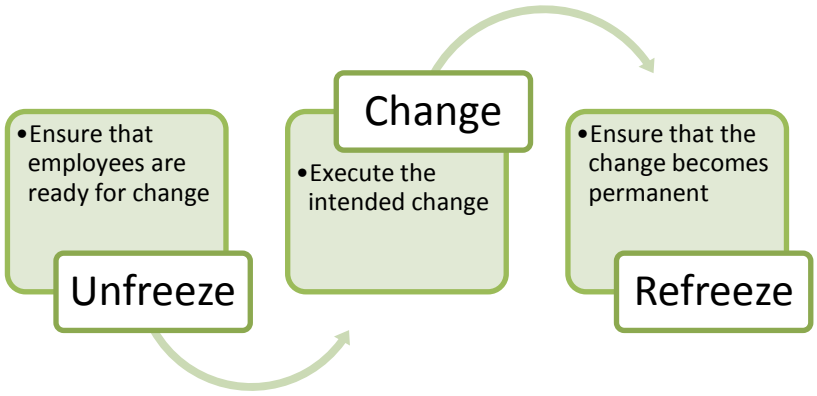


Figure 4.2-1: Lewin's Three-Step Change Model

4.2.2. The Burke-Litwin Model of Organizational Change

Warner Burke and George Litwin developed the Burke-Litwin model of organizational change. The model helps OD practitioners define areas of first-order and second-order change. The premise of the Burke-Litwin model is: "OD interventions directed toward structure, management practices, and systems (policies and procedures) result in first-order change. Interventions directed towards mission and strategy leadership and organization culture result in second-order change" (French & Bell Jr., 1999). This model became the foundation of what is now known as transactional and transformational leadership. Through this model, an organization can split the needed changes between task-related needs and non-tangible needs. One of the primary challenges of the Burke-Litwin model is the difficulty in using the model to apply to individual behavioral development within an organization. As shown in Figure 4.2-2 this challenge results from the positioning of the individual as a receiver rather than a sender of organizational messaging.

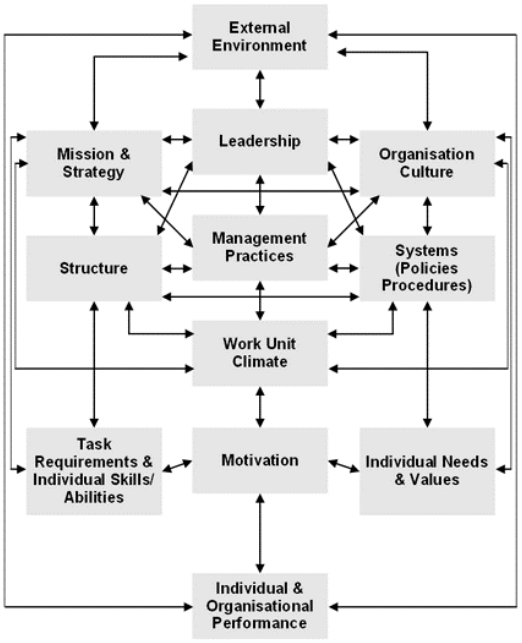


Figure 4.2-2: Burke-Litwin Change Model

4.2.3. Porras and Robertson Model of Organizational Change

Porras and Robertson developed the model of Organization Change based by focusing on individual behavior. Their proposition was that the overall disposition of the organization could be impacted through individual behavior. French and Bell (French & Bell Jr., 1999) agreed with researchers that through focusing on what is "expected, required, and rewarded", OD practitioners can obtain the desired work behaviors. Porras and Robertson model of organization change is shown below in Figure 4.2-3.

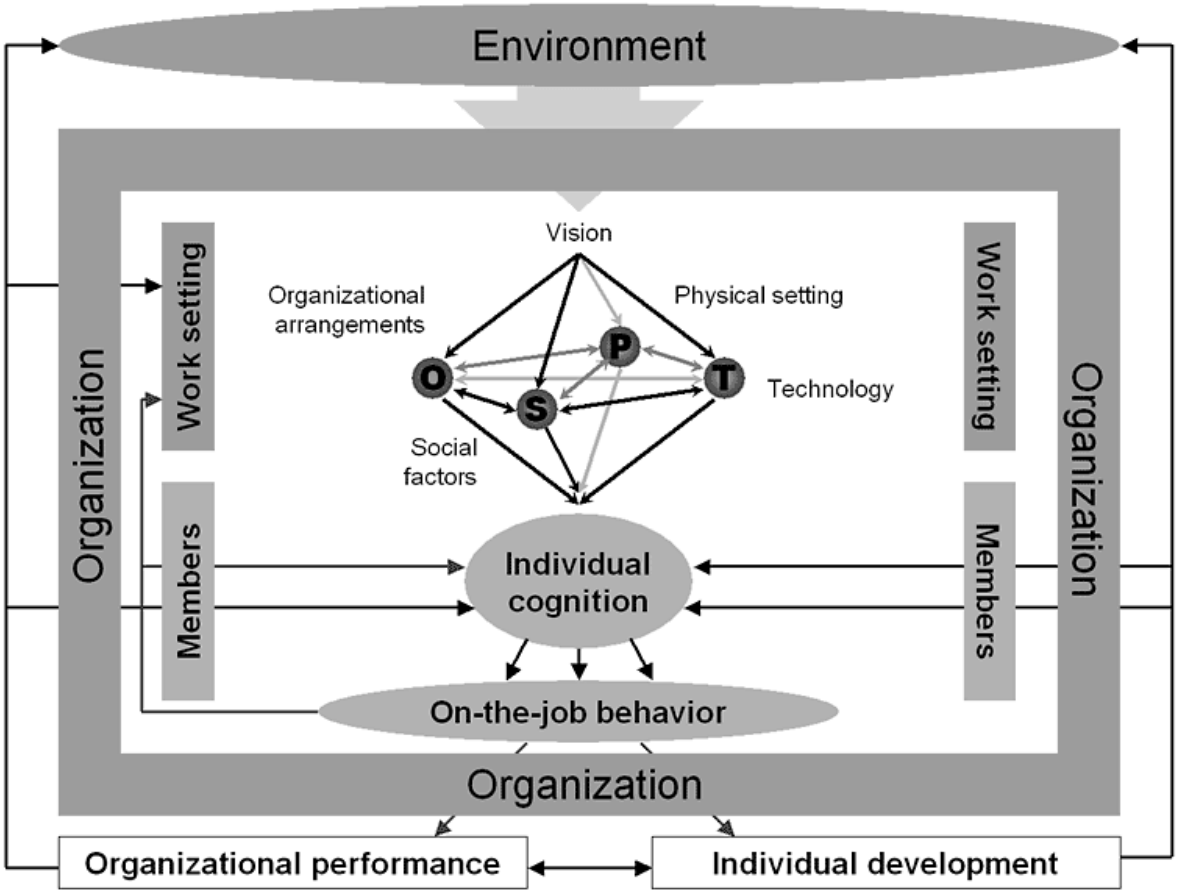


Figure 4.2-3: Overview of model by Porras and Robertson

4.2.4. Weisbord's Model (The Six Box Model)

Developed by analyst Marvin Weisbord, the six-box model is a generic framework representing a particular way of looking at organizational structure and design. The model was intended for use across a wide variety of organizations and is shown below in Figure 4.2-4.

The six-box model is based on the book "Organizational Diagnosis: A Workbook of Theory and Practice," by Marvin Weisbord (Weisbord, 1978). The model gives attention to issues such as planning, incentives and rewards, the role of support functions such as personnel, internal competitions among organizational units, standards for remuneration, partnerships, hierarchies and the delegation of authority, organizational control, accountability and performance assessment. The model also follows the basic 'systems' approach to organizational functioning including the well-known 'inputs' and 'outputs' categories. The six-box model is comprised of the following components: Purposes, Structure, Relationships, Rewards, Leadership and Helpful Mechanisms.

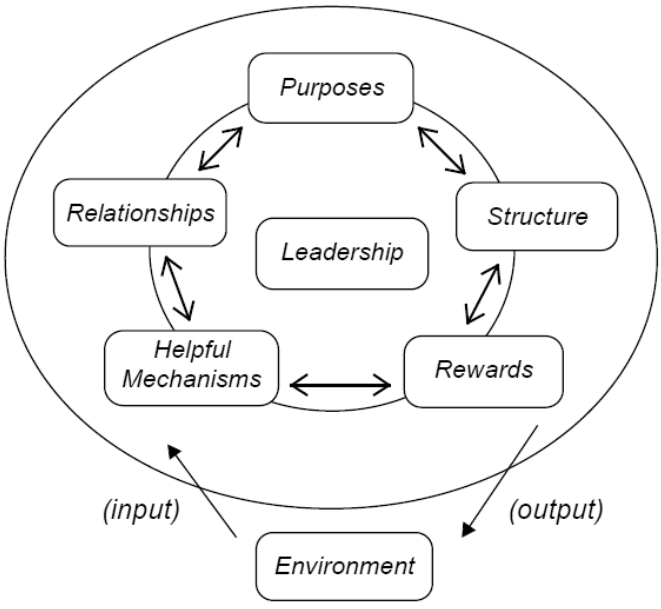


Figure 4.2-4: Weisbord Six Box Model

4.2.5. Institutional and Organizational Model (IOA Model)

The IOA model aims to help an organization define and improve its overall performance through analyzing its environment, motivation, and capacity and is shown below in Figure 4.2-5.

Figure 4.2-5: Universalia Institutional and Organizational Assessment Model (IOA Model)

Through areas of performance, environment, motivation, and capacity, the model offers a methodology to diagnose institutional strengths and weaknesses.

The next few theories and models have been under research for several years. Each of them ties in with the previous theories identified in this paper in one way or another. However, the following theories seemed focused towards more contemporary and even futuristic model of thinking.

4.2.6. Systems Theory

The Systems Theory was developed by Ludwig von Bertalanffy and identifies that organizations are “open systems that exchange with the environment” (French & Bell Jr., 1999). In theory proposed that in majority of cases, organizations work in an input and output environment and being open systems, they communicate with the environment and can be receptive to changes needed from feedback from their environment. Organizational development under the systems theory is very common. However, one of the risks of this approach is inability to gather data from the areas that feed this approach.

Ludwig Von Bertalanffy General System Theory is represented below in Figure 4.2-6.

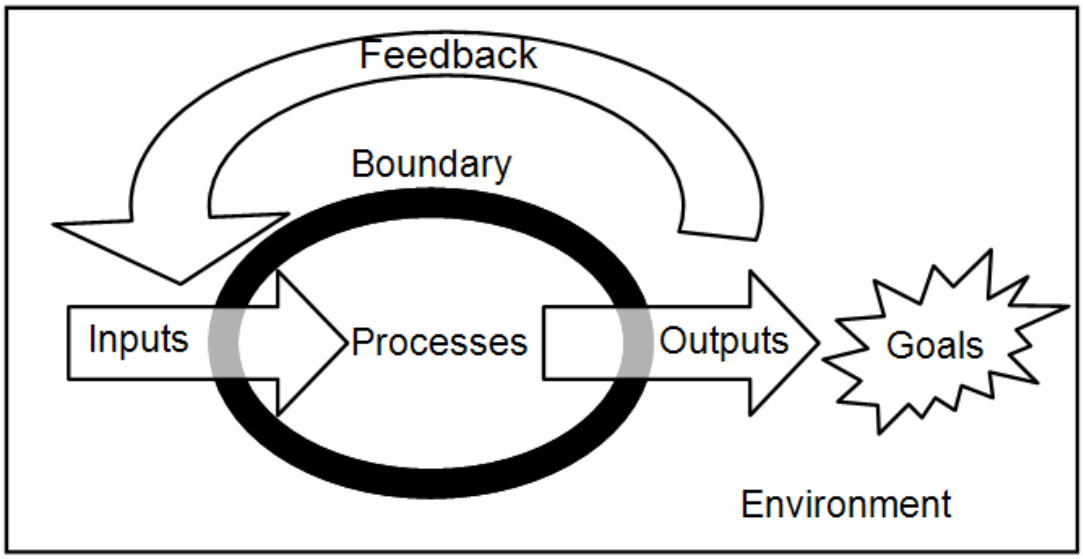


Figure 4.2-6: Ludwig Von Bertalanffy General System Theory

4.2.7. Participation and Empowerment

Participation and Empowerment allows for sharing of power throughout the organization and is most successful in customer service organizations. Organizations using this approach are specifically designed to increase participation of organizational members. According to French and Bell (French & Bell Jr., 1999) the primary goal is to, "involve all those who are part of the problem or part of the solution," and "Have decisions made by those who are closest to the problem". As a result, the organization can have better chances of becoming leaders in their industries.

4.2.8. Teams and Teamwork

The final model of OD is teams and teamwork. Teams and teamwork have been existing for a long period; however, the approach to OD through teams and teamwork is relatively modern. Work teams are the building blocks of organizations (French & Bell Jr., 1999). As a result, work teams, teamwork are some of the most popular findings in today's organizations.

The power of teams and teamwork has been primarily found in the area of social interactions between team members. However, research is still in progress to explore why some teams are successful whereas other teams tend to seek power found in teams.

4.3. Current Models and Theories of Organization Structure

Organizational structure is how an organization achieves its goals through smart organization of people and jobs such that goals can be met based on the work performed. When an organization is small, the formal structure is unnecessary as most communication is face-to-face. However, in a larger organization, decisions and delegation needs to be carried out for various tasks. These decisions and delegations need to be established using robust procedures that assign responsibilities for different functions. The decisions, delegation and processes determine the organizational structure.

In an organization, employees' responsibilities are defined by their job function, their reporting structure, and for managers, their span of control. Over time, these definitions find their way into the job description of positions rather than to particular individuals. The best structure for any organization depends on many factors including the work it does, its size in terms of employees, revenue, geographic dispersion of its facilities, and the range of its businesses i.e. degree of its diversification across markets.

Organizations can have multiple structural variations, but there are core principles and commonly used patterns that apply to all organization types. The following sections explain these patterns and provide the historical context from which some of them arose.

4.3.1. Organizational Structure during the Twentieth Century

Understanding the historical context from which organizational structures have developed helps to explain why some patterns dominate one industry or another. For instance, why do vertical hierarchies dominate? Why do horizontal hierarchies exist? This section will discuss how organizational structures have an inertia mostly brought through the managerial task required to bring in this change.

German sociologist and engineer Max Weber had concluded in late 18th century that when societies embrace capitalism, bureaucracy is the inevitable result. Since his theories were not translated into English until 1949, Weber's work had little influence on American management practice until the middle of the twentieth century.

As Industries shifted to mass productio, Frederick Taylor in the United States and Henri Fayol in France, studied the new systems and developed new insights on how to structure organizations for the greatest efficiency and productivity, which in their view was very much like a machine.

As a result, Management in mid-19th century was influenced by Weber bureaucratic management, Taylor's scientific management, and Fayol's ideas of invoking unity within the chain-of-command, authority, discipline, task specialization, and other aspects of organizational power and job separation.

The result was vertically-structured organizations characterized by distinct job classifications and top-down authority structures. This became known as the traditional or classical organizational structure.

4.3.2. Traditional Organizational Structure

While the previous section explained the emergence of the traditional organizational structure, this section provides additional detail regarding how this affected the practice of management.

The structure of every organization is unique in some respects. However, all organizational structures developed or are consciously designed to enable the organization to accomplish its core objectives. Typically, the structure of an organization evolves as the organization grows and changes over time.

Researchers identify four basic decisions that managers make as they develop an organizational structure. First, the organization's work must be divided into specific jobs. Second, the jobs must be grouped in some way. Third, the number of people and jobs that are to be grouped together must be decided. Fourth, the way decision-making authority is to be distributed must be determined.

These four decisions are also sometimes referred to as division of labor departmentalization, span of control and decision-making authority. In making each of these design decisions, a range of choices are possible.

The traditional model of the organizational structure is thus characterized by high job specialization, functional departments, narrow spans of control, and centralized authority.

The traditional model of the organizational structure is easily represented in a graphical form by an organizational chart. It is a hierarchical or pyramidal structure with an

executive at the top, a small number of vice presidents or senior managers, and several layers of management below, with the majority of employees at the bottom of the pyramid.

The number of management layers depends largely on the size of the organization. The jobs in the traditional organizational structure usually are grouped by function into departments. Figure 4.3-1 illustrate such an organization grouped by functional areas of operations, marketing, and finance.

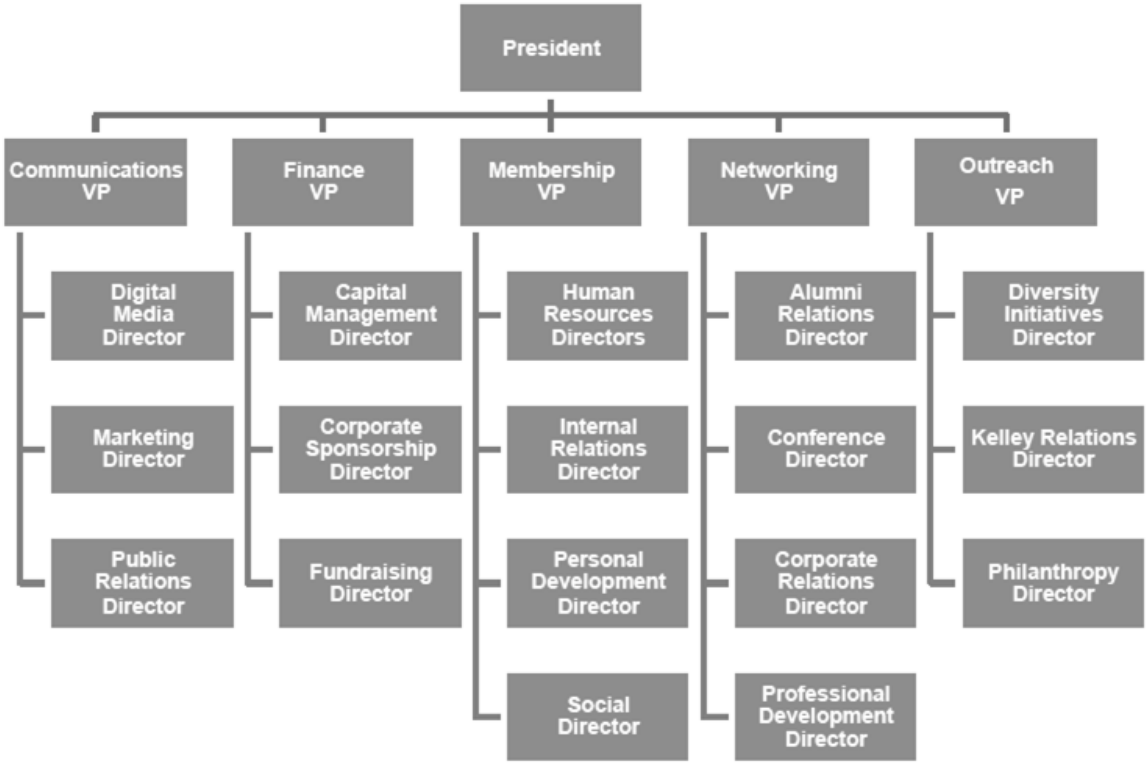


Figure 4.3-1: Typical Functional Organizational Structure

4.3.3. Departmentalization

In different parts of the organization, jobs are grouped based on various factors. These factors play a fundamental role in shaping the organization. There are many types of organization structures possible and the most commonly used are discussed in subsequent sections.

4.3.3.1. Functional Departmentalization

Organization which groups resources based on the type of job to be performed in order do its work as known as Functional departmentalization and is shown in Figure 4.3-2. For example, key functions of a company may include production, purchasing, marketing, accounting, and personnel. There a unique advantage of using functions as the basis for structuring the organization. The most common advantage is development of expertise and efficiency by grouping jobs that require the same knowledge, skills, and resources. A disadvantage of functional groupings is that people develop a narrow departmental focus leading to organizational goals being sacrificed in favor of departmental goals. Additionally, there are management challenges in coordination of work across functional boundaries, especially as the organization grows and spreads to multiple geographical locations.

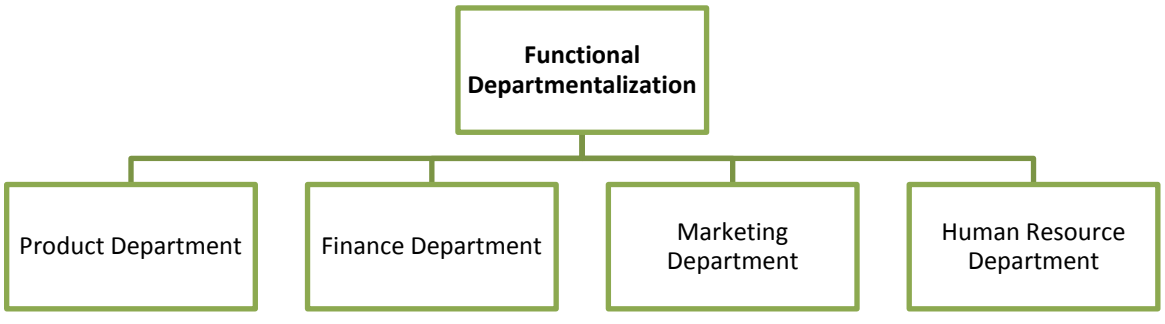


Figure 4.3-2: Example of Functional Departmentalization

4.3.3.2. Geographic Departmentalization

When organizations are spread over a wide area, it is advantageous in organizing along geographic lines. This helps by having all the activities performed in a region being managed together. This structure is commonly referred as Geographic departmentalization and is in Figure 4.3-3.

In a large organization, simple physical separation makes centralized coordination more difficult. Also, important characteristics of a region may make it advantageous to promote a local focus.

Companies that market products globally sometimes adopt a geographic structure. Also, experience gained in a regional division is often excellent training for management at higher levels.

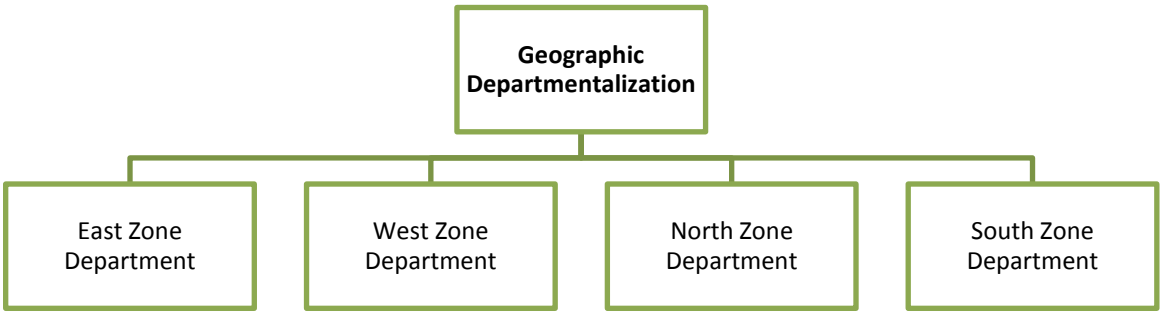


Figure 4.3-3: Example of Geographic Departmentalization

4.3.3.3. Product Departmentalization

When large, diversified companies are organized based on the products they produce, it is referred to as Product departmentalization and is shown in Figure 4.3-4. In this structure, all the activities necessary to produce and market a product or group of similar products are grouped together.

The advantage of this type of structure is that the top manager of the product group typically has considerable autonomy over the operation. In addition, personnel in the group can focus on the specific needs of their products, becoming experts in its development, production, and distribution.

One of the major disadvantages of this structure is the duplication of resources. Each product group ends up duplication the key functional areas such as marketing, finance, production, and other functions.

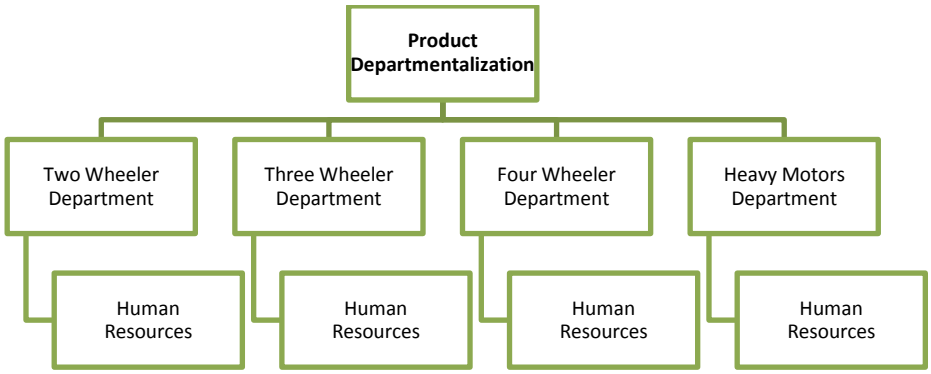


Figure 4.3-4: Example of Product Departmentalization

4.3.3.4. Process Departmentalization

In process departmentalization, departments are separated based on their role in a production process as shown in Figure 4.3-5. The best example of process departmentalization can be observed in a hospital where there may be a radiology department, surgery department, and so on.

Specialization is the unique advantage to this type of departmentalization is that it allows for people in the department to focus on one task, and the managers can be expert in that task.

Isolation of the department from the other parts of the process is the greatest disadvantage of this type of departmentalization leading to department becoming excessively concerned with its function instead of concentrating on the best way to benefit the overall production process and the organization as a whole.

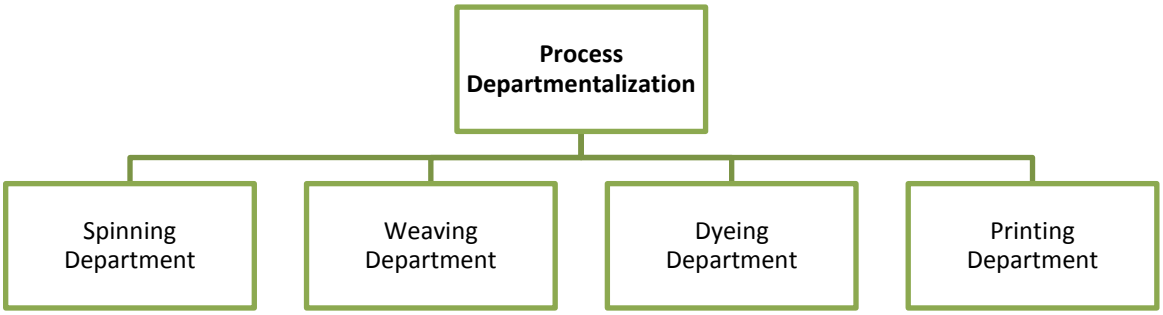


Figure 4.3-5: Example of Process Departmentalization

4.3.3.5. Customer/Market Departmentalization

An organization may find it advantageous to organize according to the types of customers it serves thereby making its personnel becoming proficient in meeting the needs of these different customers as shown in Figure 4.3-6.

Being customer focused is the unique advantage to this type of departmentalization it leads to customers receiving best service as well as attending to unique requirements of specific customers.

The greatest disadvantage of this type of departmentalization is that co-ordination may appear difficult between different departments and other enterprise functions. Also, is there is downward movement of specialization to any specified group of customers; the specialized workforce may become idle.

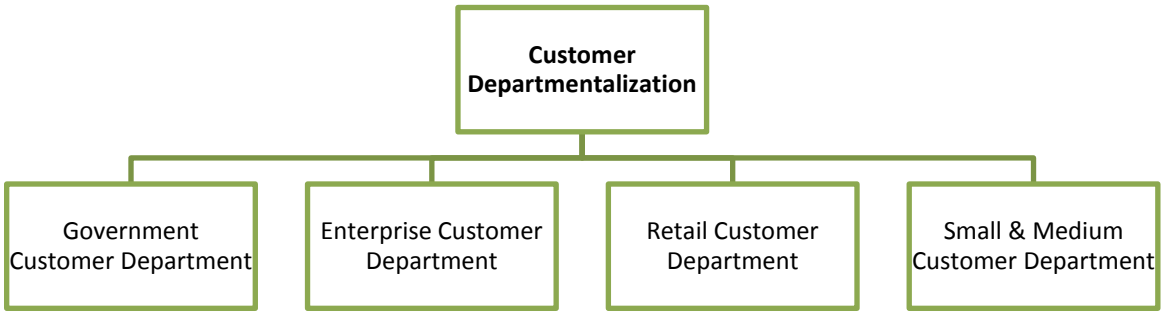


Figure 4.3-6: Example of Customer Departmentalization

4.3.3.6. Combined Departmentalization

An organization may find it advantageous to organize in a mixture or combination or union of two or more different bases of departmentalization as represented in Figure 4.3-7.

The greatest advantage to this type of departmentalization is that it allows for specialization. The people in the department are focused on one task, and the managers can be expert in that task.

The greatest disadvantage of this type of departmentalization is that it isolates the department from the other parts of the process. The department may become excessively concerned with its function instead of acting in ways that will benefit the overall production process and firm.

Figure 4.3-7: Example of Combined Departmentalization

4.3.4. Matrix Organizational Structure

Some organizations find that none of the aforementioned structures meets their needs. One approach that attempts to overcome the inadequacies is the matrix structure, which is the combination of two or more different structures. A good example is product group wanting to develop a new addition to its product line. In order to secure the best resources for this project, personnel from functional departments such as research, engineering, production, and marketing are sought. These personnel then work under the manager of the product group for the duration of the project, which can vary significantly.

The challenges which arise in matrix management situations as the personnel responsible is split between two or more managers (as shown in Figure 4.3-8) resulting in conflicts around resource scheduling, pay or merit raises and promotions.

One advantage of a matrix structure is that it facilitates the use of highly specialized staff and equipment. Rather than duplicating functions, resources are shared as needed. In some cases, highly specialized staff may divide their time among more than one project. In addition, maintaining functional departments promotes functional expertise, while at the same time working in project groups with experts from other functions fosters cross-fertilization of ideas.

The disadvantages of a matrix organization arise from the dual reporting structure. The organization's top management must take particular care to establishing proper procedures for the development of projects and to keep communication channels clear so that potential conflicts do not arise and hinder organizational functioning. In theory at least, top management is responsible for arbitrating such conflicts, but in practice power struggles

between the functional and product manager can prevent successful implementation of structural matrix arrangements. Besides the product/function matrix, other bases can be related in a matrix.

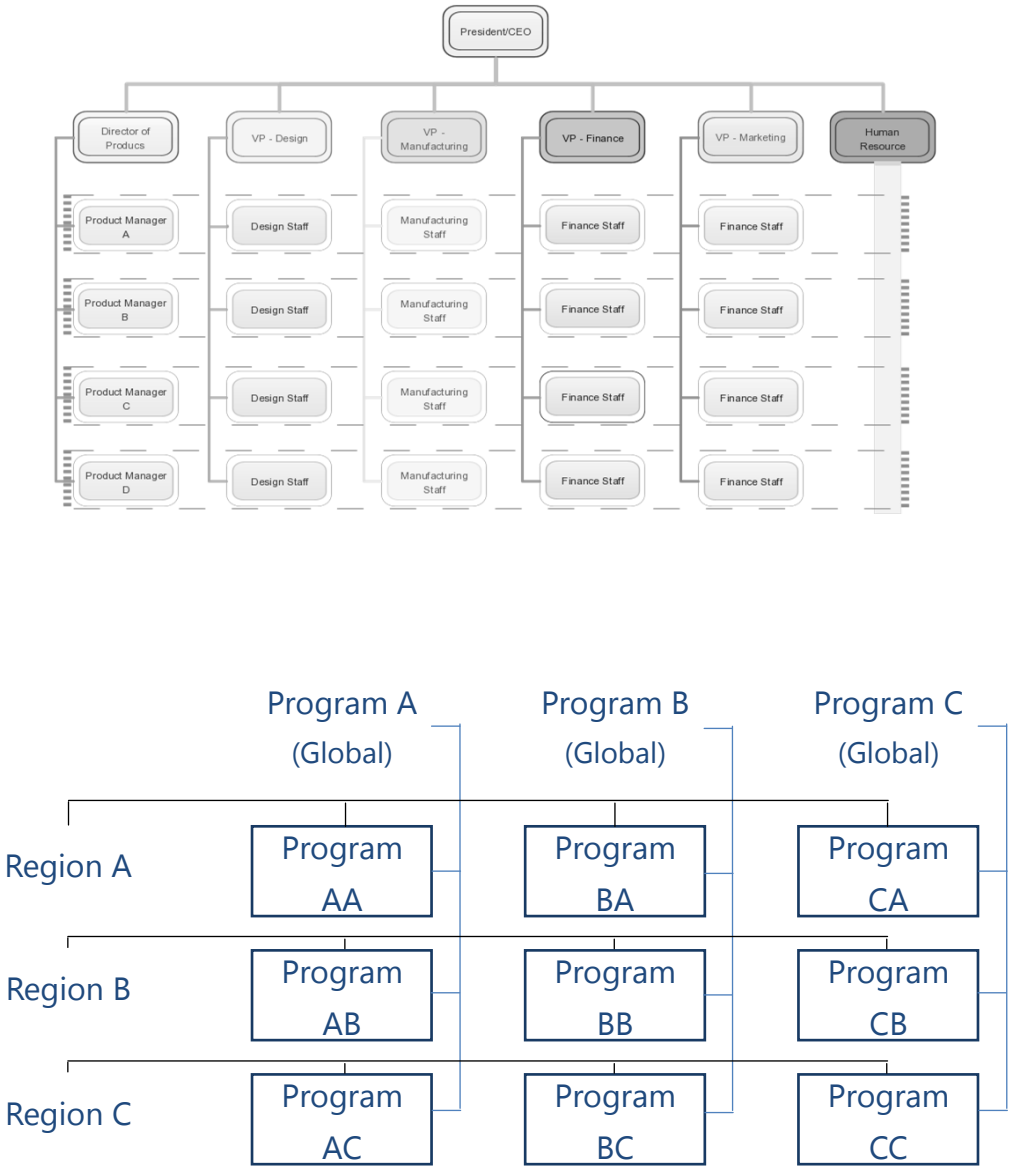


Figure 4.3-8: Examples of Matrix Organization Structure

4.3.5. Strategic Business Units

As corporations expanded, they often restructure as a means of revitalizing the organization. Growth of a business often is accompanied by a growth in bureaucracy, as positions are created to facilitate developing needs or opportunities One approach to encourage new ways of thinking and acting is to reorganize parts of the company into largely autonomous groups, called Strategic Business Units (SBUs). SBUs are often are set up like separate companies, with full profit and loss responsibility invested in the top management of the unit; often the president of the unit and/or a senior vice president of the larger corporation. This manager is responsible to the top management of the corporation. This arrangement can be seen as taking any of the aforementioned departmentalization schemes one-step further.

The SBUs might be based on product lines, geographic markets, or other differentiating factors as shown in Figure 4.3-9.

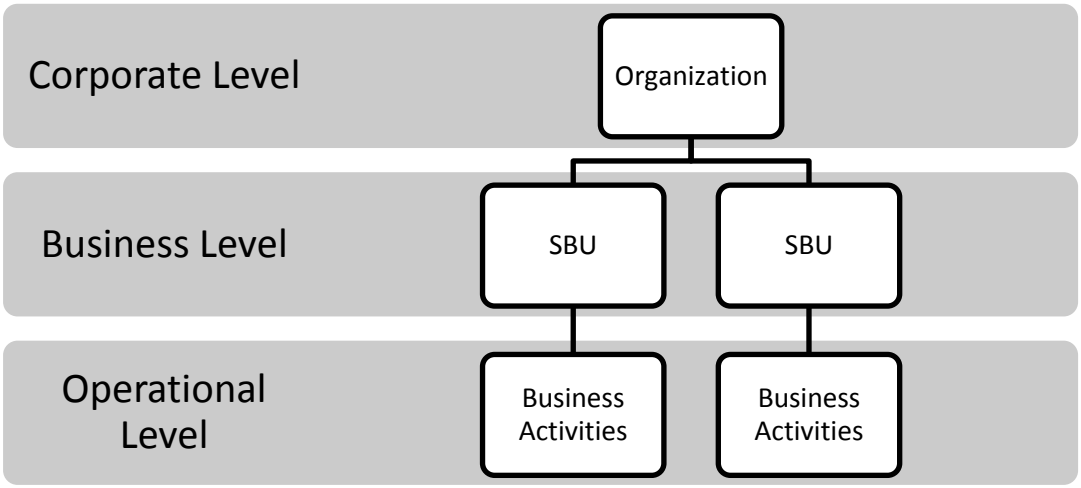


Figure 4.3-9: Example of Strategic Business Units

4.3.6. Emerging trends in organizational structure

Except for the matrix organization, all the structures described above focus on the vertical organization; that is, who reports to whom, who has responsibility and authority for all parts of the organization. Such vertical integration is sometimes necessary, but may be a hindrance in rapidly changing environments. A detailed organizational chart of a large corporation structured on the traditional model would show many layers of managers with decision-making locked into the vertically upward and execution flowing mostly down the layers. In general terms, this is an issue of dependence.

In any organization, the different people and functions do not operate completely independently. To a greater or lesser degree, all parts of the organization need each other. Important developments in organizational design in the last few decades of the twentieth century and the early part of the twenty-first century have been attempts to understand the nature of interdependence and improve the functioning of organizations with respect to this factor.

One approach is to flatten the organization, to develop the horizontal connections and de-emphasize vertical reporting relationships. At times, this involves simply eliminating layers of middle management.

In a virtual sense, technology is another means of flattening the organization. The use of computer networks and software designed to facilitate group work within an organization can speed communications and decision-making. Even more effective is the use of intranets to make company information readily accessible throughout the organization. The rapid rise of such technology has made virtual organizations and boundary less organizations possible,

where managers, technicians, suppliers, distributors, and customers connect digitally rather than physically.

A different perspective on the issue of interdependence can be seen by comparing the organic model of an organization with the mechanistic model. The traditional, mechanistic structure is characterized as highly complex because of its emphasis on job specialization, highly formalized emphasis on definite procedures and protocols, and centralized authority and accountability.

Despite the advantages of coordination that these structures present, they may hinder tasks that are interdependent. In contrast, the organic model of organization is relatively simple because it de-emphasizes job specialization, is relatively informal, and decentralizes authority. Decision-making and goal-setting processes are shared at all levels, and communication ideally flows more freely throughout the organization.

A common way for modern business organizations to move toward an organic organizational model is through the implementation of various kinds of teams. Some organizations establish self-directed work teams as the basic production group. Examples of self-directed teaming include production cells in a manufacturing firm or customer service teams in an insurance company.

At other organizational levels, cross-functional teams may be established, either on an ad hoc basis (e.g., for problem solving) or a permanent basis as the regular means of conducting the organization's work. Aid Association for Lutherans is a large insurance group that has adopted the self-directed work team approach. Part of the impetus for the organic

model is the belief that this kind of structure is more effective for employee motivation. Various studies have suggested that steps such as expanding the scope of jobs, involving workers in problem solving and planning, and fostering open communications bring greater job satisfaction and better performance.

Industry consolidation - creating huge global corporations through joint ventures, mergers, alliances, and other kinds of inter- organizational cooperative efforts - has become increasingly important in the twenty-first century. Among organizations of all sizes, concepts such as agile manufacturing, just-in-time inventory management, and ambidextrous organizations are impacting managers' thinking about their organizational structure. Indeed, few leaders were likely to implement the traditional hierarchical structure common in the first half of the century blindly. The first half of the twentieth century was dominated by the traditional one-size-fits-all traditional structure. The early twenty-first century has been dominated by the thinking that changing organizational structures while still a monumental managerial challenge, can be a necessary condition for competitive success.

4.4. Developing a Conceptual Framework

After conducting review of literature in the field of organization development specifically around dynamic organization structure based on collaboration patterns, a conceptual framework was developed to include a number of areas that have been extensively researched in the literature (refer to Chapter 3).

However, in terms of researching these concepts about their influence on dynamic organization structure, the literature provides little direction, and these are highlighted as propositions within the model developed.

The proposed model takes into account social, asynchronous, synchronous patterns of communication and collaboration while identifying the eight (8) influencing factors of Availability, Accessibility, Agreeability, Acceptability, Rewards & Recognition, Quest for Knowledge, Fear Factor and Social Power.

These eight factors are then independently mapped to the individual areas of research i.e. asynchronous and synchronous patterns of Social, Communication, and Collaboration. A subset of these eight influencing factors will be part of the factors influencing Social communication and collaboration. Similarly, a subset of these eight influencing factors will be part of the factors influencing Communication as well as Collaboration both synchronously as well as asynchronously.

With Communication as an electronic medium, the following variables that define its attributes: Asynchronous, Synchronous, Availability, and Accessibility emerge. This association is shown in Figure 4.4-1.

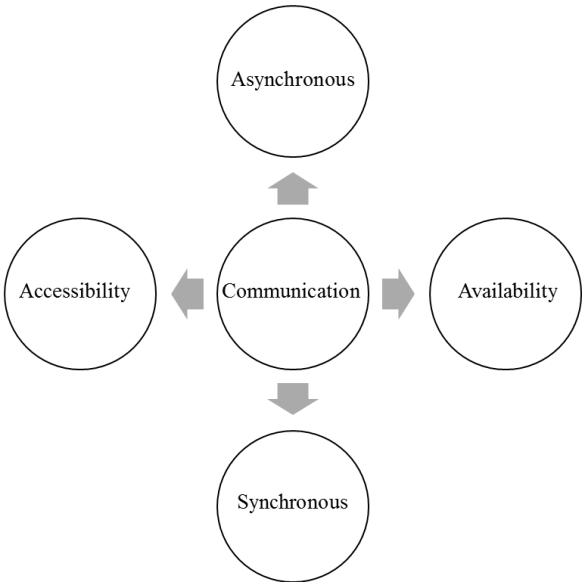


Figure 4.4-1: Communication and its influencing attributes

Based on the above, first hypothesis is developed which will be tested as part of this research. Both null, as well as an alternate hypothesis are presented here for reference.

Hypothesis $H1_0$: **Dynamic organization structures ***do not emerge*** based on Availability and Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Hypothesis $H1_a$: **Dynamic organization structures ***do emerge*** based on Availability and Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Next, with Collaboration as an electronic medium, the following variables that define its attributes: Asynchronous, Synchronous, Acceptability, and Agreeability emerge. This association is shown in Figure 4.4-2.

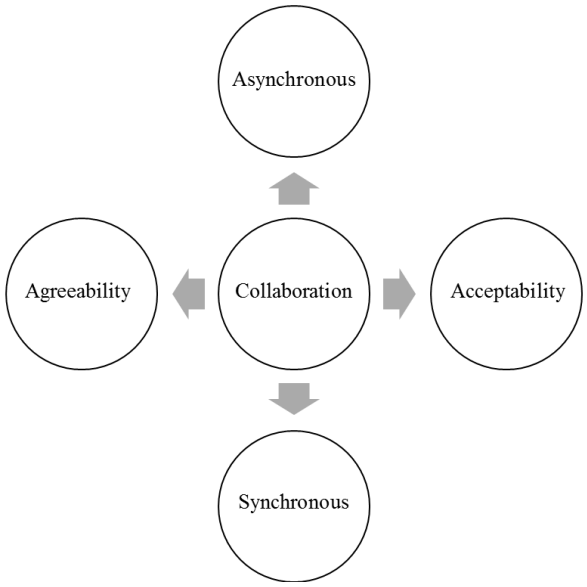


Figure 4.4-2: Collaboration and its influencing attributes

Based on the above, second hypothesis is developed which will be tested as part of this research. Both null, as well as an alternate hypothesis, are presented here for reference.

Hypothesis $H2_0$: **Dynamic organization structures ***do not emerge*** based on Agreeability and Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Hypothesis $H2_a$: **Dynamic organization structures ***do emerge*** based on Agreeability and Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Finally, with Social as a Communication and Collaboration medium, the following variables that define its attributes: Rewards & Recognition, Quest for Knowledge, Fear Factor, and Social Power emerge. This association is shown in Figure 4.4-3.

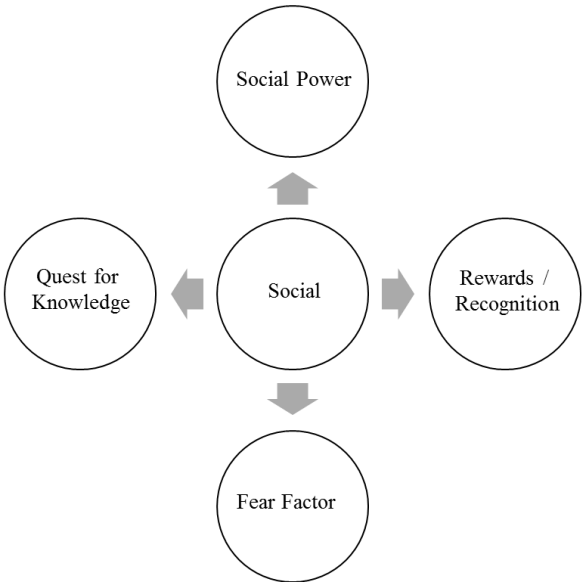


Figure 4.4-3: Social and its influencing attributes

Based on the above, third and fourth hypothesis are developed which will be tested as part of this research. Both null, as well as an alternate hypothesis are presented here for reference.

Hypothesis $H3_0$: **Dynamic organization structures ***do not emerge*** based on Rewards and Recognition and Quest for Knowledge, which result from social collaboration and communication using electronic tools.**

Hypothesis $H3_a$: **Dynamic organization structures ***do emerge*** based on Rewards and Recognition and Quest for Knowledge, which result from social collaboration and communication using electronic tools.**

Hypothesis $H4_0$: Dynamic organization structures *do not emerge* based on Fear-Factor and Social Power, which result from social collaboration and communication using electronic tools.

Hypothesis $H4_a$: Dynamic organization structures *do emerge* based on Fear-Factor and Social Power, which result from social collaboration and communication using electronic tools.

The premise of these hypotheses is to understand and establish the dynamics of organizational structures based on social, asynchronous and synchronous communication and collaboration patterns when using electronic communication tools in IT Industry and Education Institutes in Redmond, Washington, USA and Bangalore, Karnataka, India.

4.4.1. Hypothesis H1

Hypothesis H1 is based upon the construct that dynamic organization structures emerge when properly identified based on electronic asynchronous and synchronous communications tools and can impart business, human resource and social benefits for organization.

The impact of asynchronous and synchronous communication can be adjudged based on the two influencing factors including availability and accessibility.

Hypothesis $H1_0$: Dynamic organization structures *do not emerge* based on Availability and Accessibility status provided by asynchronous and

synchronous communication and collaboration using electronic tools.

Hypothesis $H1_a$: Dynamic organization structures *do emerge* based on Availability and Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.

Availability is the timely identification of resources with specific required skills within an organization that can help in achieving specified objectives. Electronic asynchronous and synchronous tools can help identify the availability of resources (Employee Address Book, Employee Skill directory, etc.) within the organization. The result is the formation of the following hypothesis.

Hypothesis $H1a_0$: Dynamic organization structures are *not dependent* on Availability status provided by asynchronous and synchronous communication and collaboration using electronic tools.

Hypothesis $H1a_a$: Dynamic organization structures are *dependent* on Availability status provided by asynchronous and synchronous communication and collaboration using electronic tools.

Accessibility is the timely access to resources with specific required skills within an organization that can help in achieving specified objectives. Electronic asynchronous and synchronous tools can help provide accessibility status (available, busy, do not disturb, away,

offline, etc.) the resources within the organization. The result is the formation of the following hypothesis.

Hypothesis $H1b_0$: Dynamic organization structures are ***not dependent* on Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Hypothesis $H1b_a$: Dynamic organization structures are ***dependent* on Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.**

On aggregation of core defining aspects of Availability, Accessibility, Asynchronous and Synchronous Communication and Collaboration, the interim framework for Dynamic Organization Structure based on Availability, Accessibility, Asynchronous and Synchronous Communication and Collaboration emerges which is shown below in Figure 4.4-4.

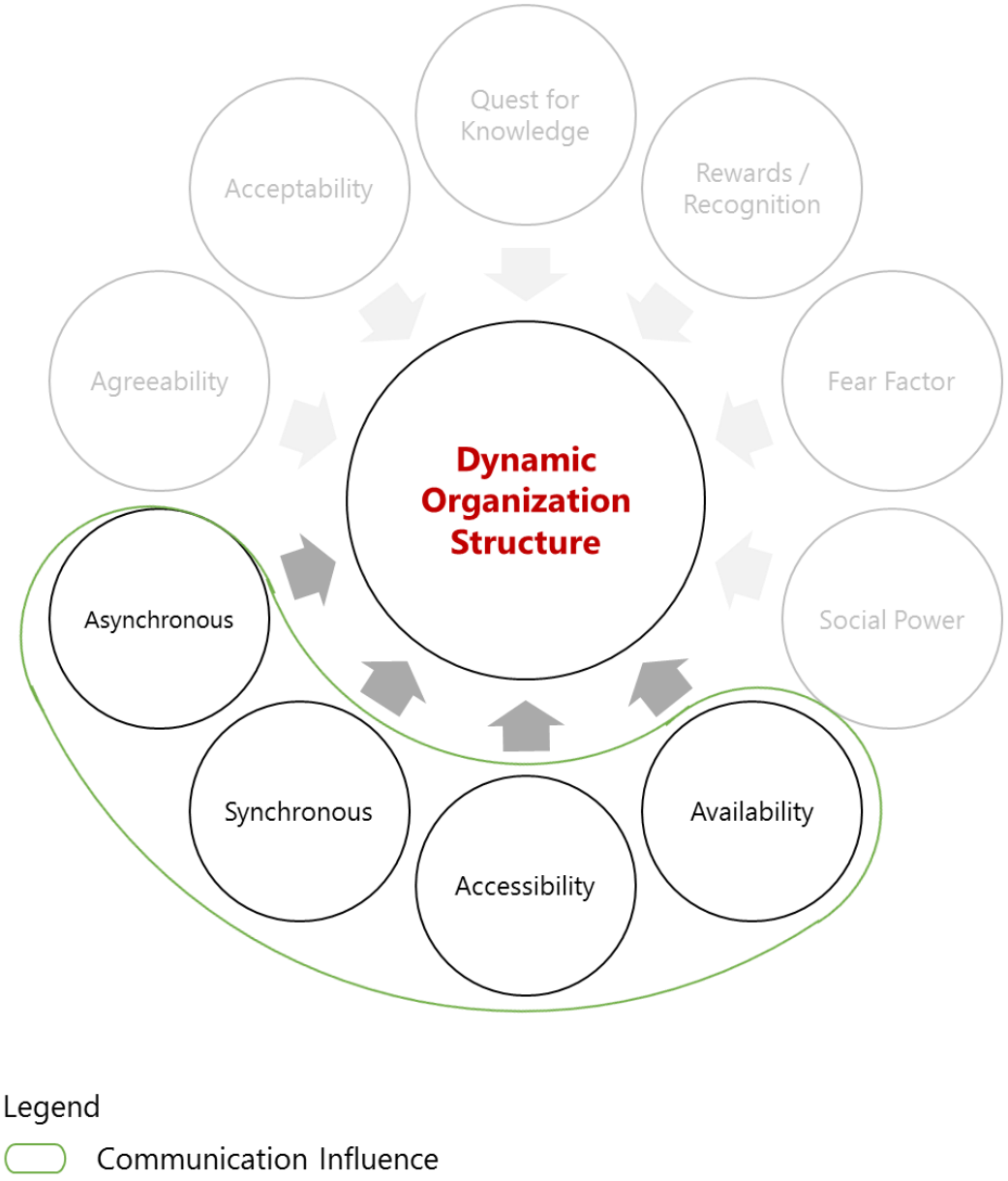


Figure 4.4-4: Emerging Framework for Dynamic Organization Structure based on Availability, Accessibility, Asynchronous and Synchronous Communication and Collaboration for Communication Influence

4.4.2. Hypothesis H2

Hypothesis H2 is based upon the construct that dynamic organization structures emerge when properly identified based on electronic asynchronous and synchronous collaboration tools.

The impact of asynchronous and synchronous communication can be adjudged based on the two influencing factors agreeability and acceptability.

Hypothesis $H2_0$: **Dynamic organization structures ***do not emerge*** based on Agreeability and Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Hypothesis $H2_a$: **Dynamic organization structures ***do emerge*** based on Agreeability and Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Agreeability is the willingness of employees within an organization to participate in achieving specified objectives. Electronic asynchronous and synchronous collaboration tools can help identify agreeability of resources (response bearing: Positive, Neutral, No Response, promptness in communication, etc.) response within the organization. The result is the formation of the following hypothesis.

Hypothesis $H2a_0$: **Dynamic organization structures are ***not dependent*** on Agreeability provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Hypothesis $H2a_a$: **Dynamic organization structures are ***dependent*** on Agreeability provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Acceptability is the willingness of the recipient resources to agree with the response provided by one of the members of the group towards possible solution to help achieve specified objectives. Electronic asynchronous and synchronous collaboration tools can help identify the acceptability of resources within the organization based on the frequency of communication, ranking of communication and creation of leaders within the group. The result is the formation of the following hypothesis.

Hypothesis $H2b_0$: Dynamic organization structures are *not dependent* on Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.

Hypothesis $H2b_a$: Dynamic organization structures are *dependent* on Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.

On aggregation of core defining aspects of Agreeability, Acceptability, Asynchronous and Synchronous Communication and Collaboration, the interim framework for Dynamic Organization Structure based on Agreeability, Acceptability, Asynchronous and Synchronous Communication and Collaboration emerges which is shown below in Figure 4.4-5.

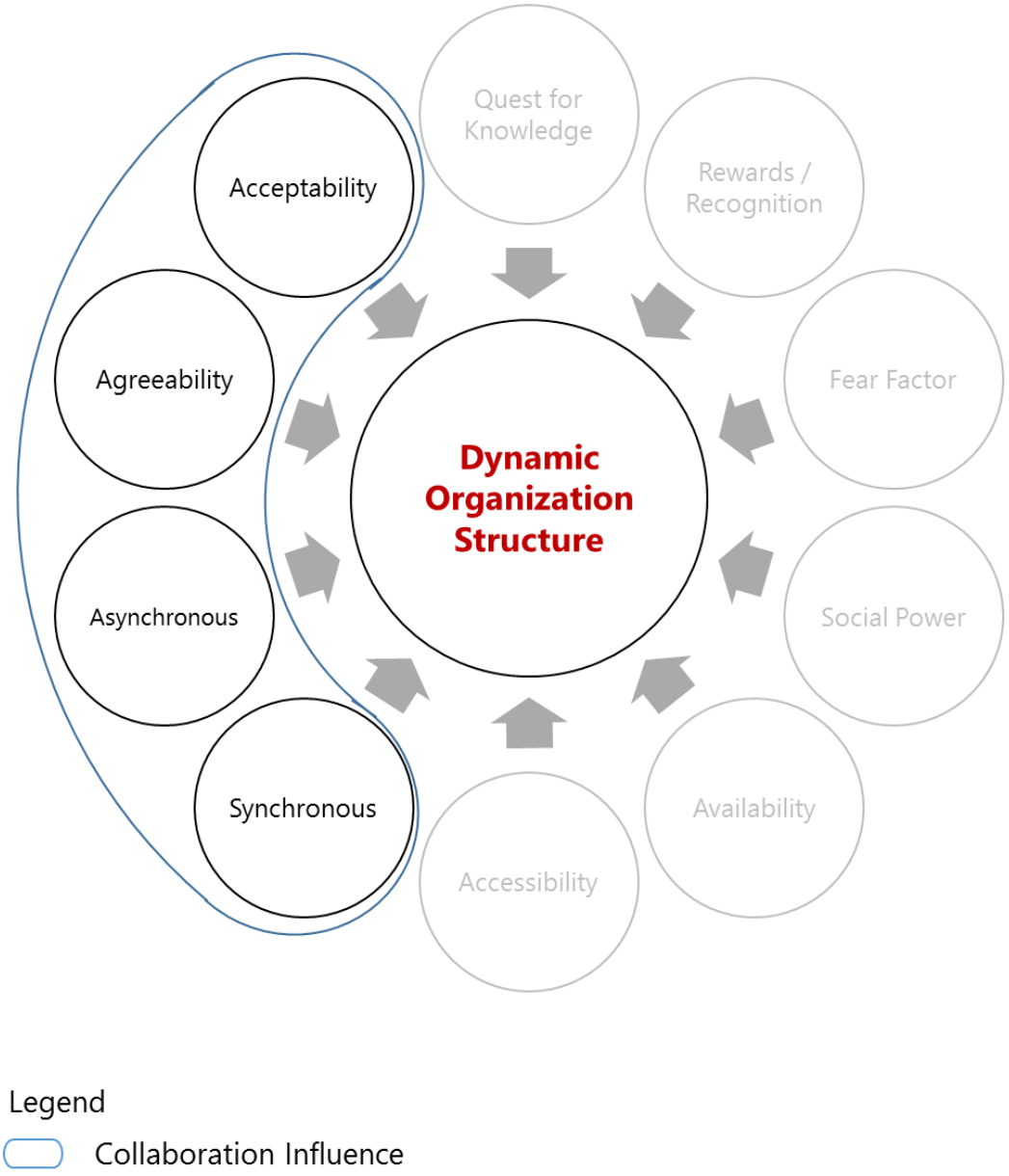


Figure 4.4-5: Emerging Framework for Dynamic Organization Structure based on Agreeability, Acceptability, Asynchronous and Synchronous Communication and Collaboration for Collaboration Influence

4.4.3. Hypothesis H3

Hypothesis H3 is based upon a construct that dynamic organization structures emerge when properly identified based on electronic social collaboration and communication tools.

The impact of social collaboration and communication patterns can be adjudged based on the influencing factors including rewards & recognition and the quest for knowledge.

Hypothesis $H3_0$: **Dynamic organization structures *do not emerge* based on Rewards and Recognition and Quest for Knowledge, which result from social collaboration and communication using electronic tools.**

Hypothesis $H3_a$: **Dynamic organization structures *do emerge* based on Rewards and Recognition and Quest for Knowledge, which result from social collaboration and communication using electronic tools.**

Rewards & Recognition as described by Jack Zigon, "something that increases the frequency of an action" (1998) i.e., intrinsic value which the members of the group derive for possible solution to help achieve specified objectives. Social tools can help identify the reward and recognition factor, importance, degree, etc. for resources within the organization. The result is the formation of the following hypothesis.

Hypothesis $H3a_0$: **Dynamic organization structures are *not dependent* on Rewards and Recognition, which result from social collaboration and communication using electronic tools.**

Hypothesis $H3a_a$: **Dynamic organization structures are *dependent* on Rewards and Recognition, which result from social collaboration and communication using electronic tools.**

Quest for Knowledge is again an intrinsic requisite of the recipient resources to again from the response provided by one of the members of the group towards a possible solution to help achieve specified objectives. Social tools can help identify the degree, depth, and acceptability within the organization based on the characteristics of the communication, ranking of communication and creation of leaders within the group. The result is the formation of the following hypothesis.

Hypothesis $H3b_0$: Dynamic organization structures are *not dependent* on Quest for Knowledge, which result from social collaboration and communication using electronic tools.

Hypothesis $H3b_a$: Dynamic organization structures are *dependent* on Quest for Knowledge, which result from social collaboration and communication using electronic tools.

4.4.4. Hypothesis H4

Hypothesis H4 is based upon the construct that dynamic organization structures emerge when properly identified based on electronic social collaboration and communication tools.

The impact of social collaboration and communication patterns can be adjudged based on the influencing factors including fear-factor and social power.

Hypothesis $H4_0$: Dynamic organization structures *do not emerge* based on Fear-Factor and Social Power, which result from social collaboration and communication using electronic tools.

Hypothesis $H4_a$: **Dynamic organization structures ***do emerge*** based on Fear-Factor and Social Power, which result from social collaboration and communication using electronic tools.**

Fear-Factor as described by H. P. Lovecraft, "The oldest and strongest emotion of mankind is fear" is the proclivity of the resources to participate as members of the group to help explore possible solution to help achieve specified objectives. Social tools can help resources by providing the necessary support in time of need. In addition, this factor forces the participants to provide validated information and not base their information on hearsay. This factor has the propensity to influence all other factors as the results can make the resource in future participate or observe in dynamic structures. The result is the formation of the following hypothesis.

Hypothesis $H4a_0$: **Dynamic organization structures are ***not dependent*** on Fear-Factor, which result from social collaboration and communication using electronic tools.**

Hypothesis $H4a_a$: **Dynamic organization structures are ***dependent*** on Fear-Factor, which result from social collaboration and communication using electronic tools.**

Social Power is ability to influence the behavior of people. This factor plays an important role in the participation of resources as this helps in establishing their credibility. The result is the formation of the following hypothesis.

Hypothesis $H4b_0$: Dynamic organization structures are *not dependent* on Social Power, which result from social collaboration and communication using electronic tools.

Hypothesis $H4b_a$: Dynamic organization structures are *dependent* on Social Power, which result from social collaboration and communication using electronic tools.

On aggregation of core defining aspects of Quest for Knowledge, Rewards and Recognition, Fear-Factor and Social Power, the interim framework for Dynamic Organization Structure based on Quest for Knowledge, Rewards and Recognition, Fear-Factor and Social Power emerges which is shown below in Figure 4.4-6.

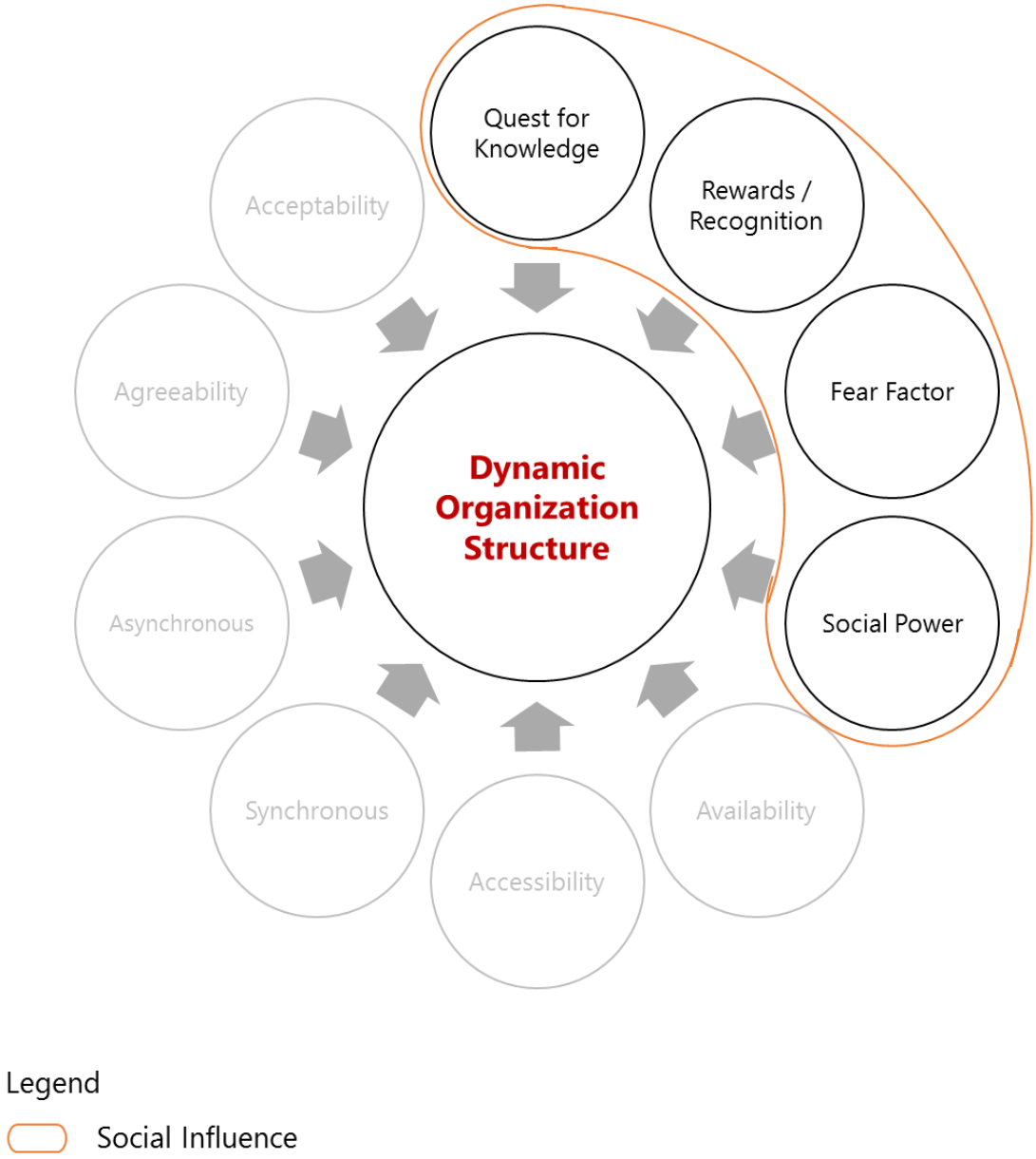


Figure 4.4-6: Emerging Framework for Dynamic Organization Structure based on Quest for Knowledge, Rewards and Recognition, Fear-Factor and Social Power for Social Influence

On aggregation of core defining aspects of Social, asynchronous and synchronous Communication and asynchronous and synchronous Collaboration, the final framework for Social, asynchronous and synchronous Communication and Collaboration emerges which is shown below in Figure 4.4-7.

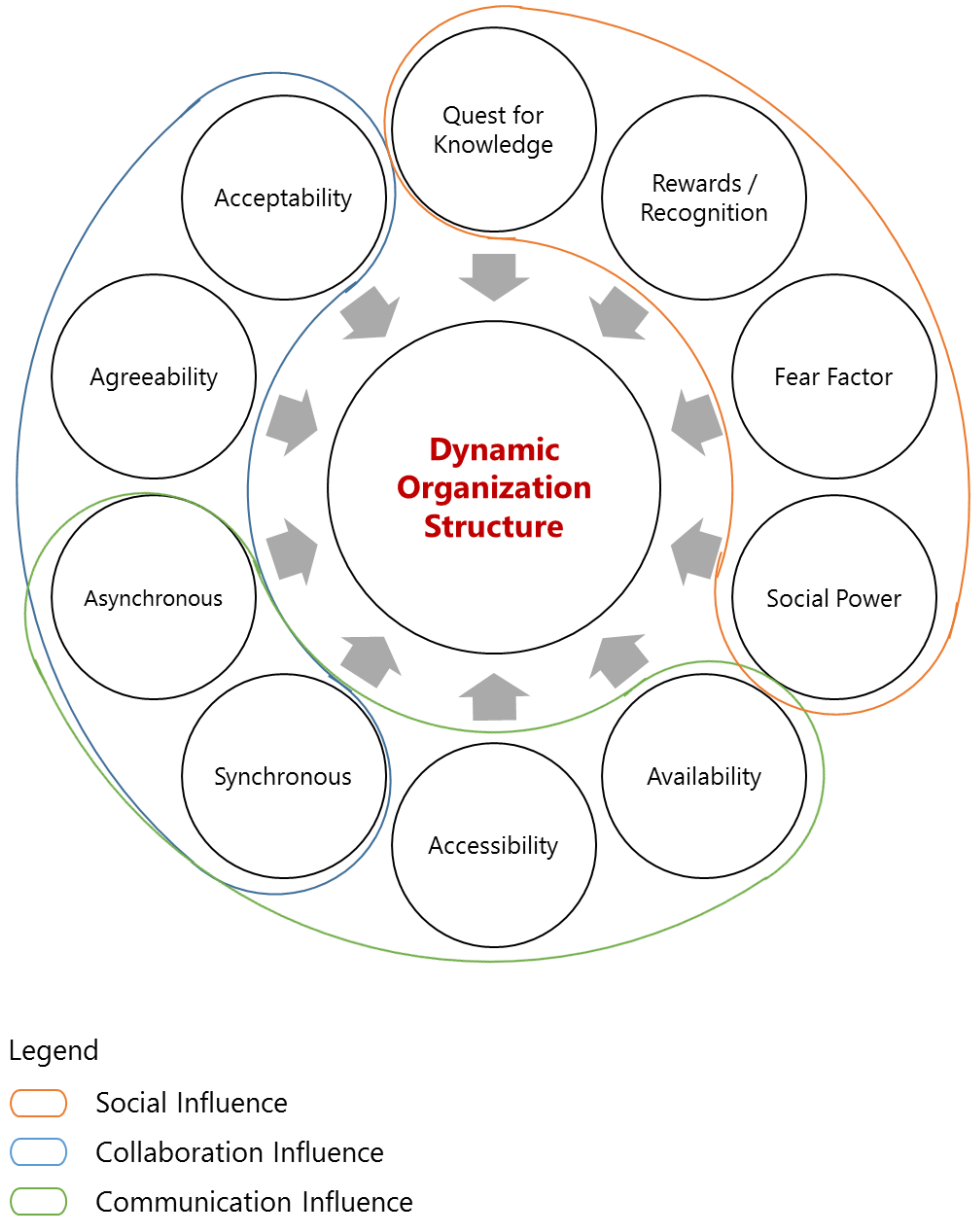


Figure 4.4-7: Framework for studying the relationship between social, asynchronous and synchronous communication and collaboration tools for creation of dynamic organization structure

With the help of this framework, the researcher would like to introduce the concept of the Dynamic Organization structure based on the technology-enabled social, communication and collaboration patterns in an organization. The resultant dynamic organization structure will help organizations in the creation of sub-organizations that can be quickly assembled to help solve critical business challenges. The benefits derived from this framework can range

from economic impact, social impact and help drive and align more towards organization goals and objectives.

Using the framework depicted in Figure 4.4-7, the researcher aims to observe the relationship between the variablesand how they are applicable to IT Industry and Education Institutes in Redmond, Washington, USA and Bangalore, Karnataka, India. The approach will be to observe how the factors influence the creation of dynamic organization structures, which can result in a successfuloutcome for both employee and organization objectives as depicted in Figure 4.4-8.

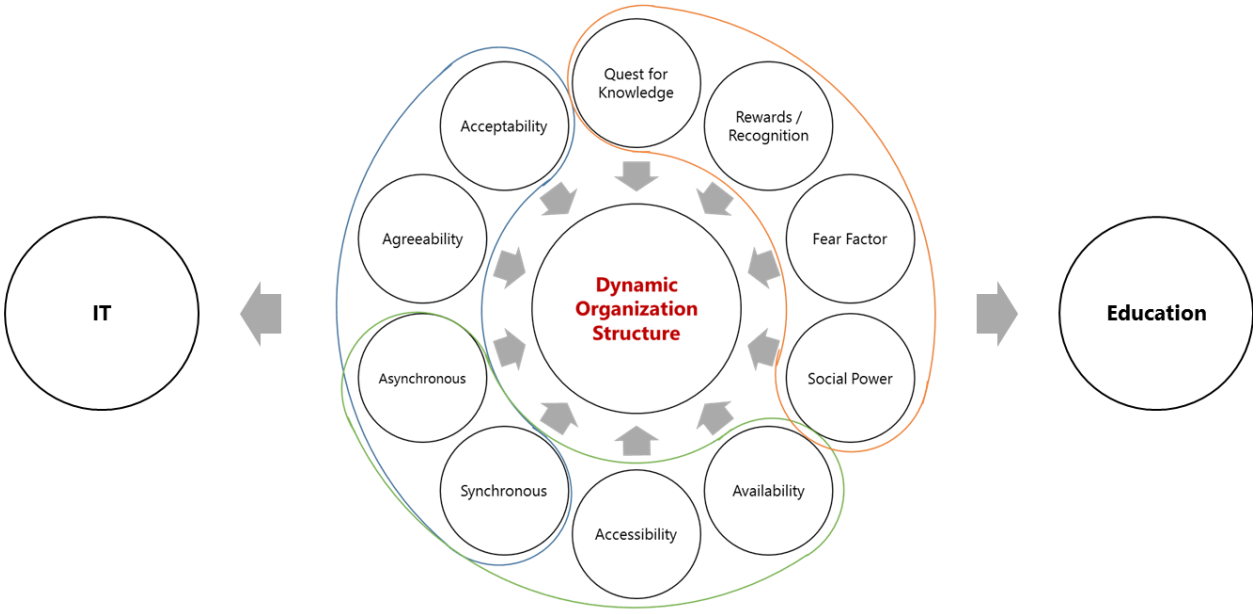


Figure 4.4-8: Framework for hypothesis testing in IT Industry and Education Institutes in Redmond, Washington, USA and Bangalore, Karnataka, INDIA

4.5. Summary

This chapter highlighted some current models and thinking of researchers around organizational development as well as the organization structures. Figure 4.4-7 presented a framework drawing together these concepts, which will be used as the basis for the research questions and analysis. The framework acknowledges the key areas of organization development while reflecting the key developments in areas of organization structures in the past half century. The Framework balances individual and organizational factors that may influence this structure based on historical evidence. Finally, it acknowledged the potential for factors external to the organization to have an impact on its development and structure.

Chapter 5: Research Design & Methodology

5.1. Overview

The previous two chapters explored the relevant literature as well as the research problem at hand. This chapter provides details of the research methodology, its purpose and how it was designed and implemented. The discussion in this chapter will review the conceptual framework in light of the design methodology.

5.2. Overview of Mixed Methods Approach

Mixed methods studies allow for inclusion of both qualitative and quantitative methods of data collection and/or analysis to achieve a range of outcomes as discussed by Creswell (Creswell, 2005); and Greene et al. (Greene, Caracelli, & Graham, 1989). Mixed methods is growing in popularity and is more widely recognized with the publication of some texts dealing specifically with mixed methodologies as separate from either quantitative or qualitative methodology. For examples and description of mixed methods studies see (Creswell, 2003), (Greene & Caracelli, 1997) and (Tashakkori & Teddlie, 2003). While these publications represent a significant advancement in the recognition of mixed methods, they also provide frameworks that explain and recognize the different approaches that utilize the mixed methodology.

This research uses mixed methods approach. The basis of selection of mixed methods approach was done upon the overall purpose of the study, and the research questions identified, the research relating to factors influencing the emergence of dynamic organization structure within an organization. In this research, a mixed methodology was adopted as

mixed methods help with initial generation of rich data. The generation of initial data helps in relation to the relatively unexplored area of asynchronous, synchronous and social collaboration. The mixed methods also help in expanding knowledge with during quantitative phase of study.

5.3. Survey Questionnaire Methodology

The terms survey and questionnaire are often left undefined in research texts and publications, or are used in a variety of contexts, sometimes interchangeably (for example, compare (Creswell, 2005), (Sekaran, 2003) and (Zikmund, 2000). In this study, the term survey questionnaire has been used throughout to refer to the instrument used for data collection. The same term was developed as in the broadest sense survey gathers data on a particular issue but not necessarily from an entire population (Babbie, 1989). A survey may use some data collection techniques including personal interviews, telephone interviews, direct observation or self-administered questionnaires (Scheaffer, Mendenhall, & Ott, 1990). In this study, the data collection technique used to survey was a questionnaire; hence the term survey questionnaire.

Survey questionnaires are recognized as an appropriate method of collecting data from a large number of research participants when the researcher have appropriate measures of variables and can clearly articulate the information of interest (Sekaran, 2003). According to McClelland (McClelland, 1994), survey questionnaires unique advantages which include accessing a large and often geographically dispersed population, gathering of data via unobtrusive means, reducing the bias introduced when an interviewer may be involved, and minimizing time requirements when surveys are well-designed and, as a result, are self-

explanatory. The design of this research, as is also well suited to the use of an instrument that has been developed or located as a result of a qualitative stage of study (Creswell, 2003).

5.4. Instrument Development

The design of the survey questionnaires is critical to effective research. According to Sekaran (Sekaran, 2003) the three most important aspects of survey design are wording of questions, variables coding and categorization, and overall appearance. All of these aspects were taken into account for the development of survey questionnaire. The survey questionnaire for pilot was used as a baseline for the research survey used in the main study. The content and context feedback from pilot was incorporated to improve the participants understanding of the survey questions, how they need to respond and how they should interpret their answers (output). Survey statements were specifically developed based on phrasing and conclusions from pilot. Additionally, feedback from an external panel was taken into account for additional inputs, validation, and quality checks. The categorization of variables by careful planning of analysis around the research questions, prior to development of instrument. Finally, the final survey appearance was assessed by the use of an expert panel.

5.4.1. Survey Construction

The survey instrument comprised of two sections (a full copy of the survey questionnaire can be found in Appendix I of this document). The first section included demographic data relating to the individual including age, sex, qualifications and position type. The same information was collected as nominal data, and specific rationale was used to develop the groupings.

The second section of the survey included multiple choice statements (nominal scales) for participants to respond. The nominal type differentiates between items or subjects based only on their names or (meta-) categories and other qualitative classifications they belong to; thus, dichotomous data involves the construction of classifications as well as the classification of items.

5.4.2. Scale Selection

While developing the survey, it was decided to use Multiple Choice Closed-ended questions. Multiple Choice Closed-ended questions limit respondents' answers. The participants were allowed to choose from a pre-existing set of dichotomous answers, such as yes/no, true/false. The same approach reduces the total number of questions. Multiple Choice Closed-ended questions are more easily analyzed as each answer has a dichotomies type response. Answer is given a number or value so that a statistical interpretation can be assessed.

5.4.3. Development of Survey Questionnaire Statements

The statements for the questions and the responses within the survey were developed based on the feedback received during the administration of survey during Pilot study. As far as possible the survey questions and the responses used common phrasing to ensure the correctness of expression. The survey was subjected to pre-testing in order to address tautological issues by an expert panel. This process was designed to address and clarify statements and to ensure that the survey would address the research questions in an appropriate manner (Singh & Smith, 2000). The pretest was carries out as it contributes to the overall validity and reliability and of the survey (McClelland, 1994). The expert panel consisted of research supervisor and research guide, external researchers heavily engaged in

quantitative research and principally quantitative analysis, and groups of researchers having expertise in wording of survey instruments.

While developing the survey, it was decided to use Multiple Choice Closed-ended questions. The same approach reduces the total number of questions. Multiple Choice Closed-ended questions are more easily analyzed. Every answer is given a number or value so that a statistical interpretation can be assessed. Closed-ended questions are also better suited for computer analysis. If open-ended questions are analyzed quantitatively, the qualitative information is reduced to coding and answers tend to lose some of their initial meaning. Because of the simplicity of closed-ended questions, this kind of loss is not a problem.

Multiple Choice Closed-ended questions can be precise, thus more likely to communicate similar meanings. Because open-ended questions allow respondents to use their unique wording, it can be difficult to compare the meanings of the responses. In large-scale surveys[4] (as in the case for this research with over 1000 respondents), closed-ended questions take less time from the participant and the researcher, and so is a less expensive survey method.

The first iteration of the survey resulted in close to 56 questions in Section 2. The total questions in Section 2 were reduced to 18 questions using multiple response sets with dichotomies type data. In the research questionnaire, eight variables were being considered (availability, accessibility, agreeability, acceptability, rewards & recognition, quest for knowledge, fear factor, social power), which were mapped to these 18 questions with the help

[4]The response rate is higher with surveys that use closed-ended question than with those that use open-ended questions.

of 54 responses in total i.e. each question had a possible multiple response set of 3 which leads to total of 54 responses to 18 questions.

The rationale for using these variables multiple times was to develop a correlation between the variables based on the research question by pairing them through various questions and answers that would help us in identifying the strength of correlation between these variables as well.

Since analysis of multiple response sets with same variables mapped to multiple questions (question response pairing) is challenging in SPSS[5], Compute Variable option was used to compute a new variable based on existing information (from other variables) on observed data.

5.4.4. Coding Survey Questionnaire Statements

Since coding of multiple response sets with same variables mapped to multiple questions is challenging, an approach of code simplification through a two-step process was used. The two-step process helped map the right variable that was being targeted for extraction from the individual responses.

5.4.4.1. Step 1: Mapping questions and answers

During this step, similar responses to different questions were mapped using a simple 4-character coding of the format – QnAm, where n was the question number, and m was the answer response. This mapping is shown below in Table 5.4-1.

[5] Statistical software which was used for computing all the various analysis

No	Question	Ans 1	Ans 2	Ans 3
1	Having instant communication dialog or interaction with experts	Q1A1	Q1A2	Q1A3
2	If the tool can rank the participants based on free/busy information	Q2A1	Q2A2	Q2A3
3	If various collaboration tools can share information between them	Q3A1	Q3A2	Q3A3
4	If there was a classification or tag available to identify experts in communication tool	Q4A1	Q4A2	Q4A3
5	If the tool can list the most active group communications	Q5A1	Q5A2	Q5A3
6	If the tool can help establish location of experts	Q6A1	Q6A2	Q6A3
7	If the participants do not engage in information sharing	Q7A1	Q7A2	Q7A3
8	If I only get negative or unusable information from participants	Q8A1	Q8A2	Q8A3
9	If the participants in a discussion do not agree to reach a consensus	Q9A1	Q9A2	Q9A3
10	During formation of groups	Q10A1	Q10A2	Q10A3
11	During discussions within the group	Q11A1	Q11A2	Q11A3
12	During winding down of groups and creation of new ones	Q12A1	Q12A2	Q12A3
13	My communication and collaboration is primarily driven by	Q13A1	Q13A2	Q13A3
14	I participate in groups as	Q14A1	Q14A2	Q14A3
15	Communication and Collaboration is essential	Q15A1	Q15A2	Q15A3
16	My communication and collaboration with my direct group	Q16A1	Q16A2	Q16A3
17	During my communication and collaboration	Q17A1	Q17A2	Q17A3
18	When I try to create a new group	Q18A1	Q18A2	Q18A3

Table 5.4-1: Survey Coding Step 1: Mapping questions and answers

5.4.4.2. Step 2: Mapping answers to variables

Since coding of multiple response sets with same variables mapped to multiple questions is challenging, an approach of code simplification was used to help map the right variable that was being targeted for extraction from the responses as shown below in Table 5.4-2 and Table 5.4-3.

	Q1				Q2				Q3				Q4				Q5				Q6			
	A1	A2	A3	Total	A1	A2	A3	Total	A1	A2	A3	Total	A1	A2	A3	Total	A1	A2	A3	Total	A1	A2	A3	Total
Availability			1	1		1		1				0				0		1		1			1	1
Accessibility				0	1			1	1			1				0				0	1			1
Agreeability	1			1				0				0				0				0				0
Acceptability		1		1				0				0				0				0		1		1
Rewards & Recognition				0				0				0	1			1				0				0
Quest for Knowledge				0			1	1			1	1		1		1			1	1				0
Fear Factor				0				0				0				0				0				0
Social Power				0				0		1		1			1	1	1			1				0
				3				3				3				3				3				3

	Q7				Q8				Q9				Q10				Q11				Q12			
	A1	A2	A3	Total	A1	A2	A3	Total	A1	A2	A3	Total	A1	A2	A3	Total	A1	A2	A3	Total	A1	A2	A3	Total
Availability			1	1		1		1				0			1	1				0				0
Accessibility				0			1	1		1		1				0				0			1	1
Agreeability				0				0	1			1	1			1	1			1				0
Acceptability				0				0				0		1		1				0	1			1
Rewards & Recognition	1			1				0				0				0				0				0
Quest for Knowledge				0				0				0				0			1	1				0
Fear Factor		1		1	1			1				0				0		1		1		1		1
Social Power				0				0			1	1				0				0				0
				3				3				3				3				3				3

	Q13				Q14				Q15				Q16				Q17				Q18			
	A1	A2	A3	Total	A1	A2	A3	Total	A1	A2	A3	Total	A1	A2	A3	Total	A1	A2	A3	Total	A1	A2	A3	Total
Availability				0				0				0				0				0				0
Accessibility			1	1				0				0				0				0				0
Agreeability		1		1				0				0				0				0			1	1
Acceptability	1			1				0		1		1		1		1				0				0
Rewards & Recognition				0		1		1			1	1				0	1			1				0
Quest for Knowledge				0			1	1	1			1				0				0	1			1
Fear Factor				0				0				0	1			1		1		1		1		1
Social Power				0	1			1				0			1	1			1	1				0
				3				3				3				3				3				3

Table 5.4-2: Survey Coding Step 2: Mapping answers to variables (Grid)

Collaboration Factors

Acceptability	Agreeability
Q1A2 Q6A3 Q10A3 Q12A2 Q13A3 Q15A1 Q16A1	Q1A1 Q9A2 Q10A2 Q11A1 Q13A2 Q18A1

Communication Factors

Accessibility	Availability
Q2A1	Q1A3
Q3A1	Q2A2
Q6A2	Q5A1
Q8A2	Q6A1
Q9A1	Q7A1
Q12A1	Q8A1
Q13A1	Q10A1

Social Factors

Fear Factor	Quest for Knowledge	Rewards & Recognition	Social Power
Q7A3	Q2A3	Q4A1	Q3A3
Q8A3	Q3A2	Q7A2	Q4A3
Q11A3	Q4A2	Q14A1	Q5A3
Q12A3	Q5A2	Q15A2	Q9A3
Q16A2	Q11A2	Q17A1	Q14A3
Q17A2	Q14A2		Q16A3
Q18A3	Q15A3		Q17A3
	Q18A2		

Table 5.4-3: Survey Coding Step 2: Mapping answers to variables

5.5. Pilot Study

Based on input from the expert panel, all appropriate refinements were made in the survey and the survey was then used in pilot study. The instrument was distributed to Senior Executives as well as New Hires within IT Industry in India and USA from Dec 2013 thru April 2014. Over 100 respondents were invited to complete the survey. The total responses recorded were 62, representing a response rate of 62%.

The pilot respondents were requested to provide feedback concerning the clarity of questions and responses, ease of understanding and readability and use of the instrument. No

concerns were identified with the phrasing of the survey questions. The respondents reported ease of understanding the questions and responses and were successful in completion of the entire survey. The data was entered into an SPSS data file and was checked for structural issues or potential format problems.

Additional input regarding design of survey was sought from organizational experts to ensure that the survey questionnaire was presentable and easy to comprehend. The knowledge of experts of the particular organizational context was invaluable and ensured that the instrument was appropriate for the target audience in terms of language. These internal reviewers suggested only minor changes; relating mostly to the collection of data. There was also inclusion of an open-ended question for internal use.

The organizational experts made no other changes or suggestions.

5.6. IT Industry in Redmond (USA) and Bangalore (INDIA)

IT Industry groups in Redmond (USA) and Bangalore (INDIA) was chosen because they were known to the researcher. In particular, the information technology sector is always adopting the latest in technology especially around Social, Asynchronous, and Synchronous collaboration. IT industry organizations have a tendency to experience continuous transformation bringing significant change. The method of sampling chosen is commonly referred to as opportunity sampling (Burns, 2000) or convenience sampling (Creswell, 2005). The background for the same was due to the existing networks of the researcher and awareness of current large-scale change occurring thought out the IT industry.

5.6.1. Participant Selection

Within the various organizations in the IT Industry groups in Redmond (USA) and Bangalore (INDIA), the group of respondents was chosen to represent a broad section of the industry. The respondents were from management as well individual contributors and professed experience of using Social, Asynchronous and Synchronous collaboration tools. The group comprised of 350 respondents from IT Industry in Redmond (USA) representing 51 companies and 350 respondents from IT Industry in Bangalore (INDIA) representing 12 companies who were invited to respond to the survey questionnaire on a voluntary basis.

Determination of sample size of participants for research is subject to deliberation. In many cases,this either resorts to as either a minimum sample size or a minimum ratio of number of observations to the number of variables used. Applying these guidelines without regard to specificaspects of a given study has drawn several criticism (MacCallum, Widaman, Zhang, & Hong, 1999),

A review of recommended sample sizes, McCollum et al. (1999) identify recommendations made by a range of authors on ratios of minimum sample size to number of variables range anywhere between 3:1 and 10:1. For conducting factor analysis, the recommendation is to have at least 100 responses. Similarly for conducting factor analysis, the ratio of at least five observations for every variable being considered, with a ratio of 10:1 being even more preferable (Hair (Jnr), Black, Babin, Anderson, & Tatham, 2006). In the research survey questionnaire, eight variables were being considered, and these were availability, accessibility, agreeability, acceptability, rewards & recognition, the quest for knowledge, fear factor, social power. Given these variables, and taking into account the guidelines by researchers, the use of the 500 responses that were received represents a ratio of

approximately 62:1 and is, therefore, more than acceptable for the purposes of this research and further analysis.

As defined by other scholars, i.e. Field and Godden, a sample is a smaller (but hopefully representative) collection of units from a population used to determine truths about that population (Field, 2005). Sample size determination involves establishing the number of observations to include in a statistical sample while ensuring representativeness. Determination of sample size differs depending on the research design. For instance, survey research design requires massive sample size for the purpose of representativeness; in census, everyone in the target population is selected to participate in the study, hence the sample size is equal to the size of the target population; in experimental research design, with treatment and control groups, sample size may differ in each cluster. There are different ways of determining a sample size.

The following sample size formula was used for infinite population ('unknown') to arrive at a representative number of respondents (Godden, 2004):

$$SS = \frac{Z^2 \times p\,(1-p)}{M^2}$$

Where:

SS= Sample Size for infinite population (more than 50,000)

Z = Z value (e.g. 1.96 for 95% confidence level)

P = population proportion (expressed as decimal)

[Assumed to be 0.5 (50%) since this would provide the maximum sample size]

M = Margin of Error at 5% (0.05)

Using the values of Z=1.96, P=0.5, and M = 0.05, the maximum sample size for infinite population would be 384.16 or 385. In this research study a sample size of 250 respondents was obtained from the IT Industry group in Redmond (USA) and another 250 respondents from the IT Industry group in Bangalore (INDIA) which cumulative for the same industry is 500 respondents, which is well above the required sample size of 385.

5.6.2. Data Collection

Google Forms™ was used to administer the survey questionnaire using online medium. Although technology has assisted administration of research survey, the use of online surveys is still a contentious issue (Evans & Mathur, 2005). The unique advantages and challenges of online surveying have been studied in many contexts; for example, see (Ilieva, Baron, & Healey, 2002); (Zimitat & Crebert, 2002), and strong empirical evidence is lacking to answer many of the concerns and questions that currently exist. A comprehensive list of unique advantages and challenges of online survey methods is provided by Evans and Mathur (Evans & Mathur, 2005), which has been assessed in context of this research is provided below.

The strengths of online surveying include:

- Speed and timeliness of administration of surveys
- Convenience of administration of surveys
- Ease of data entry and analysis
- Low administration costs
- Controlled sampling

- Ease of follow up

In addition, technological innovations ensure that the survey can have diverse features embedded to ensure easier completion for the respondent and less likelihood of invalid responses. For example, the survey tool used in this study enabled that mandatory questions were not left unanswered.

Similarly, the potential challenges of online surveys include:

- Challenges related to sampling from skewed attributes of internet users
- Lack of online experience of respondents
- Use of various online technologies used by respondents
- Samples representativeness

Many of these apply to the broader use of online surveying and, therefore, were not considered significant about this particular survey questionnaire.

Available information seems to indicate that online surveys work best in situations where sample populations can be easily identified, where sensitive questions may be asked, where rapid response rates are important, or where the respondents may be geographically disparate (Gunn, 2002); (Ritter & Sue, 2007); (Schonlau, Fricker, & Elliott, 2002). The instant addition of responses to the data set makes this medium appealing for research purposes. Additionally, the respondents from the various organizations involved in the study had been regularly using Google Forms™, and it was therefore considered the most

appropriate method for data collection. By administering the survey questionnaire to a particular list the researcher was able to control the sampling of respondents.

The use of online surveys and in particular the response rate of the survey has been a subject of active debate (Ilieva, Baron, & Healey, 2002). Since the respondents were accustomed to using and responding to surveys using online methods, the response rate was higher than traditional methods and this proved to be the situation with the 500 responses from a total surveyed population of 700, representing a response rate of 71.4%.

5.6.3. Data Analysis

The results of the survey were statistically analyzed. This was done primarily to address the specific research questions and also to identify relationships between factors and emergence of organization structures. The statistical analysis program SPSS was used for performing all the statistical analysis. The results of the various statistical analyses which were conducted and the analysis results are provided in Chapter 6. The specific methods used for conducting these statistical analyses and their rationale are explained in following section.

The use of Google Forms™ allows all data to be collected electronically and downloaded into an Excel spreadsheet. Some data manipulation was necessary prior to uploading to SPSS, which was carried out using Microsoft Excel. Once the data was uploaded into SPSS, the first step carried out was to clean the data and check for any data missing from database (Creswell, 2003). This check for missing data as well as data cleansing was significantly reduced by the use of the surveying tool that restricted input to valid responses. Since all the answers to questions in the survey were mandatory, there was no missing data, and hence it was not an issue that required additional analysis.

5.6.3.1. Descriptive Statistics

The first step of the analysis involved conducting of descriptive statistics for all the questions and the items in "Section 1: Participant Information". Since most items were either measured on nominal or ordinal scales, frequency distribution was calculated. This allows for an initial overview of the analysis, its results and provides the researcher with an opportunity to identify trends in the data (Creswell, 2005).

When this initial data was examined, there were some obvious questions and trends that were further explored by the use of cross-tabulation of results, the details of which are explained in the results in Chapter 6.

5.6.3.2. Testing for Factorability

A factor analysis was used examine the data collected in the survey. Prior to conducting any factor analysis, the data checked must be tested for suitability for developing a set of factors. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity are two measures that can inform this decision.

The KMO measures the degree of inter correlations between the variables and, therefore, identify if the data is appropriate for factor analysis (Hair (Jnr), Black, Babin, Anderson, & Tatham, 2006). The KMO measure ranges from 0 to 1. In order to assist in interpreting the outcome, the following guidelines are recommended (Kaiser, 1970 as cited in Hair (Jnr) et al., 2006, p. 114-5) as show in Table 5.6-1 below:

KMO	Interpretation
.9 and above	Marvelous
.8 - .9	Meritorious
.7 - .8	Middling
.6 - .7	Mediocre
.5 - .6	Miserable
Under .5	unacceptable

Table 5.6-1: Interpretations of KMO measure

The Bartlett Test of Sphericity is provides the probability that the correlation matrix has significant correlations among at least some of the variables as suggested by (Hair (Jnr), Black, Babin, Anderson, & Tatham, 2006).

Both these tests were conducted to ensure the items within the survey questionnaire were ready for factor analysis.

5.6.3.3. Factor Analysis

Exploratory Factor Analysis (EFA) was used in this study. EFA is exploratory in nature and most appropriate for scale development (Fabrigar, Wegener, MacCallum, & Strahan, 1999); (Hurley, et al., 1997). For the same reason, EFA was deemed most suitable for the initial testing.

5.6.3.4. Principle Components Analysis

Principal components analysis (PCA) was used as the factor extraction method. PCA was used to assist in developing a new group of variables that are uncorrelated (Chatfield & Collins, 1980)based on the assumption that the original variables (items) were correlated. Normality, homoscedasticity, and linearity are some issues which are not of importance in use of PCA (Hair (Jnr), Black, Babin, Anderson, & Tatham, 2006); (Tabachnick & Fidell, 1989). Multi-collinearity, is usually desirable when using PCA due to the assumption is that the variables will be interrelated to a certain extent (Hair (Jnr), Black, Babin, Anderson, & Tatham, 2006).

5.6.3.5. Factor Extraction, Rotation, and Retention

Factor extraction, rotation, and retention have an impact on the results based on the chosen methods of conducting the analysis. PCA was chosen for factor extraction as discussed above for this analysis. Factor rotation refers to the rotation of axes to assist with interpretation of outcomes (Tabachnick & Fidell, 1989). Within factor rotation, oblique rotation (in the form of direct oblimin) was used, since it was believed that the underlying factors might be correlated.

PCA was conducted for identifying factors with an Eigenvalue of greater than 1. The out of PCA, a Scree Plot was examined. Additional factor analysis was then conducted until the number of factors giving the cleanest loading was obtained by virtue of reducing the number of factors. If all items load onto only one factor of 0.3 or greater, then it can be considered as uni-dimensional (Coakes, Steed, & Dzidic, 2006). The items that load on more than one factor are deemed to be multidimensional. These items have the potential to be

problematic if used with further analysis and when results are interpreted (Singh & Smith, 2000).

Therefore, once the PCA was conducted, any items, which fell into the same category, were identified and give further consideration prior to inclusion in any analysis (Hair (Jnr), Black, Babin, Anderson, & Tatham, 2006). The rationale for specific retention or exclusion of these items is explained during the analysis in Chapter 6.

5.6.3.6. Factor Reliability

Cronbach's alpha was used for testing for reliability for the factors, which resulted from PCA. Cronbach's alpha measures internal reliability by computing the average inter-item correlation within each of the factors emerging. Factors that result in a Cronbach's alpha of 0.6 or greater are considered reliable. These factors are then useful for further analysis as part of a specific variable (Hair (Jnr), Black, Babin, Anderson, & Tatham, 2006). Any item that loads negatively onto a factor has to be recoded for Cronbach's alpha to be conducted because all items within a factor must be unidirectional (Nichols, 2014).

5.6.3.7. Correlation Analysis

Post identification and testing of factors for reliability, correlation analysis was conducted to determine whether a relationship existed between these factors and the emergence of dynamic organization structures.

5.6.3.8. Multiple Regression Analysis

Multiple regression analysis was conducted to determine the extent to which each of the factors that resulted from PCA, were able to provide an explanation or prediction of the

emergence of dynamic organization structures (Hair (Jnr), Black, Babin, Anderson, & Tatham, 2006).

5.7. Education Institutes in Redmond (USA) and Bangalore (INDIA)

Education Institutes groups in Redmond (USA) and Bangalore (INDIA) were chosen because they provide a good contrast as well as similarities to the IT Industry groups. The Education environment, similar to the IT communities, is always adopting the latest in technology especially around Social, Asynchronous, and Synchronous collaboration and is transformational in nature. Opportunity sampling was used as the sampling method. The background for the same was due to the existing networks of the researcher and awareness of current large-scale change occurring thought out the Education sector.

5.7.1. Development of Survey Questionnaire Statements

The statements within the survey for Education Institutes was derived from the same survey administered to IT Institute, which reflects findings from the Pilot Survey of the study and were developed around the constructs present in the process model resulting from pilot phase. Where possible, the items developed used verbatim comments or conventional phrasing to ensure the appropriateness of wording based on the student population.

5.7.2. Participant Selection

Within the various Education Institutes in Redmond (USA) and Bangalore (INDIA), the group of students undergoing engineering, and other technical disciplines, were chosen had experience of using Social, Asynchronous and Synchronous collaboration tools.

These student groups comprised of 350 respondents from Bellevue College (www.bellevuecollege.edu) in Redmond (USA) and 350 respondents from Vemana Institute of Technology (vemanait.edu.in) in Bangalore (INDIA). The students were invited to participate on a voluntary basis.

Background on sample size is similar as presented in Section 5.6 (Survey of IT Industry in Redmond (USA) and Bangalore (INDIA)).

5.7.3. Data Collection

The survey questionnaire was administered online using the same program, Google Forms™. Since the respondents from the organization involved in the study had been regularly using this particular online survey tool and it was, therefore, considered the most appropriate method for data collection. All users were accustomed to this approach, and the sampling was controlled by administering the survey questionnaire to a particular list identifying all within the educational institutes. The total participation was 500 responses from a total surveyed population of 700, representing a response rate of 71.4%.

5.7.4. Data Analysis

The results of the survey were statistically analyzed. This was done primarily to address the specific research questions and to identify relationships between factors and emergence of organization structures. The statistical analysis program SPSS was used for performing all the statistical analysis. The results of the various statistical analysis that were conducted and the analysis results are provided in Chapter 7. The specific methods used for conducting these statistical analysis, and their rationale were explained in this chapter under

Section 5.6.3 (Data Analysis) as they are identical due to the same format, structure and data type used for survey instrument administered to respondents of Educational Institutes.

5.8. Summary

This chapter provided a detailed explanation of the research design and the methods used for data collection and analysis. An overview of the mixed methods approach was provided, along with detailed explanations of each of the phases of the study. For the Pilot Phase, the development of survey questions with multiple-choice responses and process of analyzing the same were explained. The next two phases for IT Industry and Education Institutes were also described, identifying the survey questionnaire development and analysis processes. Integral to the discussion was consideration of the ethical elements of the study as well as issues of reliability and validity. The following chapter provides the findings from the pilot phase of the study.

Chapter 6: Pilot Survey Results

6.1. Overview

The previous chapter provided a detailed discussion and justification for the use of a mixed methodology for this research. This chapter provides specific details of the Pilot Survey, the participants, data analysis and findings will be discussed.

6.2. Evaluation for Pilot Study

Relative Autonomy Index (RAI) is a measure of motivational autonomy developed by psychologists Ryan, Deci, Chirkov and others (Chirkov, Ryan, Kim, & Kaplan, 2003); (Deci, Koestner, & Ryan, 2001). RAI is a direct measure of the individual's ability to act on what they value. The same measure is computed regarding specific domains or activities. According to the SDT formulation, a person is autonomous when their behavior is experienced as willingly enacted and when they fully endorse the actions in which they are engaged, and the values expressed. People are most autonomous when they act in accord with their authentic interests or integrated values and desires (Deci, Koestner, & Ryan, 2001). SDT contrasts independent behavior with controlled behavior, 'in which one's actions are experienced as controlled by forces that are phenomenally alien to the self, or that compels one to behave in particular ways regardless of one's values or interests' (Chirkov, Ryan, Kim, & Kaplan, 2003). The RAI measures the extent to which the person's motivation for their behavior in a particular domain is autonomous as opposed to somewhat controlled.

Human behavior is motivation driven both intrinsic and extrinsic. Intrinsic motivation is associated with the enjoyment of the activity in itself. Extrinsic motivation is the

performance of an act in an instrumental way (one's action is effectively coerced) which can be categorized into four different types determined by the degree of self-endorsed behavior: external, introjected, identified and integrated. As established by Levesque (Levesque & Brown, 2007), the distinction between all types of motivations is not relevant in every context, which is primary reason the analysis combination subscales into the following: external, introjected, identified and integrated motivation.

6.3. Survey Administration

The survey questions were designed to ask individuals to rate each of four possible motivations for their actions in a particular domain. RAI then combines these subscales into one single measure that is the weighted sum of the person's scores in the subscales. The subscales weights are a function of their position in the self-determination continuum: -2 for extrinsic motivation, -1 for introjected motivation, 1 for identified motivation and +2 for intrinsic motivation, making the RAI range between -5 and 5. Positive scores are interpreted as individual's motivation being relatively autonomous, and negative scores indicate a controlled motivation.

6.4. Survey Data Collection and Analysis

Data was collected thru survey conducted for Senior Leaders within IT Industry and New Hires in IT Industry from Dec 2013 thru April 2014. The total sample size is 62 individuals. The questionnaires include several modules that provide an integrated data platform to answer a variety of research questions.

In order to measure effectiveness of RAI to measures autonomy of individuals, the first step is to examine whether the data collected is consistent with the hypotheses of the

measurement model and second step will be to perform standard tests to assess the internal consistency of the scale itself. The two primary hypotheses that help assess adherence of data to measurement model are:

- Data has four dimensions (extrinsic, introjected, identified and intrinsic motivations)
- Motivation subscales have an ordered correlation among them.

On examining the structure of survey questions, the primary objective will be to investigate the feasibility of a four-dimension structure. However, the main limitation of this approach is that it disregards the domain-specific nature of autonomy measure. i.e. it assumes that questions about the same type of motivation but referring to different areas of decision-making load on a common factor. Following Guio, Gordon and Marlier (2012), the next step will be to analyze the structure of the data using three different statistical methods: factor, multiple correspondence, and cluster analysis.

As a first step, an exploratory factor analysis (EFA) is conducted to test if a six-factor solution that discriminates the items of the four motivation subscales emerges. The axes were rotated to help facilitate the interpretation of the factor loadings. EFA uses oblique rotation, given that the motivation subscales are likely to be correlated.

Table 6.4-1 thru Table 6.4-7 provide various outputs of Exploratory Factor Analysis as computed by SPSS.

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
A1	2.565	2.1009	62
A2	1.290	1.8851	62
A3	3.129	1.9958	62
A4	3.258	1.6589	62
A5	3.565	1.9044	62
A7	3.387	1.6231	62
A8	-.581	.4975	62
A9	3.371	1.8128	62
A10	1.919	2.8244	62
A11	3.435	1.7982	62
A12	2.468	2.4809	62
A13	1.629	2.4174	62
A14	1.855	1.5133	62
A15	2.774	1.5302	62
A16	-1.258	1.9747	62
A17	3.161	2.3060	62
A18	-3.645	1.2160	62

Table 6.4-1: Descriptive Statistics output of EFA

Factor Matrix[a]

	Factor					
	1	2	3	4	5	6
A1	.788	.612				
A7	.781	-.623				
A4	.284	.177	.109		-.269	.203
A3	.231	-.212	.148	.141		-.224
A10		-.194	.976			
A11	.287	.123	.501	.147	-.227	.119
A17	.145		.413	.233	.212	
A14	-.149	.222	.312	-.198		-.205
A18	-.183		-.261	-.184	.162	
A12	.164	-.176		.743	.310	
A9	.199	-.164		.468		-.317
A5	.300			.447		-.368
A2	.119	-.137		.431	-.102	-.128
A16	-.174	.109	-.163	-.132	.578	-.139
A13	.275	.123	.282	.396	-.549	
A15			.156	.147	.489	.206
A8		.236	.112	.129		.659

Extraction Method: Maximum Likelihood.

a. 6 factors extracted. 25 iterations required.

Table 6.4-2: Factor Matrix output of EFA

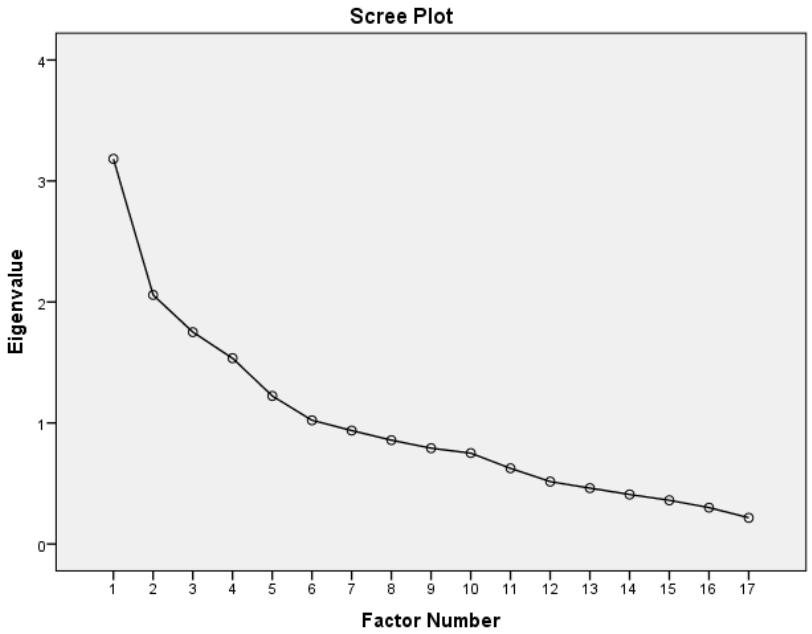


Figure 6.4-1: Scree Plot output of EFA

Goodness-of-fit Test

Chi-Square	df	Sig.
33.012	49	.001

Table 6.4-3: Goodness-of-fit Test output of EFA

Pattern Matrix[a]

	Factor					
	1	2	3	4	5	6
A1	1.022		-.127		.123	
A4	.314			-.137	-.257	.132
A7	.110	-1.026		-.103		
A3		-.253	.169	.184	.105	-.166
A10	-.217		1.033	-.138		
A11	.248		.430		-.232	.139
A17	.106		.389	.143	.203	.171
A14		.251	.323	-.112	.106	-.249
A18		.100	-.244	-.180	.165	
A12	-.104			.651	.304	.394
A5	.188			.614		-.174
A9				.588		-.122
A2				.470		
A16		.101	-.117		.602	-.125
A13	.197		.175	.376	-.537	.184
A15			.158		.471	.283
A8	.126			-.148		.671

Extraction Method: Maximum Likelihood.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 14 iterations.

Table 6.4-4: Pattern Matrix output of EFA

Structure Matrix

	Factor					
	1	2	3	4	5	6
A1	.981	-.143		.132		.124
A4	.382				-.317	.184
A7	.160	-.987		.324	-.123	
A3		-.320	.198	.307		-.128
A14		.296	.279	-.166	.116	-.219
A10			.966			
A11	.404	-.120	.514	.182	-.296	.229
A17	.183		.451	.218	.161	.230
A18	-.125	.206	-.289	-.276	.196	
A12		-.335	.155	.676	.269	.402
A5	.194	-.255		.611		-.134
A9		-.302		.610		-.102
A2		-.225		.484	-.110	
A16	-.149	.200	-.160	-.168	.618	-.155
A13	.377	-.141	.309	.416	-.593	.248
A15			.189		.451	.299
A8	.215	.109		-.151		.682

Extraction Method: Maximum Likelihood.

Rotation Method: Oblimin with Kaiser Normalization.

Table 6.4-5: Structure Matrix output of EFA

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3.183	18.724	18.724	1.809	10.641	10.641	1.605
2	2.058	12.108	30.831	1.113	6.550	17.191	1.649
3	1.751	10.301	41.132	1.724	10.140	27.331	1.831
4	1.535	9.032	50.164	1.544	9.083	36.415	2.069
5	1.224	7.197	57.361	1.207	7.099	43.513	1.332
6	1.022	6.015	63.375	.922	5.421	48.935	1.057
7	.937	5.514	68.889				
8	.858	5.047	73.937				
9	.792	4.657	78.594				
10	.751	4.417	83.011				
11	.625	3.678	86.689				
12	.515	3.032	89.721				
13	.461	2.714	92.435				
14	.409	2.405	94.840				
15	.361	2.123	96.963				
16	.300	1.765	98.728				
17	.216	1.272	100.000				

Extraction Method: Maximum Likelihood.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 6.4-6: Total Variance output of EFA

Factor Correlation Matrix

Factor	1	2	3	4	5	6
1	1.000	-.064	.205	.067	-.185	.143
2	-.064	1.000	-.059	-.411	.098	-.055
3	.205	-.059	1.000	.176	-.025	.109
4	.067	-.411	.176	1.000	-.059	.033
5	-.185	.098	-.025	-.059	1.000	-.018
6	.143	-.055	.109	.033	-.018	1.000

Extraction Method: Maximum Likelihood.

Rotation Method: Oblimin with Kaiser Normalization.

Table 6.4-7: Factor Correlation Matrix output of EFA

First, full set of items are considered. The sample under analysis is small. According to Kaiser Criterion, there are six factors in the data as they have Eigenvalues > 1. The first four factors account for 50 percent of the variance while the last two account for 7 and 6 percent.

The Extraction Sums of Squared Loadings provides similar information based only on the extracted factors. The means for each of the items appear to be reasonable as each of the items is measured on RAI scale. No values are above +5 or below -5.

The standard deviations are all similar suggesting that there are no outliers for any of the items.

Factors capturing extrinsic and introjected subscales are strongly correlated, and they are both weakly correlated with the factor capturing intrinsic subscale. However, unlike the case of new hires, it is observed that contrary to existing theory, the factors capturing extrinsic and intrinsic motivations are again strongly correlated for Senior Leaders in IT Industry.

The Scree Plot shows that there are six relatively high (factors 1, 2, 3, 4, 5 and 6) eigenvalues. Retain factors that are above the 'bend' – the point at which the curve of decreasing eigenvalues changes from a steep line to a flat, gradual slope.

The Factor Matrix represents information from the initial un-rotated solution. The values are weights that relate the item (or variable) to the respective factor.

The Goodness-of-fit Test determines if the sample data (correlations) are likely to arisen from six correlated factors. In the same context, the probability value of the Chi-Square statistic should be greater than the chosen alpha (0.05). Based on the results, the six-factor model is a good description of the data as $p < 0.001$.

The Pattern Matrix shows the factor loadings for the rotated solution. Factor loadings are similar to regression weights (or slopes) and indicate the strength of the association between the variables and the factors. The solution has been rotated to achieve an interpretable structure.

The Structure Matrix shows the correlations between the factors and the items for the rotated solution. Since the factors are correlated the Pattern Matrix, and the Structure Matrix are not the same.

The Factor Correlation Matrix shows that factors 1, 2, 3, 4, 5 and 6 are statistically correlated.

6.5. Survey Data Qualitative Analysis

6.5.1. Question 1: Having instant communication (online) dialog / interaction with experts?

helps me get my views ratified by experts	18	72%
helps create a bond of trust and reach out to same experts again and again	18	72%
urges me to reach out to them as it is easy	18	72%

New Hires in IT Industry

helps me get my views ratified by experts	27	73%
helps create a bond of trust and reach out to same experts again and again	20	54.1%
urges me to reach out to them as it is easy	20	54.1%

Sr. Leaders in IT Industry

Figure 6.5-1: Qualitative Analysis of response to Pilot Survey Question 1

It is observed that the answers to the questions are nearly similar for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-1. It is also observed that the Sr. Leaders are also inclined to get their views ratified by experts more often than New Hires.

6.5.2. Question 2: If the tool can rank the participants based on free/busy information?

Figure 6.5-2: Qualitative Analysis of response to Pilot Survey Question 2

It is observed that the answers to the questions are once again nearly similar for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-2. Both groups tend to rely more on the output of electronic groups rather than create their rankings. It is also observed that New Hires tend to use these electronic tools for identifying experts and start communication, whereas Sr. Leaders use these instruments to manage communication and collaboration actively.

6.5.3. Question 3: If various collaboration tools can share information between them?

I will be more successful as I will reach out to folks outside of my work / school	21	84%
I will create my own groups / network to accomplish a task	13	52%
I will spend less time searching for information and more time using information	17	68%

New Hires in IT Industry

I will be more successful as I will reach out to folks outside of my work / school	22	59.5%
I will create my own groups / network to accomplish a task	16	43.2%
I will spend less time searching for information and more time using information	28	75.7%

Sr. Leaders in IT Industry

Figure 6.5-3: Qualitative Analysis of response to Pilot Survey Question 3

It is observed that the answers to the questions are nearly similar for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-3. Both groups try to spend less time searching for information and more time using information as well as feel that they will be more successful if they reach out to folks outside of their work/school. Another interesting observation is that both groups are not much inclined to create their network but rather get connected to existing networks/groups.

6.5.4. Question 4: If there was a classification or tag available to identify experts in communication tool?

Figure 6.5-4: Qualitative Analysis of response to Pilot Survey Question 4

It is observed that the answers to the questions are nearly similar for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-4. Both groups are looking for ways and means to help accomplish their tasks faster. Another interesting observation is that both groups are equally inclined to engage in discussions in other areas of their interest as well aspire to act as experts in areas of their interest.

6.5.5. Question 5: If the tool can list the most active group communications?

Figure 6.5-5: Qualitative Analysis of response to Pilot Survey Question 5

It is observed that the answers to the questions are nearly similar for responses 1 and 3 but differ in response 2 for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-5. Both groups are looking forward to engaging in groups where there is active communication as well as where subject matter experts are participating. This helps identify that both the groups are looking forward to taking part in the most intense discussion and would like to contribute to that communication. One aberration is observed in Sr. Leaders group where they do not look for answers to their problems by looking for most active conversation and focus on identifying issues at hand.

6.5.6. Question 6: If the tool can help establish location of experts?

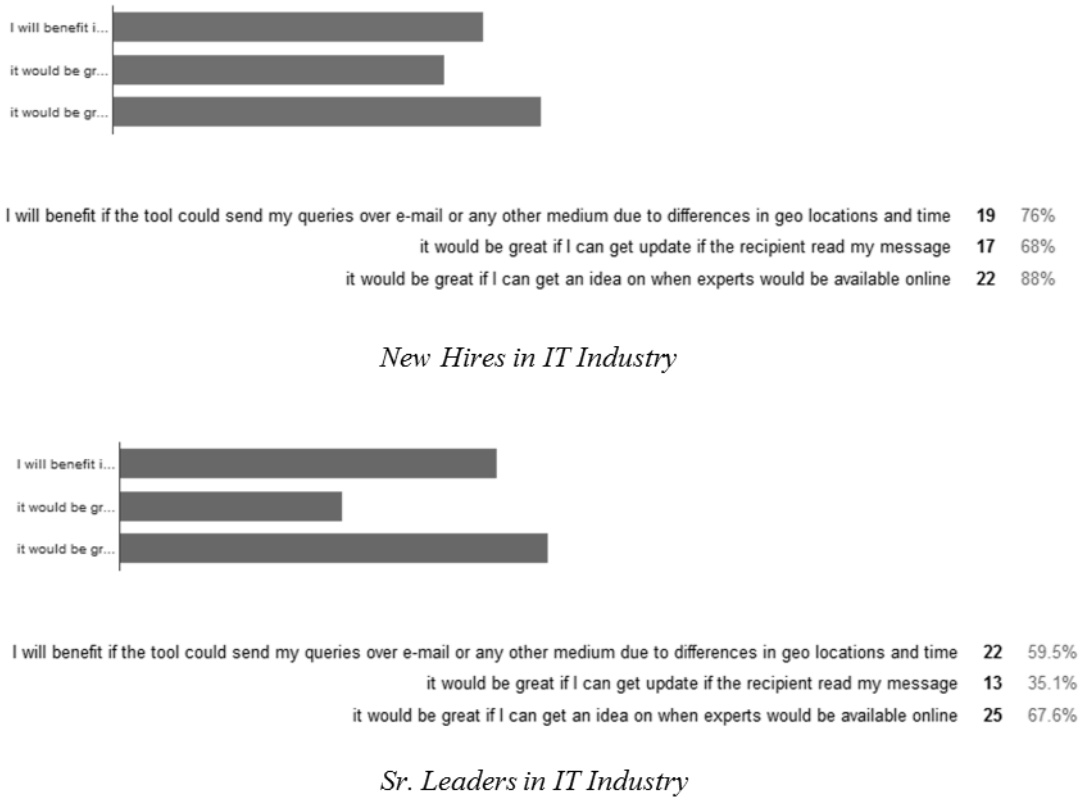


Figure 6.5-6: Qualitative Analysis of response to Pilot Survey Question 6

It is observed that the answers to the questions are nearly similar to all responses for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-6. Both groups are looking forward to engaging in asynchronous discussions given geographic and time differences. Also, both groups are looking for details on when the experts will be available online. It is also observed that both groups are not very interested in getting updates of message read receipt functionality.

6.5.7. Question 7: If the participants do not engage in information sharing?

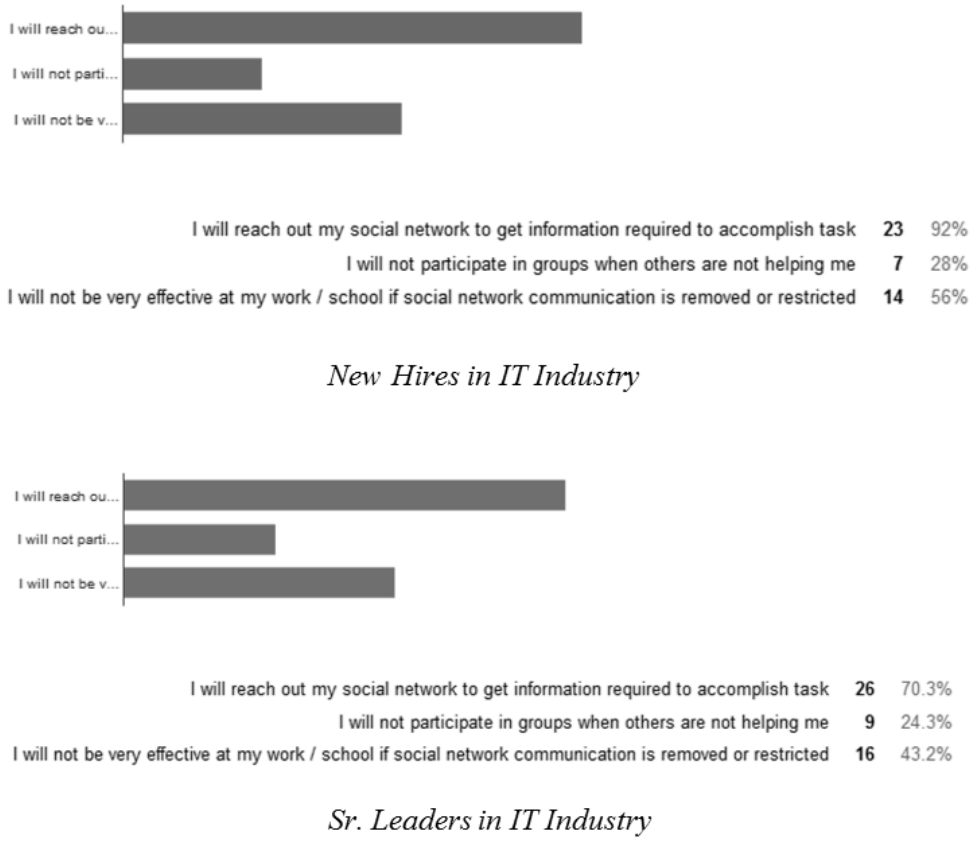
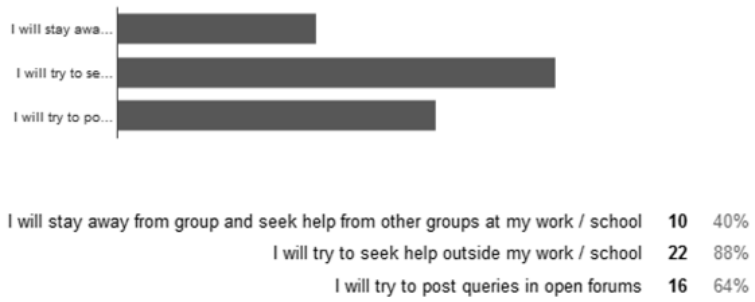


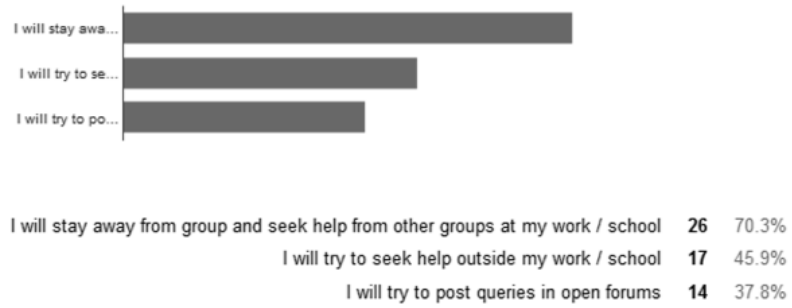
Figure 6.5-7: Qualitative Analysis of response to Pilot Survey Question 7

It is observed that the answers to the questions are nearly similar to all responses for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-7. Both groups are looking forward to engaging with their external social network to get the required details and information to accomplish their tasks. Both groups also feel that their effectiveness will be severely hampered, if their access to electronic communication and collaboration tools is restricted or removed. It is also observed that both groups are very positive in their group collaboration despite the fact that they may not get help from participants within the group.

6.5.8. Question 8: If I only get negative or unusable information from participants?



New Hires in IT Industry



Sr. Leaders in IT Industry

Figure 6.5-8: Qualitative Analysis of response to Pilot Survey Question 8

It is observed that the answers to the questions vary between New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-8. At one hand, New Hires are more inclined towards seeking help from outside their work environment given that their networks within work environments may not have formed yet. New Hires, on the other hand, tend to stay away from groups that do not provide help and seek participation within groups that provide more help. Both groups are not very inclined towards posting their queries in open forums. Both groups, therefore, seek involvement in networks that can quickly help them get the required help from their both informal as well as formal networks.

6.5.9. Question 9: If the participants in a discussion do not agree to reach a consensus?

Figure 6.5-9: Qualitative Analysis of response to Pilot Survey Question 9

It is observed that the answers to the questions are nearly similar to all responses for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-9. Both groups are looking forward to engaging with experts within their external social network to get the required details and information to accomplish their tasks. Both groups also feel that their effectiveness will be increased if they can reach out to experts in a given field provided their work is published and made available. Finally, both groups confirm that they will use the information or details supplied by the most respected participant in the group.

6.5.10. Question 10: During formation of groups?

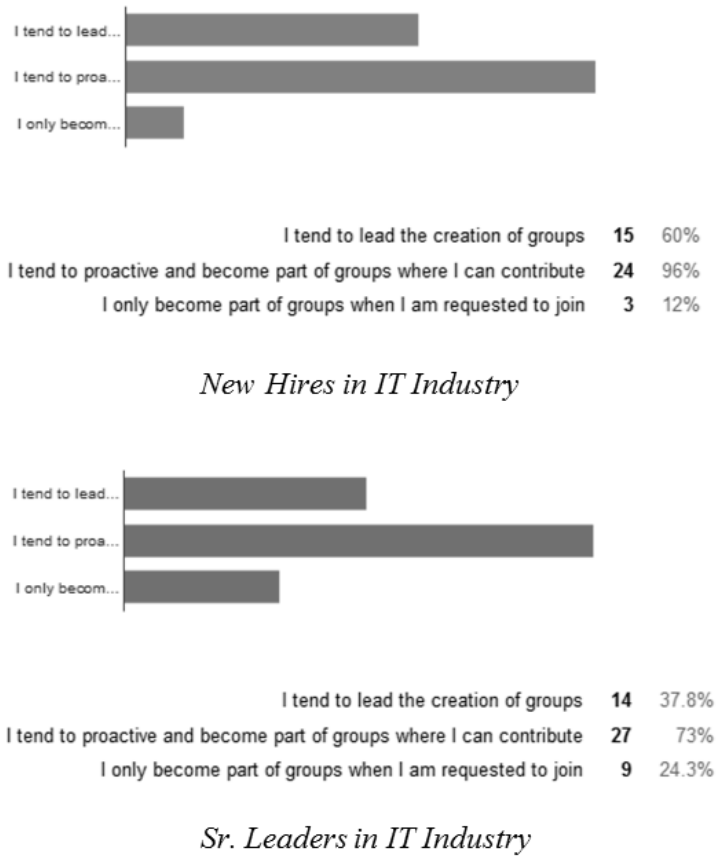


Figure 6.5-10: Qualitative Analysis of response to Pilot Survey Question 10

It is observed that the answers to the questions are nearly similar to all responses for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-10. Both groups are looking forward to proactive engagements where they can and become part of groups and can contribute. Both groups also believe that they can lead the creation of groups if they think that a new group will be required for generating the required information to accomplish their tasks. Finally, both groups confirm that they join groups and will not wait to be invited to be part of a group, establishing that individual desires take precedence over work and group requirements.

6.5.11. Question 11: During discussions within the group?

I am more open and contribute a lot if the group provides inclusiveness and positive feedback	23	92%
I tend to shy away from group and seek participation in other groups where I am more openly accepted	2	8%
I am more creative and participative when I can provide new contributions or unique points of view to discussions	20	80%

New Hires in IT Industry

I am more open and contribute a lot if the group provides inclusiveness and positive feedback	21	56.8%
I tend to shy away from group and seek participation in other groups where I am more openly accepted	4	10.8%
I am more creative and participative when I can provide new contributions or unique points of view to discussions	23	62.2%

Sr. Leaders in IT Industry

Figure 6.5-11: Qualitative Analysis of response to Pilot Survey Question 11

It is observed that the answers to the questions are nearly similar to all responses for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-11. Both groups believe that they can be more creative and participative when they can provide new contributions or unique points of view to discussions. Both groups also believe that they can be more open and contribute a lot if the group provides inclusiveness and positive feedback. Similarly, both groups also shy away from groups that do not provide an open and conducive collaboration environment and seek participation in other groups where they are openly accepted and can discuss and collaborate freely.

6.5.12. Question 12: During winding down of groups and creation of new ones?

Figure 6.5-12: Qualitative Analysis of response to Pilot Survey Question 12

It is observed that the answers to the questions are nearly similar to all responses for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-12. Both groups feel that they would like to be part of the group part of groups where they can learn and grow by learning from experiences of other group members. Both groups also express the desire to participate more in groups where there was a prior positive experience with former associates during previous interactions. Both groups are also averse to negative experiences and stay away from groups where the experience was not very positive due to the behavior of group members.

6.5.13. Question 13: My communication and collaboration is primarily driven by?

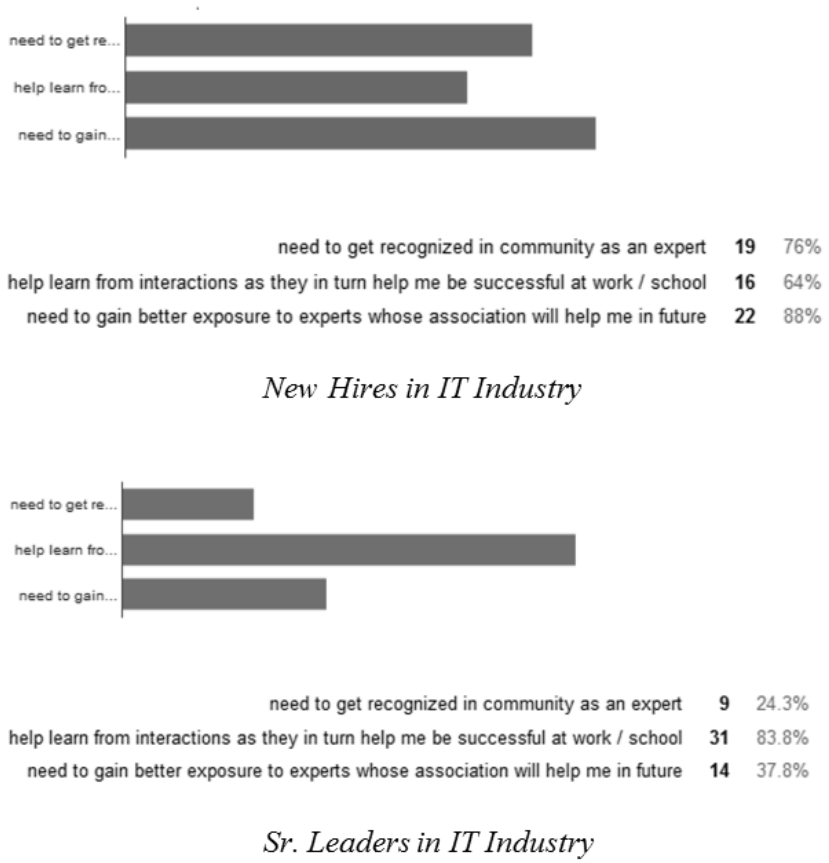


Figure 6.5-13: Qualitative Analysis of response to Pilot Survey Question 13

It is observed that the answers to the questions vary between New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-13. On one hand, New Hires are more inclined towards being recognized in the community as an expert. Sr. Leaders, on the contrary, are more willing to learn from interactions as they in turn help them to be successful. New Hires feel that they need to gain better exposure to experts whose association will assist them in future; however, Sr. Leaders believe that they need to identify experts to help them in completing organizational tasks and activities to meet organizational goals and requirements.

6.5.14. Question 14: I participate in groups as?

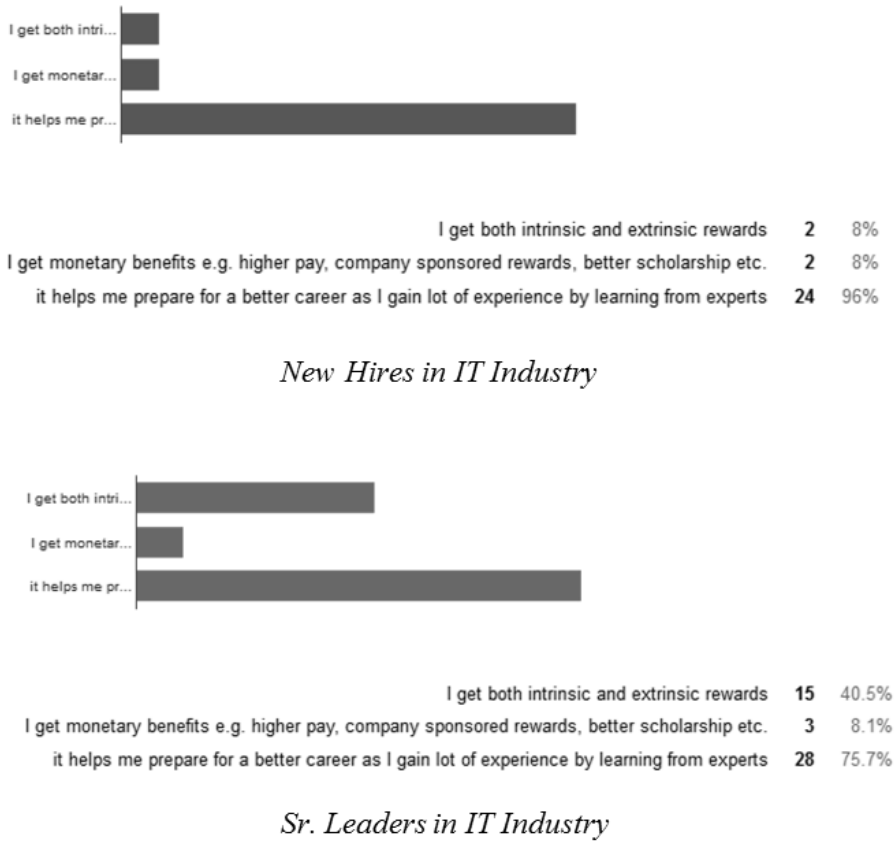


Figure 6.5-14: Qualitative Analysis of response to Pilot Survey Question 14

It is observed that the answers to the questions are nearly similar to all responses for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-14. Both groups feel that they are prepared for a better career as they can gain a lot from experience by learning from experts. Both groups also express the desire to not worry about get monetary benefits e.g. higher pay; company sponsored reward during group collaborations. However, Sr. Leaders do understand that by actively engaging in groups, they can benefit from both intrinsic and extrinsic rewards.

6.5.15. Question 15: Communication and Collaboration is essential?

Figure 6.5-15: Qualitative Analysis of response to Pilot Survey Question 15

It is observed that the answers to the questions are nearly similar to all responses for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-15. Both groups feel that communication and collaboration are essential as it helps in driving initiatives beyond the current scope, leading to mindshare with the primary stakeholders outside their sphere of influence. Both groups also express the desire to gain the trust of their team members when they can bring external perspective in their communication. Both groups also feel that it is important for them to function in their job, as they may not be the most skilled and experienced person for the given assignment.

6.5.16. Question 16: My communication and collaboration with my direct group?

Figure 6.5-16: Qualitative Analysis of response to Pilot Survey Question 16

It is observed that the answers to the questions vary between New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-16. On one hand, New Hires are more reserved limited as they feel it will expose their areas of development. Sr. Leaders, on the contrary, are more inclined to understand the areas of development of their team members. New Hires believe that they need to gain better exposure to experts whose association will help them in future; however, Sr. Leaders feel that they need to understand where they can make great impact due to their unique position within the group and use it as an advantage. Both groups also believe that their group collaboration and communication is more expanded as they feel they will understand the areas of development of their team members.

6.5.17. Question 17: My communication and collaboration with my direct group?

I am more outward thinking and try to bring in different viewpoints which might not be directly related to current discussion	24	96%
I tend to stick to just the current discussions and only provide monosyllable responses e.g Yes, No, Agree, Disagree	3	12%
I try to stay away from confrontational and directed discussions as I feel my inputs will negatively impact me immediately or in future	1	4%

New Hires in IT Industry

I am more outward thinking and try to bring in different viewpoints which might not be directly related to current discussion	29	78.4%
I tend to stick to just the current discussions and only provide monosyllable responses e.g Yes, No, Agree, Disagree	7	18.9%
I try to stay away from confrontational and directed discussions as I feel my inputs will negatively impact me immediately or in future	6	16.2%

Sr. Leaders in IT Industry

Figure 6.5-17: Qualitative Analysis of response to Pilot Survey Question 17

It is observed that the answers to the questions are nearly similar to all responses for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-17. Both groups believe that they bring outward thinking and try to bring in different viewpoints that might not be directly related to the current discussion. Both groups also express they do not tend to stick to just the current discussions and provide monosyllable responses, e.g., Yes, No, Agree, Disagree. Both groups also express they try to stay away from confrontational and directed discussions as they feel that their inputs will negatively impact them immediately or in future.

6.5.18. Question 18: When I try to create a new group?

I tend to include participants from outside my work / school as it helps contain my areas of exposure	25	100%
I tend to stay away from outside participants as I feel it will be detrimental for me due to exposure in community	1	4%
I like to include only participants with whom I have a very positive and comfortable working relationship	4	16%

New Hires in IT Industry

I tend to include participants from outside my work / school as it helps contain my areas of exposure	24	64.9%
I tend to stay away from outside participants as I feel it will be detrimental for me due to exposure in community	5	13.5%
I like to include only participants with whom I have a very positive and comfortable working relationship	14	37.8%

Sr. Leaders in IT Industry

Figure 6.5-18: Qualitative Analysis of response to Pilot Survey Question 18

It is observed that the answers to the questions are nearly similar to all responses for both New Hires and Sr. Leaders in IT Industry as shown above in Figure 6.5-18. Both groups tend to include participants from outside their network as it helps them contain their areas of exposure. Both groups also express when they create new groups; they tend to stay away from outside participants as they feel it will be detrimental to them due to exposure to the community. Both groups also express they are not inclined towards having only participants with whom they have had a very positive and comfortable working relationship bringing out the view that they are both interested in getting diverse and meaningful participation and not having participant with similar opinions.

6.6. Summary

In this chapter, a detailed examination of a measure of individuals' autonomy was conducted using Relative Autonomy Index using the data representative of new hires and senior leadership in IT Industry. Relative Autonomy Index was used to get an understanding of how respondents will respond to questions and whether the questions and answers represent that both new hires and senior leaders are similar in their autonomy except of areas where their experience in the industry lead them to distinguish their need for recognition, participation, and rewards.

Chapter 7: IT Industry Results

7.1. Overview

Previous chapter outlined the Pilot phase of the study and discussed in detail the data collection, its analysis and results findings. This chapter provides specific details of the Information Technology (IT) Industry groups in Redmond (State of Washington, USA) and Bangalore (State of Karnataka, INDIA), the research participants, data analysis and findings.

7.2. IT Industry groups in Redmond (USA) and Bangalore (INDIA)

The research study drew its study population from two high-technology regions: Redmond, WA, USA and Bangalore, India. Redmond, (a Township to the northeast of Seattle; part of the larger Puget Sound Region in Washington State) has the highest concentration of Cloud-Based IT Companies. With more than 40 IT companies with revenues over $1Bn are based in the Puget Sound region.

The two leading IT names in the region are Microsoft and Amazon. With their base in Puget Sound Region, these companies attract IT professionals from around the work seeking to gain new technology knowledge and enhance the development of solutions based on the technology offered by these businesses.

Bangalore, on the other hand, has the largest concentration of Information Technology (IT) industries in India. This concentration stems from the fact that there has been a special reorganization of the global information technology sector as well as the dynamic growth offered to the global information technology sector by India. More than a

third of the IT firms in India are based in Bangalore, and the city still has the largest concentration of IT firms in India.

These two cities hence provide the right base for this study as broad representatives from nearly all IT companies are available in one single location, and hence the study revolves around these two cities.

7.3. Response Rate and Data Preparation

The survey questionnaire was administered to 350 participants from IT Industry in Redmond (USA) and Bangalore (INDIA) respectively. Refer to Appendix II and Appendix III for a copy of the survey that was administered to study participants from Redmond (USA) and Bangalore (INDIA).

The survey respondents from Redmond (USA) represented 51 companies and respondents from IT Industry in Bangalore (INDIA) represented 12 companies. The participants were invited to take part in the study on a voluntary basis. A total of 250 qualified and complete responses were received from each group (cumulative of 500 responses), providing an overall response rate of 71.4%.

Once data was downloaded from survey tool into Excel, it was formatted for use with SPSS for further analysis. SPSS was used for both descriptive as well as inferential statistics. The data gathered in the survey dictates the types of statistical analysis techniques to be used.

7.4. Demographics

Section 1 of the survey questionnaire gathered data about the background of respondents. This section provides an overview of the demographic data captured as part of survey response from participants.

In summary, for IT Industry in Redmond (USA), the total male population was 85.2%, and female population was 14.8% as shown in Table 7.4-1. Of this population, over 69.6% of respondents had a college Graduate degree. A deeper sub-division of this audience reveals 60% comprised male respondents and 9.6% female respondents. Similarly, 27.2% of respondents had a college Post Graduate degree. A deeper sub-division of this audience reveals 86% comprised male respondents and 14% female respondents. Only 3.2% of respondents had a Doctorate. A deeper sub-division of this audience reveals 50% comprised male respondents and 50% female respondents.

Since 85% of respondents were male, results need to be analyzed with caution when assuming findings apply equally to both genders.

Qualification	Male	Female	Percent (n=250)
Graduate	60.0	9.6	69.6
Post Graduate	23.6	3.6	27.2
Doctorate	1.6	1.6	3.2
Total	85.2	14.8	100.0

Table 7.4-1: Qualification of respondents of IT Industry in Redmond (USA) by gender

Similarly, for IT Industry in Bangalore (India), the total male population was 73.2%, and female population was 26.8% as shown in Table 7.4-2. Of this population, over 69.6% of respondents had a college Graduate degree. A deeper sub-division of this audience reveals 71.8% comprised male respondents and 28.2% female respondents. Similarly, 27.2% of respondents had a college Post Graduate degree. A deeper sub-division of this audience reveals 76.4% comprised male respondents and 23.6% female respondents. Only 3.2% of respondents had a Doctorate. A deeper sub-division of this audience reveals 75% comprised male respondents and 25% female respondents.

Qualification	Male	Female	Percent (n=250)
Graduate	50.0%	19.6%	69.6%
Post Graduate	20.8%	6.4%	27.2%
Doctorate	2.4%	0.8%	3.2%
Total	73.2%	26.8%	100.0%

Table 7.4-2: Qualification of respondents of IT Industry in Bangalore (INDIA) by gender

Section 1 of the survey questionnaire also gathered data about the use of electronic communication tools in use by respondents and is presented in this section. Table 7.4-3 provides a ranked order of the tools and their usage for both male and female population. Based on this information, the results ascertain that usage of electronic tools within the IT Industry in Redmond is prevalent and is in active usage. Interesting observations are high dynamic usage of both Text Messaging (interpersonal communication) and E-Mail (group communication), Instant Message Chat (interpersonal communication) as well as Web Conference (group discussion) followed by usage of social tools.

	Male		Female	
Use of electronic communication tools	**Yes**	**No**	**Yes**	**No**
Text Messaging	85.2%	0.0%	14.8%	0.0%
E-Mail	85.2%	0.0%	14.8%	0.0%
Instant Message Chat	78.4%	6.8%	13.6%	1.2%
Web Conference	78.0%	7.2%	12.8%	2.0%
Facebook	77.2%	8.0%	12.8%	2.0%
Social Sites	72.8%	12.4%	13.6%	1.2%
Cloud Tools	68.8%	16.4%	10.4%	4.4%
Wiki's	66.0%	19.2%	11.6%	3.2%
Audio Chat	65.6%	19.6%	12.0%	2.8%
Social Tools	63.2%	22.0%	12.0%	2.8%
Video Chat	62.8%	22.4%	10.8%	4.0%
Forums	54.0%	31.2%	8.8%	6.0%
White Boarding	25.2%	60.0%	3.6%	11.2%

Note: Percent (n=250)

Table 7.4-3: Use of electronic communication tools in IT Industry in Redmond (USA) by gender

It is observed that White Boarding is not actively used as a tool for communication. The same can act as a part of a later study on why White Boarding as a tool is diminishing in its usage.

On categorizing the tools based on their mode of communication i.e. social, asynchronous as well as synchronous, an interesting observation surfaces. Based on the survey results, it is observed that Social, Asynchronous as well as Synchronous

communication tools are used in equal proportions and are used more than 72% of time (taking cumulative of tools usage across male and female populations) as shown in Table 7.4-4 and Table 7.4-5.

	Male		Female	
Mode of electronic communication tools	**Yes**	**No**	**Yes**	**No**
Asynchronous	76.3%	8.9%	12.9%	1.9%
Social	66.8%	18.4%	11.8%	3.0%
Synchronous	62.0%	23.2%	10.6%	4.2%

Note: Percent (n=250)

Table 7.4-4: Mode of electronic communication tools usage in IT Industry in Redmond (USA) by gender

Mode of electronic communication tools	**Yes**	**No**
Asynchronous	89.20%	10.80%
Social	78.60%	21.40%
Synchronous	72.60%	27.40%

Note: Percent (n=250)

Table 7.4-5: Mode of electronic communication tools usage in IT Industry in Redmond (USA)

Similarly, when taking into account the responses registered from IT Industry in Bangalore (INDIA), Section 1 of the survey questionnaire gathered data about the use of electronic communication tools in use by respondents and is presented in this section. Table 7.4-6 provides a ranked order of the tools and their usage for both male and female population. Once again based on this information, it can be sufficiently ascertained that usage of electronic tools within the IT Industry in Bangalore is prevalent and is in active usage.

	Male		Female	
Use of electronic communication tools	**Yes**	**No**	**Yes**	**No**
Text Messaging	73.2%	0.0%	26.8%	0.0%
E-Mail	73.2%	0.0%	26.8%	0.0%
Instant Message Chat	69.2%	4.0%	22.8%	4.0%
Web Conference	66.0%	7.2%	24.8%	2.0%
Facebook	65.6%	7.6%	24.4%	2.4%
Social Sites	63.2%	10.0%	23.2%	3.6%
Cloud Tools	59.6%	13.6%	19.6%	7.2%
Wiki's	58.8%	14.4%	18.8%	8.0%
Social Tools	55.6%	17.6%	19.6%	7.2%
Audio Chat	54.0%	19.2%	23.6%	3.2%
Video Chat	51.2%	22.0%	22.4%	4.4%
Forums	47.6%	25.6%	15.2%	11.6%
White Boarding	22.0%	51.2%	6.8%	20.0%

Note: Percent (n=250)

Table 7.4-6: Use of electronic communication tools in IT Industry in Bangalore (INDIA) by gender

Interesting observations are; high active usage of both Text Messaging (interpersonal communication) and E-Mail (group communication), Instant Message Chat (interpersonal communication) as well as Web Conference (group discussion) followed by usage of social tools. Once again, it is observed that White Boarding is not actively used as a tool for communication.

On categorizing the above tools based on their mode of communication i.e. social, asynchronous as well as synchronous, an interesting observation surfaces. Based on the survey results, it is observed that Social, Asynchronous as well as Synchronous communication tools are used in equal proportions and are used more than 71% of time (taking cumulative of tools usage across male and female populations) as shown in Table 7.4-7 and Table 7.4-8.

	Male		**Female**	
Mode of electronic communication tools	**Yes**	**No**	**Yes**	**No**
Asynchronous	65.20%	7.00%	23.00%	4.80%
Social	58.70%	15.20%	19.80%	6.30%
Synchronous	50.50%	20.70%	22.10%	7.70%

Note: Percent (n=250)

Table 7.4-7: Mode of electronic communication tools in IT Industry in Bangalore (INDIA) by gender

Mode of electronic communication tools	**Yes**	**No**
Asynchronous	88.20%	11.80%
Social	78.50%	21.50%
Synchronous	71.60%	28.40%

Note: Percent (n=250)

Table 7.4-8: Mode of electronic communication tools in IT Industry in Bangalore (INDIA)

The survey also captured the age of respondents for IT Industry in Redmond (USA) and Bangalore (INDIA). The distribution of age groups of survey respondents established an equal balanced response set from the survey population. The age distribution for IT Industry in Redmond (USA) is shown below in Table 7.4-9. The age distribution for IT Industry in Bangalore (INDIA) is shown below in Table 7.4-10.

	Male		Female	
Age Group	**Count**	**%**	**Count**	**%**
25 to 30 years	45	18.00%	6	2.40%
31 to 35 years	46	18.40%	9	3.60%
36 to 40 years	37	14.80%	6	2.40%
41 to 45 years	44	17.60%	12	4.80%
46 to 50 years	41	16.40%	4	1.60%
Total	213	85.20%	37	14.80%

Note: Percent (n=250)

Table 7.4-9: Age Distribution of IT Industry respondent in Redmond (USA)

	Male		Female	
Age Group	**Count**	**%**	**Count**	**%**
25 to 30 years	46	18.40%	18	7.20%
31 to 35 years	47	18.80%	19	7.60%
36 to 40 years	43	17.20%	17	6.80%
41 to 45 years	35	14.00%	11	4.40%
46 to 50 years	12	4.80%	2	0.80%
Total	183	73.20%	67	26.80%

Note: Percent (n=250)

Table 7.4-10: Age Distribution of IT Industry respondent in Bangalore (INDIA)

In summary, these results provide broad understanding of the respondents and their usage of electronic communication tools. These results are most useful when considered in conjunction with the results from the Section 2 of the Survey Questionnaire. These results are outlined in future sections.

7.5. Descriptive Statistics

The first stage of the analysis involved drawing descriptive statistics from all the questions and the items in "Section 2: Survey Questionnaire" developed from the pilot findings. Since most items were nominal scales, frequency distribution was calculated. During this stage of the analysis, the researcher is presented with an initial overview of the results and provides an opportunity to further identify trends in the data (Creswell, 2005).

On examination of data, there were trends that emerged that were further explored by the use of Principal Components Analysis and Chi-Squared Tests. A Chi-squared test was used due to nominal (categorical) data. The test also helped determine whether an association (or relationship) between two categorical variables in a sample is likely to reflect a real association between these two variables in the population.

Principal Components Analysis (PCA), was the factor extraction method used in this study. The original variables (items) were assumed to be correlated and with the help of PCA, new group of variables are developed which are uncorrelated (Chatfield & Collins, 1980).

When using PCA, multi-collinearity, is desirable which otherwise is avoided due to the original assumption that the variables will be interrelated to a certain extent (Hair (Jnr), Black, Babin, Anderson, & Tatham, 2006).

7.5.1. Availability Factor Frequency

The availability factor frequency for both IT Industry in Redmond (USA) and Bangalore (INDIA) is provided below in Table 7.5-1 and Table 7.5-2. For factors of both of these groups the dominant response selected by majority of respondents is 4 which equates to answer "I will benefit if the tool could send my queries over e-mail or any other medium due to differences in geo locations and time" as well as response 3 which is "it will help me to identify where most experts are engaged and where I can or should engage". These ties into the research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H1_a$: Dynamic organization structures do emerge based on Availability and Accessibility in electronic asynchronous and synchronous communication.

Availability

	Valid								Missing	Total
	.00	2.00	3.00	4.00	5.00	6.00	7.00	Total	System	
Frequency	4	13	34	64	55	46	30	246	4	250
Percent	1.6	5.2	13.6	25.6	22.0	18.4	12.0	98.4	1.6	100.0
Valid Percent	1.6	5.3	13.8	26.0	22.4	18.7	12.2	100.0		
Cumulative Percent	1.6	6.9	20.7	46.7	69.1	87.8	100.0			

Table 7.5-1: Frequency Distribution of Availability Factor for IT Industry in Redmond (USA)

Availability

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	9	34	58	64	63	9	4	9	250
Percent	3.6	13.6	23.2	25.6	25.2	3.6	1.6	3.6	100.0
Valid Percent	3.6	13.6	23.2	25.6	25.2	3.6	1.6	3.6	100.0
Cumulative Percent	3.6	17.2	40.4	66.0	91.2	94.8	96.4	100.0	

Table 7.5-2: Frequency Distribution of Availability Factor for IT Industry in Bangalore (INDIA)

7.5.2. Accessibility Factor Frequency

The accessibility factor frequency for both IT Industry in Redmond (USA) and Bangalore (INDIA) is provided below in Table 7.5-3 and Table 7.5-4. For factors of both of these groups the dominant response selected by majority of respondents is 6 which equates to answer "I tend to participate more in groups where I had a positive experience with former associates during prior interactions". This tie into the research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H1_a$: Dynamic organization structures do emerge based on Availability and Accessibility in electronic asynchronous and synchronous communication.

Accessibility

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	5	23	37	20	34	33	50	48	250
Percent	2	9.2	14.8	8	13.6	13.2	20	19.2	100
Valid Percent	2	9.2	14.8	8	13.6	13.2	20	19.2	100
Cumulative Percent	2	11.2	26	80.8	59.6	72.8	46	100	

Table 7.5-3: Frequency Distribution of Accessibility Factor for IT Industry in Redmond (USA)

Accessibility

	Valid							
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	15	39	42	31	37	73	13	250
Percent	6.0	15.6	16.8	12.4	14.8	29.2	5.2	100.0
Valid Percent	6.0	15.6	16.8	12.4	14.8	29.2	5.2	100.0
Cumulative Percent	6.0	21.6	38.4	50.8	65.6	94.8	100.0	

Table 7.5-4: Frequency Distribution of Accessibility Factor for IT Industry in Bangalore (INDIA)

7.5.3. Agreeability Factor Frequency

The agreeability factor frequency for both IT Industry in Redmond (USA) and Bangalore (INDIA) is provided below in Table 7.5-5 and Table 7.5-6. For IT Industry in Redmond (USA), the dominant response selected by majority of respondents is 5 which equates to answer "help learn from interactions as they in turn help me be successful at work/school". For IT Industry in Bangalore (INDIA), the dominant response selected by a majority of respondents is 3 which equates to answer "I tend to proactive and become part of groups where I can contribute." These ties into the research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H2_a$: Dynamic organization structures do emerge based on Agreeability and Acceptability in electronic asynchronous and synchronous communication.

Agreeability

	Valid						
	1.00	2.00	3.00	4.00	5.00	6.00	Total
Frequency	4	4	53	60	69	60	250
Percent	1.6	1.6	21.2	24.0	27.6	24.0	100.0
Valid Percent	1.6	1.6	21.2	24.0	27.6	24.0	100.0
Cumulative Percent	1.6	3.2	24.4	48.4	76.0	100.0	

Table 7.5-5: Frequency Distribution of Agreeability Factor for IT Industry in Redmond (USA)

Agreeability

	Valid							
	.00	1.00	2.00	3.00	4.00	5.00	6.00	Total
Frequency	4	12	64	102	43	12	13	250
Percent	1.6	4.8	25.6	40.8	17.2	4.8	5.2	100.0
Valid Percent	1.6	4.8	25.6	40.8	17.2	4.8	5.2	100.0
Cumulative Percent	1.6	6.4	32.0	72.8	90.0	94.8	100.0	

Table 7.5-6: Frequency Distribution of Agreeability Factor for IT Industry in Bangalore (INDIA)

7.5.4. Acceptability Factor Frequency

The acceptability factor frequency for both IT Industry in Redmond (USA) and Bangalore (INDIA) is provided below in Table 7.5-7 and Table 7.5-8. For both of these factors the dominant response selected by majority of respondents is 4 which equates to answer "I tend to stay away from groups where the experience was not very positive due to behavior of group members". This tie into the research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H2_a$: Dynamic organization structures do emerge based on Agreeability and Acceptability in electronic asynchronous and synchronous communication.

Acceptability

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	8	22	59	34	63	35	16	13	250
Percent	3.2	8.8	23.6	13.6	25.2	14.0	6.4	5.2	100.0
Valid Percent	3.2	8.8	23.6	13.6	25.2	14.0	6.4	5.2	100.0
Cumulative Percent	3.2	12.0	35.6	49.2	74.4	88.4	94.8	100.0	

Table 7.5-7: Frequency Distribution of Acceptability Factor for IT Industry in Redmond (USA)

Acceptability

	Valid							
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	6	49	59	79	20	20	17	250
Percent	2.4	19.6	23.6	31.6	8.0	8.0	6.8	100.0
Valid Percent	2.4	19.6	23.6	31.6	8.0	8.0	6.8	100.0
Cumulative Percent	2.4	22.0	45.6	77.2	85.2	93.2	100.0	

Table 7.5-8: Frequency Distribution of Acceptability Factor for IT Industry in Bangalore (INDIA)

7.5.5. Rewards and Recognition Factor Frequency

The rewards and recognition factor frequency for both IT Industry in Redmond (USA) and Bangalore (INDIA) is provided below in Table 7.5-9 and Table 7.5-10. For both of these factors, the dominant response selected by a majority of respondents is 3 which equates to answer "I get both intrinsic and extrinsic rewards." This tie into the research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H3_a$: Dynamic organization structures do emerge based on Rewards and Recognition and Quest for Knowledge in social communication and collaboration.

Rewards and Recognition

	Valid						
	.00	1.00	2.00	3.00	4.00	5.00	Total
Frequency	8	28	43	113	41	17	250
Percent	3.2	11.2	17.2	45.2	16.4	6.8	100.0
Valid Percent	3.2	11.2	17.2	45.2	16.4	6.8	100.0
Cumulative Percent	3.2	14.4	31.6	76.8	93.2	100.0	

Table 7.5-9: Frequency Distribution of Rewards and Recognition Factor for IT Industry in Redmond (USA)

Rewards and Recognition

	Valid						
	.00	1.00	2.00	3.00	4.00	5.00	Total
Frequency	12	13	46	70	42	67	250
Percent	4.8	5.2	18.4	28.0	16.8	26.8	100.0
Valid Percent	4.8	5.2	18.4	28.0	16.8	26.8	100.0
Cumulative Percent	4.8	10.0	28.4	56.4	73.2	100.0	

Table 7.5-10: Frequency Distribution of Rewards and Recognition Factor for IT Industry in Bangalore (INDIA)

7.5.6. Quest for knowledge Factor Frequency

The quest for knowledge factor frequency for both IT Industry in Redmond (USA) and Bangalore (INDIA) is provided below in Table 7.5-11 and Table 7.5-12. For IT Industry in Redmond (USA), the dominant response selected by a majority of respondents is 2 which equates to answer "I will create my own groups/network to accomplish a task." For IT Industry in Bangalore (INDIA), the dominant response selected by majority of respondents is 5 which equates to answer "I tend to shy away from group and seek participation in other groups where I am more openly accepted". These ties into the research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis$H3_a$: Dynamic organization structures do emerge based on Rewards and Recognition and Quest for Knowledge in social communication and collaboration.

Quest for Knowledge

	Valid						
	1.00	2.00	3.00	4.00	5.00	8.00	Total
Frequency	59	76	45	31	30	9	250
Percent	23.6	30.4	18.0	12.4	12.0	3.6	100.0
Valid Percent	23.6	30.4	18.0	12.4	12.0	3.6	100.0
Cumulative Percent	23.6	54.0	72.0	84.4	96.4	100.0	

Table 7.5-11: Frequency Distribution of Quest for Knowledge Factor for IT Industry in Redmond (USA)

Quest for Knowledge

	Valid								
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	Total
Frequency	21	33	28	48	74	33	8	5	250
Percent	8.4	13.2	11.2	19.2	29.6	13.2	3.2	2.0	100.0
Valid Percent	8.4	13.2	11.2	19.2	29.6	13.2	3.2	2.0	100.0
Cumulative Percent	8.4	21.6	32.8	52.0	81.6	94.8	98.0	100.0	

Table 7.5-12: Frequency Distribution of Quest for Knowledge Factor for IT Industry in Bangalore (INDIA)

7.5.7. Fear-Factor Factor Frequency

The fear-factor factor frequency for both IT Industry in Redmond (USA) and Bangalore (INDIA) is provided below in Table 7.5-13 and Table 7.5-14. For both of these factors the dominant response selected by majority of respondents is 4 which equates to answer "I like to be part of groups where I learn and grow by learning from experiences of other group members". This tie into the research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H4_a$: Dynamic organization structures do emerge based on Fear-Factor and Social Power in social communication and collaboration.

Fear-Factor

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	5	27	39	36	79	51	8	5	250
Percent	2.0	10.8	15.6	14.4	31.6	20.4	3.2	2.0	100.0
Valid Percent	2.0	10.8	15.6	14.4	31.6	20.4	3.2	2.0	100.0
Cumulative Percent	2.0	12.8	28.4	42.8	74.4	94.8	98.0	100.0	

Table 7.5-13: Frequency Distribution of Fear-Factor Factor for IT Industry in Redmond (USA)

Fear-Factor

	Valid								Missing	Total
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total	System	
Frequency	4	20	51	59	56	43	13	246	4	250
Percent	1.6	8.0	20.4	23.6	22.4	17.2	5.2	98.4	1.6	100.0
Valid Percent	1.6	8.1	20.7	24.0	22.8	17.5	5.3	100.0		
Cumulative Percent	1.6	9.8	30.5	77.2	53.3	94.7	100.0			

Table 7.5-14: Frequency Distribution of Fear-Factor Factor for IT Industry in Bangalore (INDIA)

7.5.8. Social Power Factor Frequency

The social power factor frequency for both IT Industry in Redmond (USA) and Bangalore (INDIA) is provided below in Table 7.5-15 and Table 7.5-16. For both of these factors, the dominant response selected by a majority of respondents is 6 which equates to answer "helps me understand where I can make a great impact due to my unique position within the group." In addition, for IT Industry in Redmond (USA), the second dominant response selected by majority of respondents is 4 which equates to answer "I will seek help from expert from industry, provided their details are published and made available". These ties into the research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H4_a$: Dynamic organization structures do emerge based on Fear-Factor and Social Power in social communication and collaboration.

Social Power

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	9	8	19	42	60	43	60	9	250
Percent	3.6	3.2	7.6	16.8	24.0	17.2	24.0	3.6	100.0
Valid Percent	3.6	3.2	7.6	16.8	24.0	17.2	24.0	3.6	100.0
Cumulative Percent	3.6	6.8	14.4	31.2	55.2	72.4	96.4	100.0	

Table 7.5-15: Frequency Distribution of Social Power for IT Industry in Redmond (USA)

Social Power

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	8	8	39	44	33	39	51	28	250
Percent	3.2	3.2	15.6	17.6	13.2	15.6	20.4	11.2	100.0
Valid Percent	3.2	3.2	15.6	17.6	13.2	15.6	20.4	11.2	100.0
Cumulative Percent	3.2	6.4	22.0	39.6	52.8	68.4	88.8	100.0	

Table 7.5-16: Frequency Distribution of Social Power for IT Industry in Bangalore (INDIA)

7.6. Survey Questionnaire Results

Unlike the demographic results that are useful when considered at the individual level in conjunction with other results, the questionnaire results (Cameron & Quinn, 1999) are most useful when aggregated to obtain an assessment of the organizational culture by all respondents.

As discussed earlier, this survey was completed by 250 respondents each from IT Industry in Redmond (USA) and IT Industry in Bangalore (INDIA).

7.6.1. Principal Components Analysis

As explained in Chapter 5, a principal component analysis (PCA) was conducted, using the data collected thru Section 2 of the survey questionnaire. Details of why PCA was chosen were discussed in Chapter 5 of this study.

7.6.1.1. Testing for Factorability

The first stage in factor analysis is to test for factorability. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity are two such tests. The results of these tests are shown in Table 7.6-1 and Table 7.6-2.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.811
Bartlett's Test of Sphericity	Approx. Chi-Square	719.807
	Df	28
	Sig.	.000

Table 7.6-1: KMO and Bartlett's Test for IT Industry in Redmond (USA)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.863
Bartlett's Test of Sphericity	Approx. Chi-Square	773.156
	Df	28
	Sig.	.000

Table 7.6-2: KMO and Bartlett's Test for IT Industry in Bangalore (INDIA)

With KMO measure being > .8, there is a reasonable level of inter correlations between the variables, making them appropriate for factor analysis. Bartlett's test of sphericity tests the hypothesis that the correlation matrix is an identity matrix (or unit matrix); i.e. all diagonal elements are 1, and all off-diagonal elements are 0, implying that all of the variables are uncorrelated. The Sig. value for this analysis leads us to reject the null hypothesis and conclude that there are correlations in the data set that are appropriate for factor analysis.

7.6.1.2. Factor Retention

Factor analysis was conducted to reduce the number of items in the survey into a smaller group of separate factors (Conway & Huffcutt, 2003). Using PCA with direct oblimin rotation, eight factors resulted with Eigen values greater than 1. On review of these factors, the number of factors emerging from this test was considered based on the uppermost boundary, reinforcing the claim by Hayton et.al. (Hayton, Allen, & Scarpello, 2004),

A Scree test was also conducted to show a graphical representation of the Eigen values of each of the factors extracted. The results are shown in Figure 7.6-1 and Figure 7.6-2. During analysis of Scree Plot, the researcher is looking for obvious discontinuities or breaks in the factors in order to determine the number of final factors (Hayton, Allen, &

Scarpello, 2004). In the Scree test for this research, eight major factors can be identified for both the test cases.

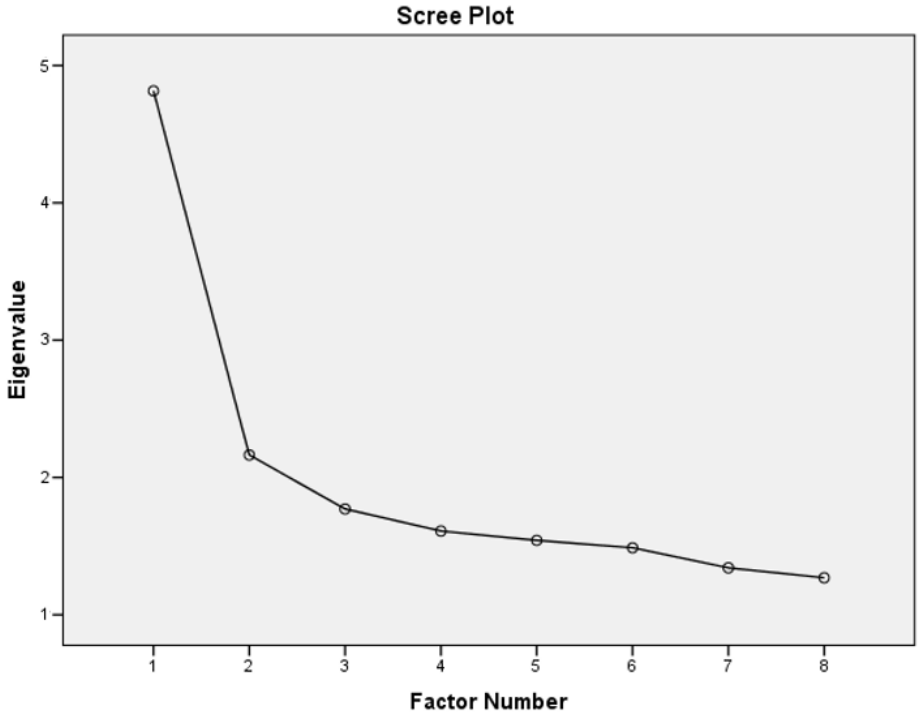


Figure 7.6-1: Scree Plot for IT Industry in Redmond (USA)

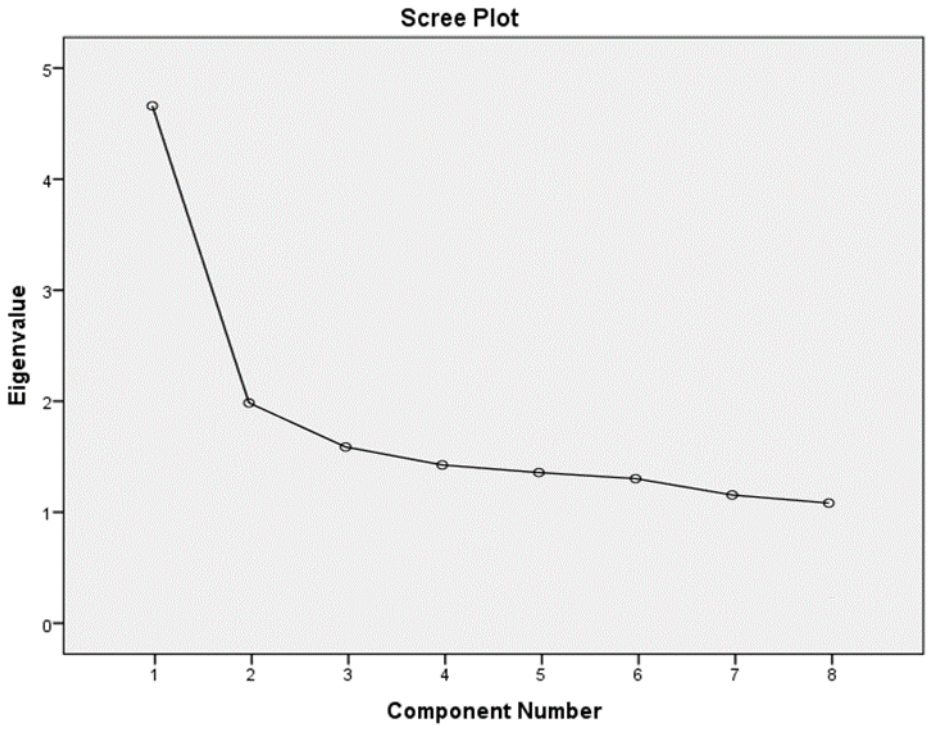


Figure 7.6-2: Scree Plot for IT Industry in Bangalore (INDIA)

Given the results of the Eigen values and Scree Plot, a number of factor analyses were then conducted (using principal components, direct oblimin rotation and specifying the number of factors to be used) with eight factors showing the cleanest loading of most items on a single factor.

7.6.1.3. Reliability Results

Cronbach's alpha was used for testing the factors for internal reliability. The factors that result in a Cronbach's alpha of 0.6 or greater were considered reliable and were deemed useful for further analysis as part of a specific variable (Hair (Jnr), Black, Babin, Anderson, & Tatham, 2006). The Cronbach's alpha results are shown in Table 7.6-3 and Table 7.6-4.

Factors	Items	Cronbach's Alpha
Agreeability	Question 1 - Response 1, Question 9 - Response 2, Question 10 - Response 2, Question 11 - Response 1, Question 13 - Response 2, Question 18 - Response 1	.826
Acceptability	Question 1 - Response 2, Question 6 - Response 3, Question 10 - Response 3, Question 12 - Response 2, Question 13 - Response 3, Question 15 - Response 1, Question 16 - Response 1	.811
Accessibility	Question 2 - Response 1, Question 3 - Response 1, Question 6 - Response 2, Question 8 - Response 2, Question 9 - Response 1, Question 12 - Response 1, Question 13 - Response 1	.800
Availability	Question 1 - Response 3, Question 2 - Response 2, Question 5 - Response 1, Question 6 - Response 1, Question 7 - Response 1, Question 8 - Response 1, Question 10 - Response 1	.825
Fear Factor	Question 7 - Response 3, Question 8 - Response 3, Question 11 - Response 3, Question 12 - Response 3, Question 16 - Response 2, Question 17 - Response 2, Question 18 - Response 3	.820
Rewards	Question 4 - Response 1, Question 7 - Response 2, Question 14 - Response 1, Question 15 - Response 2, Question 17 - Response 1	.822
Social Power	Question 3 - Response 3, Question 4 - Response 3, Question 5 - Response 3, Question 9 - Response 3, Question 14 - Response 3, Question 16 - Response 3, Question 17 - Response 3	.830
Knowledge	Question 2 - Response 3, Question 3 - Response 2, Question 4 - Response 2, Question 5 - Response 2, Question 11 - Response 2, Question 14 - Response 2, Question 15 - Response 3,Question 18 - Response 2	.818

Table 7.6-3: Cronbach's alpha results for IT Industry in Redmond (USA)

Factors	Items	Cronbach's Alpha
Agreeability	Question 1 - Response 1, Question 9 - Response 2, Question 10 - Response 2, Question 11 - Response 1, Question 13 - Response 2, Question 18 - Response 1	.816
Acceptability	Question 1 - Response 2, Question 6 - Response 3, Question 10 - Response 3, Question 12 - Response 2, Question 13 - Response 3, Question 15 - Response 1, Question 16 - Response 1	.814
Accessibility	Question 2 - Response 1, Question 3 - Response 1, Question 6 - Response 2, Question 8 - Response 2, Question 9 - Response 1, Question 12 - Response 1, Question 13 - Response 1	.809
Availability	Question 1 - Response 3, Question 2 - Response 2, Question 5 - Response 1, Question 6 - Response 1, Question 7 - Response 1, Question 8 - Response 1, Question 10 - Response 1	.815
Fear Factor	Question 7 - Response 3, Question 8 - Response 3, Question 11 - Response 3, Question 12 - Response 3, Question 16 - Response 2, Question 17 - Response 2, Question 18 - Response 3	.813
Rewards	Question 4 - Response 1, Question 7 - Response 2, Question 14 - Response 1, Question 15 - Response 2, Question 17 - Response 1	.844
Social Power	Question 3 - Response 3, Question 4 - Response 3, Question 5 - Response 3, Question 9 - Response 3, Question 14 - Response 3, Question 16 - Response 3, Question 17 - Response 3	.823
Knowledge	Question 2 - Response 3, Question 3 - Response 2, Question 4 - Response 2, Question 5 - Response 2, Question 11 - Response 2, Question 14 - Response 2, Question 15 - Response 3,Question 18 - Response 2	.817

Table 7.6-4: Cronbach's alpha results for IT Industry in Bangalore (INDIA)

7.6.1.4. Chi-squared Test

A Chi-squared test was used as nominal (categorical) data was captured through survey responses. The test helped determine whether an association (or relationship) between two categorical variables in a sample is likely to reflect a real association between these two variables in the population.

The Chi-squared test was carried out between the Availability and Accessibility in asynchronous and synchronous communications patterns. For IT Industry in Redmond (USA) and Bangalore (INDIA) and the results are shown below in Table 7.6-5 and Table 7.6-6 respectively.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	295.923[a]	42	.000
Likelihood Ratio	277.508	42	.000
Linear-by-Linear Association	53.961	1	.000
N of Valid Cases	246		

Table 7.6-5: Chi-Square Tests for Availability and Accessibility for IT Industry in Redmond (USA)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	209.994[a]	35	.000
Likelihood Ratio	181.439	35	.000
Linear-by-Linear Association	27.345	1	.000
N of Valid Cases	250		

Table 7.6-6: Chi-Square Tests for Availability and Accessibility for IT Industry in Bangalore (INDIA)

The first hypothesis was based on the emergence of dynamic organization structure based on Availability and Accessibility in electronic asynchronous and synchronous communication. The null and alternate hypotheses are presented here for reference:

Hypothesis $H1_0$: **Dynamic organization structures ***do not emerge*** based on Availability and Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Hypothesis $H1_a$: **Dynamic organization structures ***do emerge*** based on Availability and Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Since $p < 0.001$, the null hypothesis was rejected and it is established that Dynamic organization structures do emerge based on Availability and Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.

Similarly, Chi-squared test was carried out between the Agreeability and Acceptability in asynchronous and synchronous collaboration patterns for IT Industry in Redmond (USA) and Bangalore (INDIA) and the results are shown below in Table 7.6-7 and Table 7.6-8 respectively.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	209.994[a]	35	.000
Likelihood Ratio	181.439	35	.000
Linear-by-Linear Association	27.345	1	.000
N of Valid Cases	250		

Table 7.6-7: Chi-Square Tests for Agreeability and Acceptability for IT Industry in Redmond (USA)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	295.923[a]	42	.000
Likelihood Ratio	277.508	42	.000
Linear-by-Linear Association	53.961	1	.000
N of Valid Cases	246		

Table 7.6-8: Chi-Square Tests for Agreeability and Acceptability for IT Industry in Bangalore (INDIA)

The second hypothesis was based on the emergence of dynamic organization structure based on Agreeability and Acceptability in electronic asynchronous and synchronous collaboration. The null and alternate hypotheses are presented here for reference:

Hypothesis $H2_0$: Dynamic organization structures *do not emerge* based on Agreeability and Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.

Hypothesis $H2_a$: Dynamic organization structures *do emerge* based on Agreeability and Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.

Since $p < 0.001$, the null hypothesis was rejected and it is established that Dynamic organization structures do emerge based on Agreeability and Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.

Next Chi-squared test was carried out between the Rewards and Recognition and Quest for Knowledge in social communication and collaboration for IT Industry in Redmond (USA) and Bangalore (INDIA) and the results are shown below in Table 7.6-9 and Table 7.6-10 respectively.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	208.796[a]	25	.000
Likelihood Ratio	164.420	25	.000
Linear-by-Linear Association	27.442	1	.000
N of Valid Cases	250		

Table 7.6-9: Chi-Square Tests for Rewards and Recognition and Quest for Knowledge for IT Industry in Redmond (USA)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	207.924[a]	35	.000
Likelihood Ratio	180.239	35	.000
Linear-by-Linear Association	27.345	1	.000
N of Valid Cases	250		

Table 7.6-10: Chi-Square Tests for Rewards and Recognition, Quest for Knowledge for IT Industry in Bangalore (INDIA)

The third hypothesis was based on the emergence of dynamic organization structure based on Rewards and Recognition and Quest for Knowledge in social communication and collaboration. The null and alternate hypotheses are presented here for reference:

Hypothesis $H3_0$: Dynamic organization structures *do not emerge* based on Rewards and Recognition and Quest for Knowledge, which result from social collaboration and communication using electronic tools.

Hypothesis $H3_a$: Dynamic organization structures *do emerge* based on Rewards and Recognition and Quest for Knowledge, which result from social collaboration and communication using electronic tools.

Since $p < 0.001$, the null hypothesis was rejected and it is established that Dynamic organization structures do emerge based on Rewards and Recognition and Quest for Knowledge, which result from social collaboration and communication using electronic tools.

Next Chi-squared test was carried out between the Fear-Factor and Social Power in social communication and collaboration for IT Industry in Redmond (USA) and Bangalore (INDIA) and the results are shown below in Table 7.6-11 and Table 7.6-12 respectively.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	430.523[a]	49	.000
Likelihood Ratio	307.126	49	.000
Linear-by-Linear Association	67.876	1	.000
N of Valid Cases	250		

Table 7.6-11: Chi-Square Tests for Fear-Factor and Social Power for IT Industry in Redmond (USA)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	307.924[a]	32	.000
Likelihood Ratio	208.239	32	.000
Linear-by-Linear Association	27.345	1	.000
N of Valid Cases	250		

Table 7.6-12: Chi-Square Tests for Fear-Factor and Social Power for IT Industry in Bangalore (INDIA)

The final hypothesis was based on the emergence of dynamic organization structure based on Fear-Factor and Social Power in social communication and collaboration. The null and alternate hypotheses are presented here for reference:

Hypothesis $H4_0$: Dynamic organization structures *do not emerge* based on Fear-Factor and Social Power, which result from social collaboration and communication using electronic tools.

Hypothesis $H4_a$: Dynamic organization structures *do emerge* based on Fear-Factor and Social Power, which result from social collaboration and communication using electronic tools.

Since $p < 0.001$, the null hypothesis was rejected and it is established that Dynamic organization structures do emerge based on Fear-Factor and Social Power, which result from social collaboration and communication using electronic tools.

7.7. Research Question

In Chapter 1, the research foundation was established to answer critical research questions. Although these research questions do not directly impact this research study and it outcomes, it does provide significant insights and direction for future research.

For IT Industry, the goal was to uncover the answer to the following questions.

- Are Communication and Collaboration primarily Asynchronous than Synchronous?
- Are Communication and Collaboration primarily Synchronous than Asynchronous?
- Are Communication and Collaboration equally Asynchronous and Synchronous?
- Is Social Communication and Collaboration leveraged as a primary medium?
- Is Social Communication and Collaboration leveraged as a secondary medium?

As evident from the ranked order of use of social, communication and collaboration tools in Table 7.4-3 and Table 7.4-6, the research identified that IT industry respondents use asynchronous and synchronous medium in equal proportions, and social collaboration and communication is indeed a primary medium.

7.8. Summary

This chapter provided the findings and analysis for IT Industry in Redmond (USA) and Bangalore (INDIA). A survey questionnaire administered to 250 respondents each for the two industries. The study findings suggest the existence of factors that support the creation of dynamic organization structures. Factor analysis identified eight individual factors that were Availability, Accessibility, Agreeability, Acceptability, Rewards & Recognition, Quest for Knowledge, Fear Factor, and Social Power. The Chi-squared test confirmed that the individual factors were correlated indicating the link between organization structure and social, communication and collaboration patterns.

The next chapter provides findings and analysis for Education Institutes in Redmond (USA) and Bangalore (INDIA).

Chapter 8: Education Institutes Results

8.1. Overview

The previous chapter provided the findings and analysis for IT Industry in Redmond (USA) and Bangalore (INDIA). This Chapter provides specific details of Education Institute in Redmond (State of Washington, USA) and Bangalore (State of Karnataka, INDIA), the research participants, data analysis and findings.

8.2. Education Institutes in Redmond (USA) and Bangalore (INDIA)

The research study drew its study population from two regions: Redmond, WA, USA and Bangalore, India. Redmond, (a Township to the northeast of Seattle; part of the larger Puget Sound Region in Washington State) has a modest concentration education institutes. Due to high concentration of IT companies in Redmond and Bangalore, the education institutes in these cities often offer the latest technology options to studies to use in their day-to-day activities that is many times sponsored by the respective IT companies.

The research goal was to select a college in Redmond and Bangalore respectively with similar composition but in a different cultural setting, offering the same number of undergraduate degree programs and comparable in their stature and academic rankings.

As a result, Bellevue College in Redmond and Vemana Institute of Technology in Bangalore were selected for study. Bellevue College is a large school of over 35,000 students located outside of Seattle, Washington in the suburban City of Bellevue (adjacent to Redmond). It is the third largest school in Washington behind Washington State University

and the University of Washington. Originally, a community college, in 2010 it was awarded baccalaureate accreditation by the NW Commission on Colleges and Universities. The college offers many educational options including associate degrees, bachelor degrees and other career-related degrees and certificates. Today it offers six undergraduate programs.

Similarly, Vemana Institute of Technology was established in 1999 with four engineering courses. It has been the flagship Institute of Karnataka Reddyjana Sangha situated in Koramangala. It is ranked 92 out of 4000 engineering colleges in India and ranked 10th among the 184 colleges in Bangalore State. Today Vemana Institute of Technology offers six undergraduate programs.

8.3. Response Rate and Data Preparation

The survey questionnaire was administered to 350 participants from Education Institute in Redmond (USA) and Bangalore (INDIA) respectively. Refer to Appendix IV and Appendix V for a copy of the survey that was administered to study participants from Redmond (USA) and Bangalore (INDIA).

The participants were invited to take part in the study on a voluntary basis. A total of 250 qualified and complete responses were received from each group (cumulative of 500 responses), providing an overall response rate of 71.4%. Once data was downloaded from survey tool into Excel, it was transferred into SPSS for further analysis. SPSS was used for both descriptive as well as inferential statistics. The data gathered in the survey dictates the types of statistical analysis techniques to be used.

8.4. Demographics

Section 1 of the survey questionnaire gathered data about the gender of respondents. In summary, for Education Institute in Redmond (USA), 54% of respondents were male, and 46% were female. All respondent were part of undergraduate degree program as shown in Table 8.4-1.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	115	46.0	46.0	46.0
	Male	135	54.0	54.0	100.0
	Total	250	100.0	100.0	

Table 8.4-1: Gender of respondents of Education Institute in Redmond (USA)

Similarly, for Education Institute in Bangalore (INDIA), 35% of respondents were male, and 65% were female. All respondent were part of undergraduate degree program as shown in Table 8.4-2.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	87	34.8	34.8	34.8
	Female	163	65.2	65.2	100.0
	Total	250	100.0	100.0	

Table 8.4-2: Gender of respondents of Education Institute in Bangalore (INDIA)

Section 1 of the survey questionnaire also gathered data about the use of electronic communication tools in use by respondents. This section provides an overview of the individuals' demographic responses. Table 8.4-3 provides a ranked order of the tools and their usage for both male and female population. Based on this information, the results

ascertain that usage of electronic tools within the Education Institute in Redmond (USA) is prevalent and is in active usage.

	Male		Female	
Use of electronic communication tools	**Yes**	**No**	**Yes**	**No**
Text Messaging	54.0%	0.0%	46.0%	0.0%
E-Mail	54.0%	0.0%	46.0%	0.0%
Facebook	54.0%	0.0%	46.0%	0.0%
Instant Message Chat	50.4%	3.6%	41.6%	4.4%
Web Conference	49.6%	4.4%	41.2%	4.8%
Cloud Tools	48.2%	11.2%	36.4%	9.6%
Social Sites	46.4%	7.6%	40.0%	6.0%
Audio Chat	43.2%	10.8%	34.4%	11.6%
Wiki's	40.8%	31.2%	36.8%	9.2%
Video Chat	40.4%	13.6%	33.2%	12.8%
Social Tools	39.6%	14.4%	35.6%	10.4%
White Boarding	38.4%	15.6%	32.8%	13.2%
Forums	32.8%	21.2%	30.0%	16.0%

Note: Percent (n=250)

Table 8.4-3: Use of electronic communication tools in Education Institute in Redmond (USA) by gender

Interesting observations are; high active usage of Text Messaging (inter-personal communication) and E-Mail (group communication), Facebook, Instant Message Chat (interpersonal communication) as well as Web Conference (group discussion) followed by usage of cloud tools.

The research analysis categorized the above tools based on their mode of communication i.e. social, asynchronous as well as synchronous, an interesting observation surfaces. Based on the survey results, the analysis demonstrates that Social, Asynchronous as well as Synchronous communication tools are used in equal proportions and are used more than 72% of time (taking cumulative of tools usage across male and female populations) as observed in Table 8.4-4 and Table 8.4-5.

	Male		**Female**	
Mode of electronic communication tools	**Yes**	**No**	**Yes**	**No**
Asynchronous	49.3%	4.7%	41.3%	4.7%
Social	43.2%	10.8%	37.9%	8.1%
Synchronous	44.4%	9.6%	36.6%	9.4%

Note: Percent (n=250)

Table 8.4-4: Mode of electronic communication tools usage in Education Institute in Redmond (USA) by gender

Mode of electronic communication tools	**Yes**	**No**
Asynchronous	90.6%	9.4%
Social	81.1%	18.9%
Synchronous	81.0%	19.0%

Note: Percent (n=250)

Table 8.4-5: Mode of electronic communication tools usage in Education Institute in Redmond (USA)

Similarly, on analyzing the responses from Section 1 of the survey questionnaire for Education Institute in Bangalore (INDIA), the gathered data provides insights into use of electronic communication tools in use by respondents and is presented in this section to provide an overview of the individuals who responded.

Table 8.4-6 provides a ranked order of the tools and their usage for both male and female population. Based on this information, the results ascertain that usage of electronic tools within the Education Institute in Bangalore (INDIA) is prevalent and is in active usage.

	Male		Female	
Use of electronic communication tools	**Yes**	**No**	**Yes**	**No**
Text Messaging	34.8%	0.0%	65.2%	0.0%
E-Mail	34.8%	0.0%	65.2%	0.0%
Facebook	34.8%	0.0%	65.2%	0.0%
Instant Message Chat	32.0%	2.8%	60.0%	5.2%
Social Sites	28.4%	6.4%	58.0%	7.2%
Audio Chat	27.2%	7.6%	50.4%	14.8%
Cloud Tools	26.0%	8.8%	53.2%	12.0%
Social Tools	26.0%	8.8%	49.2%	16.0%
Video Chat	25.6%	9.2%	48.0%	17.2%
Forums	20.4%	14.4%	42.4%	22.8%
White Boarding	8.8%	26.0%	20.0%	45.2%
Wiki's	8.0%	26.8%	14.4%	50.8%
Web Conference	3.6%	31.2%	5.6%	59.6%

Note: Percent (n=250)

Table 8.4-6: Use of electronic communication tools in Education Institute in Bangalore (INDIA) by gender

Interesting observations are the high active usage of Text Messaging (interpersonal communication) and E-Mail (group communication), Facebook, Instant Message Chat (interpersonal communication) followed by usage of social tools. However, it is observed that White Boarding, Wiki, and Web Conferencing is not actively used as an electronic tool for communication.

On categorizing the tools based on their mode of communication i.e. social, asynchronous as well as synchronous, an interesting observation surfaces. Based on the survey results, it is observed that Social, Asynchronous as well as Synchronous communication tools are used in equal proportions and are used more than 71% of time (taking cumulative of tools usage across male and female populations) as observed in Table 8.4-7 and Table 8.4-8.

	Male		Female	
Mode of electronic communication tools	**Yes**	**No**	**Yes**	**No**
Asynchronous	25.9%	8.9%	49.5%	15.7%
Social	27.4%	7.4%	53.7%	11.5%
Synchronous	19.4%	15.4%	36.8%	28.4%

Note: Percent (n=250)

Table 8.4-7: Mode of electronic communication tools in Education Institute in Bangalore (INDIA) by gender

Mode of electronic communication tools	**Yes**	**No**
Asynchronous	75.4%	24.6%
Social	81.1%	18.9%
Synchronous	56.2%	43.8%

Note: Percent (n=250)

Table 8.4-8: Mode of electronic communication tools in Education Institute in Bangalore (INDIA)

The survey also captured the age of respondents for Education Institute in Redmond (USA) and Bangalore (INDIA). The distribution of age groups of survey respondents established an equal balanced response set from the survey population. The age distribution for Education Institute in Redmond (USA) is shown below in Table 8.4-9. The age distribution for Education Institute in Bangalore (INDIA) is shown in Table 8.4-10.

	Male		Female	
Age Group	**Count**	**%**	**Count**	**%**
18 to 25 years	105	42.00%	86	34.40%
25 to 30 years	4	1.60%	6	2.40%
31 to 40 years	6	2.40%	4	1.60%
41 to 50 years	8	3.20%	12	4.80%
51 to 60 years	12	4.80%	7	2.80%
Total	135	54.00%	115	46.00%

Note: Percent (n=250)

Table 8.4-9: Age Distribution of Education Institute respondent in Redmond (USA)

	Male		Female	
Age Group	**Count**	**%**	**Count**	**%**
18 to 25 years	67	26.80%	134	53.60%
25 to 30 years	8	3.20%	3	1.20%
31 to 40 years	4	1.60%	16	6.40%
41 to 50 years	6	2.40%	5	2.00%
51 to 60 years	5	2.00%	2	0.80%
Total	90	35.00%	160	65.00%

Note: Percent (n=250)

Table 8.4-10: Age Distribution of Education Institute respondent in Bangalore (INDIA)

In summary, these results provide broad understanding of the participants and their usage of electronic communication tools. These results are useful when considered in conjunction with the results from the Section 2 of Survey Questionnaire. The results of Section 2 are outlined in future sections.

8.5. Descriptive Statistics

The first part of the analysis involved drawing descriptive statistics about all the questions and the items in “Section 2: Survey Questionnaire” developed from pilot findings. Since most items were nominal scales, frequency distribution was calculated. This part of the analysis allows for an initial overview of the results, providing identification of trends in the data as well (Creswell, 2005).

When survey data was examined, there were trends that emerged that were further explored by the use of Principal Components Analysis and Chi-Squared Tests. A Chi-squared test was used as the analysis had nominal (categorical) data. The test also helped determine whether an association (or relationship) between two categorical variables in a sample is likely to reflect a real association between these two variables in the population.

The original variables (items) were assumed to be correlated and with the help of PCA, new group of variables are developed which are uncorrelated (Chatfield & Collins, 1980).

8.5.1. Availability Factor Frequency

The availability factor frequency for both Education Institute in Redmond (USA) and Bangalore (INDIA) is provided below in Table 8.5-1 and Table 8.5-2. For factors of both of these groups the dominant response selected by majority of respondents is 5 which equates to answer "I will reach out my social network to get information required to accomplish task" as well as response 4 for respondents in Redmond (USA) which is "I will benefit if the tool could send my queries over e-mail or any other medium due to differences in geo locations and time". These ties into the research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H1_a$: Dynamic organization structures do emerge based on Availability and Accessibility in electronic asynchronous and synchronous communication.

Availability

	Valid								Missing	Total
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total	System	
Frequency	13	33	51	66	65	13	5	246	4	250
Percent	5.2	13.2	20.4	26.4	26.0	5.2	2.0	98.4	1.6	100.0
Valid Percent	5.3	13.4	20.7	26.8	26.4	5.3	2.0	100.0		
Cumulative Percent	5.3	18.7	39.4	66.3	92.7	98.0	100.0			

Table 8.5-1: Frequency Distribution of Availability Factor for Education Institute in Redmond (USA)

Availability

	Valid								
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	7.00	Total
Frequency	17	15	34	22	70	47	45	9	250
Percent	6.8	6.0	13.6	8.8	28.0	18.8	18.0	3.6	100.0
Valid Percent	6.8	6.0	13.6	8.8	28.0	18.8	18.0	3.6	100.0
Cumulative Percent	6.8	12.8	26.4	35.2	63.2	82.0	100.0	100.0	

Table 8.5-2: Frequency Distribution of Availability Factor for Education Institute in Bangalore (INDIA)

8.5.2. Accessibility Factor Frequency

The accessibility factor frequency for both Education Institute in Redmond (USA) and Bangalore (INDIA) is provided below in Table 8.5-3 and Table 8.5-4. For factors of both of these groups the dominant response selected by majority of respondents in Education Institute in Redmond (USA) is 4 which equates to answer "I will try to seek help outside my school". Similarly, the dominant response selected by majority of respondents in Education Institute in Bangalore (INDIA) is 6 which equates to answer "I tend to participate more in groups where I had a positive experience with former associates during prior interactions". These ties into research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H1_a$: Dynamic organization structures do emerge based on Availability and Accessibility in electronic asynchronous and synchronous communication.

Accessibility

	Valid								
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	1.00	Total
Frequency	5	15	21	61	65	34	40	9	250
Percent	2.0	6.0	8.4	24.4	26.0	13.6	16.0	3.6	100
Valid Percent	2.0	6.0	8.4	24.4	26.0	13.6	16.0	3.6	100
Cumulative Percent	2.0	8.0	16.4	40.8	66.8	80.4	96.4	100.0	

Table 8.5-3: Frequency Distribution of Accessibility Factor for Education Institute in Redmond (USA)

Accessibility

	Valid							
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	9	26	54	41	53	54	13	250
Percent	3.6	10.4	21.6	16.4	21.2	21.6	5.2	100.0
Valid Percent	3.6	10.4	21.6	16.4	21.2	21.6	5.2	100.0
Cumulative Percent	3.6	14.0	35.6	52.0	73.2	94.8	100.0	

Table 8.5-4: Frequency Distribution of Accessibility Factor for Education Institute in Bangalore (INDIA)

8.5.3. Agreeability Factor Frequency

The agreeability factor frequency for both Education Institute in Redmond (USA) and Bangalore (INDIA) is provided below in Table 8.5-5 and Table 8.5-6. For Education Institute in Redmond (USA), the dominant response selected by a majority of respondents is 5 which equates to answer "help learn from interactions as they in turn help me be successful at school." For Education Institute in Bangalore (INDIA), the dominant response selected by a majority of respondents is 3 which equates to answer "I tend to proactive and become part of groups where I can contribute." These ties into research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H2_a$: Dynamic organization structures do emerge based on Agreeability and Acceptability electronic asynchronous and synchronous collaboration.

Agreeability

	Valid						
	1.00	2.00	3.00	4.00	5.00	6.00	Total
Frequency	7	17	52	52	93	29	250
Percent	2.8	6.8	20.8	20.8	37.2	11.6	100.0
Valid Percent	2.8	6.8	20.8	20.8	37.2	11.6	100.0
Cumulative Percent	2.8	9.6	30.4	51.2	88.4	100.0	

Table 8.5-5: Frequency Distribution of Agreeability Factor for Education Institute in Redmond (USA)

Agreeability

	Valid						
	1.00	2.00	3.00	4.00	5.00	6.00	Total
Frequency	19	52	93	61	16	9	250
Percent	7.6	20.8	37.2	24.4	6.4	3.6	100.0
Valid Percent	7.6	20.8	37.2	24.4	6.4	3.6	100.0
Cumulative Percent	7.6	28.4	65.6	90.0	96.4	100.0	

Table 8.5-6: Frequency Distribution of Agreeability Factor for Education Institute in Bangalore (INDIA)

8.5.4. Acceptability Factor Frequency

The agreeability factor frequency for both Education Institute in Redmond (USA) and Bangalore (INDIA) is provided below in Table 8.5-7 and Table 8.5-8. For Education Institute in Redmond (USA), the dominant response selected by majority of respondents is 4 which equates to answer "I tend to stay away from groups where the experience was not very positive due to behavior of group members". For Education Institute in Bangalore (INDIA), the dominant response selected by a majority of respondents is 3 which equates to answer "I only become part of groups when I am requested to join." These ties into research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H2_a$: Dynamic organization structures do emerge based on Agreeability and Acceptability electronic asynchronous and synchronous collaboration.

Acceptability

	Valid							
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	25	53	62	48	49	4	9	250
Percent	10.0	21.2	24.8	19.2	19.6	1.6	3.6	100.0
Valid Percent	10.0	21.2	24.8	19.2	19.6	1.6	3.6	100.0
Cumulative Percent	10.0	31.2	56.0	75.2	94.8	96.4	100.0	

Table 8.5-7: Frequency Distribution of Acceptability Factor for Education Institute in Redmond (USA)

Acceptability

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	4	15	37	80	39	62	13	4	250
Percent	1.6	6.0	14.8	32.0	15.6	24.8	5.2	1.6	100.0
Valid Percent	1.6	6.0	14.8	32.0	15.6	24.8	5.2	1.6	100.0
Cumulative Percent	1.6	7.6	22.4	54.4	70.0	94.8	100.0	1.6	

Table 8.5-8: Frequency Distribution of Acceptability Factor for Education Institute in Bangalore (INDIA)

8.5.5. Rewards and Recognition Factor Frequency

The rewards and recognition factor frequency for both Education Institute in Redmond (USA) and Bangalore (INDIA) is provided below in Table 8.5-9 and Table 8.5-10. For both of these factors, the dominant response selected by a majority of respondents is 3 which equates to answer "I get both intrinsic and extrinsic rewards." This tie into research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H3_a$: Dynamic organization structures do emerge based on Rewards and Recognition and Quest for Knowledge in social communication and collaboration.

Rewards and Recognition

	Valid						
	.00	1.00	2.00	3.00	4.00	5.00	Total
Frequency	11	25	40	65	63	46	250
Percent	4.4	10.0	16.0	26	25.2	18.4	100.0
Valid Percent	4.4	10.0	16.0	26	25.2	18.4	100.0
Cumulative Percent	4.4	14.4	30.4	81.6	55.6	100.0	

Table 8.5-9: Frequency Distribution of Rewards and Recognition Factor for Education Institute in Redmond (USA)

Rewards and Recognition

	Valid						
	.00	1.00	2.00	3.00	4.00	5.00	Total
Frequency	8	19	93	105	8	13	250
Percent	3.2	7.6	37.2	42.0	3.2	5.2	100.0
Valid Percent	3.3	7.7	37.8	42.7	3.3	5.3	100.0
Cumulative Percent	3.3	11.0	48.8	91.5	94.7	100.0	

Table 8.5-10: Frequency Distribution of Rewards Recognition Factor for Education Institute in Bangalore (INDIA)

8.5.6. Quest for knowledge Factor Frequency

The quest for knowledge factor frequency for both Education Institute in Redmond (USA) and Bangalore (INDIA) is provided below in Table 8.5-11 and Table 8.5-12. For Education Institute in Redmond (USA), the dominant response selected by majority of respondents is 5 which equates to answer "I tend to shy away from group and seek participation in other groups where I am more openly accepted". For Education Institute in Bangalore (INDIA), the dominant response selected by a majority of respondents is 6 which equates to answer "I get monetary benefits e.g. better scholarship, etc." These ties into research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H3_a$: Dynamic organization structures do emerge based on Rewards and Recognition and Quest for Knowledge in social communication and collaboration.

Quest for Knowledge

	Valid								
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	Total
Frequency	8	40	48	27	61	29	20	17	250
Percent	3.2	16.0	19.2	10.8	24.4	11.6	8.0	6.8	100.0
Valid Percent	3.2	16.0	19.2	10.8	24.4	11.6	8.0	6.8	100.0
Cumulative Percent	3.2	19.2	38.4	49.2	73.6	85.2	93.2	100.0	

Table 8.5-11: Frequency Distribution of Quest for Knowledge Factor for Education Institute in Redmond (USA)

Quest for Knowledge

	Valid								
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	Total
Frequency	4	12	53	41	36	60	20	24	250
Percent	1.6	4.8	21.2	16.4	14.4	24.0	8.0	9.6	100.0
Valid Percent	1.6	4.8	21.2	16.4	14.4	24.0	8.0	9.6	100.0
Cumulative Percent	1.6	6.4	27.6	44.0	58.4	82.4	90.4	100.0	

Table 8.5-12: Frequency Distribution of Quest for Knowledge Factor for Education Institute in Bangalore (INDIA)

8.5.7. Fear-Factor Factor Frequency

The fear-factor factor frequency for both Education Institute in Redmond (USA) and Bangalore (INDIA) is provided below in Table 8.5-13 and Table 8.5-14. For Education Institute in Redmond (USA), the dominant response selected by majority of respondents is 4 which equates to answer "I like to be part of groups where I learn and grow by learning from experiences of other group members". For Education Institute in Bangalore (INDIA), the dominant response selected by majority of respondents is 1 which equates to answer "I will not be very effective at school if social network communication is removed or restricted". These ties into research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H4_a$: Dynamic organization structures do emerge based on Fear-Factor and Social Power in social communication and collaboration.

Fear-Factor

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	13	14	44	46	61	46	17	9	250
Percent	5.2	5.6	17.6	18.4	24.4	18.4	6.8	3.6	100.0
Valid Percent	5.2	5.6	17.6	18.4	24.4	18.4	6.8	3.6	100.0
Cumulative Percent	5.2	10.8	28.4	46.8	71.2	89.6	96.4	100.0	

Table 8.5-13: Frequency Distribution of Fear-Factor Factor for Education Institute in Redmond (USA)

Fear-Factor

	Valid							
	.00	1.00	2.00	3.00	4.00	5.00	6.00	Total
Frequency	31	64	50	51	29	16	9	250
Percent	12.4	25.6	20.0	20.4	11.6	6.4	3.6	100.0
Valid Percent	12.4	25.6	20.0	20.4	11.6	6.4	3.6	100.0
Cumulative Percent	12.4	38.0	58.0	78.4	90.0	96.4	100.0	

Table 8.5-14: Frequency Distribution of Fear-Factor Factor for Education Institute in Bangalore (INDIA)

8.5.8. Social Power Factor Frequency

The social power factor frequency for both Education Institute in Redmond (USA) and Bangalore (INDIA) is provided below in Table 8.5-15 and Table 8.5-16. For Education Institute in Redmond (USA), the dominant response selected by majority of respondents is 4 which equates to answer "I will seek help from expert from academia, provided their details are published and made available". For Education Institute in Bangalore (INDIA), the dominant responses selected by majority of respondents is 2 and 3 which equates to answers "I will serve as an expert in my area of interest" and "it will help me understand who is actively contributing as a subject matter expert" respectively. These ties into research question that formation of organization structures is dependent on the experience of people in groups as well as Hypothesis $H4_a$: Dynamic organization structures do emerge based on Fear-Factor and Social Power in social communication and collaboration.

Social Power

	Valid						
	1.00	2.00	3.00	4.00	5.00	7.00	Total
Frequency	8	61	51	65	56	9	250
Percent	3.2	24.4	20.4	26.0	22.4	3.6	100.0
Valid Percent	3.2	24.4	20.4	26.0	22.4	3.6	100.0
Cumulative Percent	3.2	27.6	48.0	74.0	96.4	100.0	

Table 8.5-15: Frequency Distribution of Social Power for Education Institute in Redmond (USA)

Social Power

	Valid							
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	8	65	65	55	30	18	9	250
Percent	3.2	26.0	26.0	22.0	12.0	7.2	3.6	100.0
Valid Percent	3.2	26.0	26.0	22.0	12.0	7.2	3.6	100.0
Cumulative Percent	3.2	29.2	55.2	77.2	89.2	96.4	100.0	

Table 8.5-16: Frequency Distribution of Social Power for Education Institute in Bangalore (INDIA)

8.6. Survey Questionnaire Results

Unlike the demographic results that are useful when considered at the individual level in conjunction with other results, the questionnaire results (Cameron & Quinn, 1999) are most useful when aggregated to obtain an assessment of the organizational culture by all respondents.

As discussed earlier, this survey was completed by 250 respondents each from Education Institute in Redmond (USA) and IT Industry in Bangalore (INDIA).

8.6.1. Principal Components Analysis

As explained in Chapter 5, a principal component analysis (PCA) was conducted, using the data collected thru Section 2 of the survey questionnaire. Details of why PCA was chosen were discussed in Chapter 5 of this study.

8.6.1.1. Testing for Factorability

The first stage in factor analysis is to test for factorability. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity are two such tests. The results of these tests are shown in Table 8.6-1 and Table 8.6-2.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.863
Bartlett's Test of Sphericity	Approx. Chi-Square	773.156
	df	28
	Sig.	.000

Table 8.6-1: KMO and Bartlett's Test for Education Institute in Redmond (USA)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.869
Bartlett's Test of Sphericity	Approx. Chi-Square	846.149
	df	28
	Sig.	.000

Table 8.6-2: KMO and Bartlett's Test for Education Institute in Bangalore (INDIA)

With KMO measure being > .8, there is a reasonable level of inter correlations between the variables, making them appropriate for factor analysis. Bartlett's test of sphericity tests the hypothesis that the correlation matrix is an identity matrix (or unit matrix); i.e. all diagonal elements are 1, and all off-diagonal elements are 0, implying that all of the variables are uncorrelated. The Sig. value for this analysis leads us to reject the null hypothesis and conclude that there are correlations in the data set that are appropriate for factor analysis.

8.6.1.2. Factor Retention

Factor analysis was conducted to reduce the number of items in the survey into a smaller group of separate factors (Conway & Huffcutt, 2003). Using PCA with direct oblimin rotation, eight factors resulted with Eigen values greater than 1. On review of these factors, the number of factors emerging from this test was considered based on the uppermost boundary, reinforcing the claim by Hayton et.al. (Hayton, Allen, & Scarpello, 2004),

A Scree test was also conducted to show a graphical representation of the Eigen values of each of the factors extracted. The results are shown in Figure 8.6-1 and Figure 8.6-2. During analysis of Scree plot, the researcher is looking for obvious discontinuities or

breaks in the factors in order to determine the number of final factors (Hayton, Allen, & Scarpello, 2004). In the Scree test for this research, eight major factors can be identified for both the test cases.

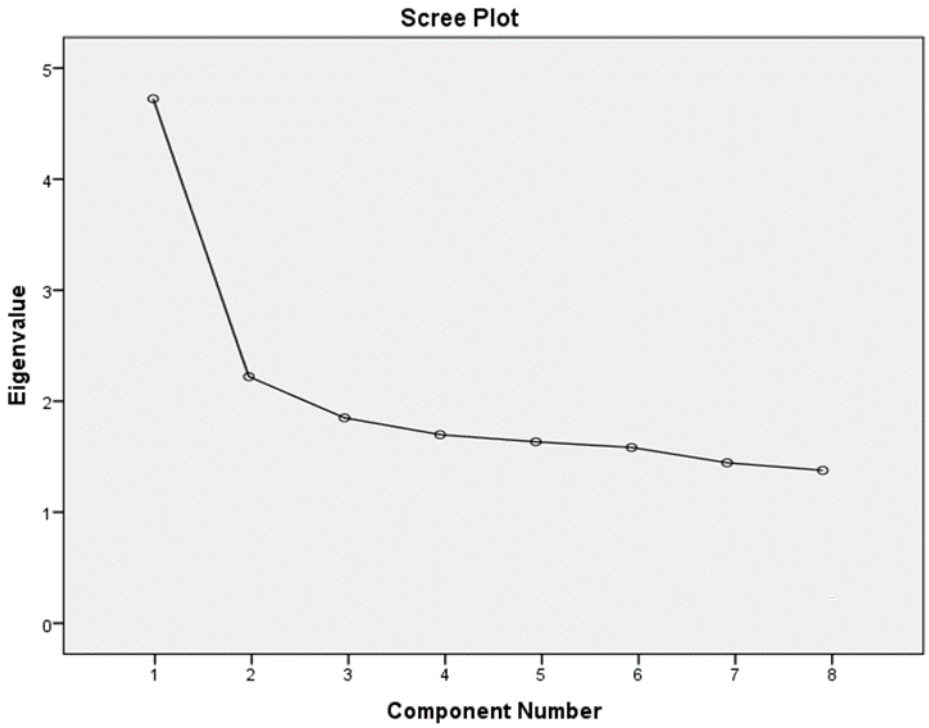


Figure 8.6-1: Scree Plot for Education Institute in Redmond (USA)

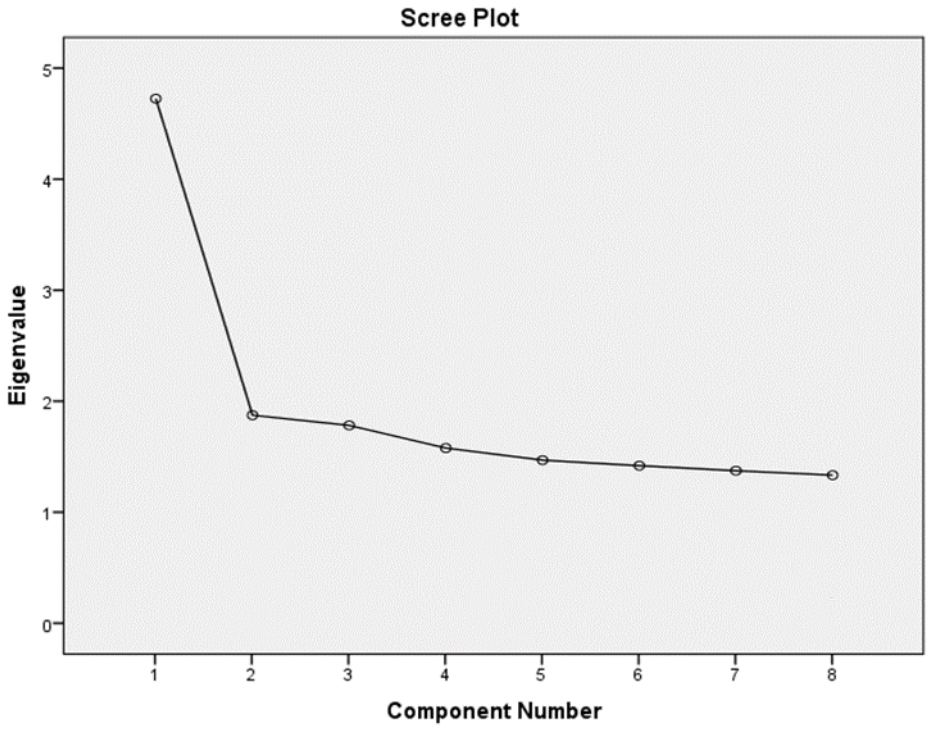


Figure 8.6-2: Scree Plot for Education Institute in Bangalore (INDIA)

Given the results of the Eigen values and Scree plot, a number of factor analyses were then conducted (using principal components, direct oblimin rotation and specifying the number of factors to be used) with eight factors showing the cleanest loading of most items on a single factor.

8.6.1.3. Reliability Results

Cronbach's alpha was used for testing the factors for internal reliability. The factors which resulting in a Cronbach's alpha of 0.6 or greater were considered reliable and were deemed useful for further analysis as part of a specific variable (Hair (Jnr), Black, Babin, Anderson, & Tatham, 2006). The Cronbach's alpha results are shown in Table 8.6-3 and Table 8.6-4.

Factors	Items	Cronbach's Alpha
Agreeability	Question 1 - Response 1, Question 9 - Response 2, Question 10 - Response 2, Question 11 - Response 1, Question 13 - Response 2, Question 18 - Response 1	.846
Acceptability	Question 1 - Response 2, Question 6 - Response 3, Question 10 - Response 3, Question 12 - Response 2, Question 13 - Response 3, Question 15 - Response 1, Question 16 - Response 1	.845
Accessibility	Question 2 - Response 1, Question 3 - Response 1, Question 6 - Response 2, Question 8 - Response 2, Question 9 - Response 1, Question 12 - Response 1, Question 13 - Response 1	.843
Availability	Question 1 - Response 3, Question 2 - Response 2, Question 5 - Response 1, Question 6 - Response 1, Question 7 - Response 1, Question 8 - Response 1, Question 10 - Response 1	.848
Fear Factor	Question 7 - Response 3, Question 8 - Response 3, Question 11 - Response 3, Question 12 - Response 3, Question 16 - Response 2, Question 17 - Response 2, Question 18 - Response 3	.851
Rewards	Question 4 - Response 1, Question 7 - Response 2, Question 14 - Response 1, Question 15 - Response 2, Question 17 - Response 1	.841
Social Power	Question 3 - Response 3, Question 4 - Response 3, Question 5 - Response 3, Question 9 - Response 3, Question 14 - Response 3, Question 16 - Response 3, Question 17 - Response 3	.854
Knowledge	Question 2 - Response 3, Question 3 - Response 2, Question 4 - Response 2, Question 5 - Response 2, Question 11 - Response 2, Question 14 - Response 2, Question 15 - Response 3,Question 18 - Response 2	.851

Table 8.6-3: Cronbach's alpha for Education Institute in Redmond (USA)

Factors	Items	Cronbach's Alpha
Agreeability	Question 1 - Response 1, Question 9 - Response 2, Question 10 - Response 2, Question 11 - Response 1, Question 13 - Response 2, Question 18 - Response 1	.852
Acceptability	Question 1 - Response 2, Question 6 - Response 3, Question 10 - Response 3, Question 12 - Response 2, Question 13 - Response 3, Question 15 - Response 1, Question 16 - Response 1	.865
Accessibility	Question 2 - Response 1, Question 3 - Response 1, Question 6 - Response 2, Question 8 - Response 2, Question 9 - Response 1, Question 12 - Response 1, Question 13 - Response 1	.841
Availability	Question 1 - Response 3, Question 2 - Response 2, Question 5 - Response 1, Question 6 - Response 1, Question 7 - Response 1, Question 8 - Response 1, Question 10 - Response 1	.852
Fear Factor	Question 7 - Response 3, Question 8 - Response 3, Question 11 - Response 3, Question 12 - Response 3, Question 16 - Response 2, Question 17 - Response 2, Question 18 - Response 3	.841
Rewards	Question 4 - Response 1, Question 7 - Response 2, Question 14 - Response 1, Question 15 - Response 2, Question 17 - Response 1	.846
Social Power	Question 3 - Response 3, Question 4 - Response 3, Question 5 - Response 3, Question 9 - Response 3, Question 14 - Response 3, Question 16 - Response 3, Question 17 - Response 3	.859
Knowledge	Question 2 - Response 3, Question 3 - Response 2, Question 4 - Response 2, Question 5 - Response 2, Question 11 - Response 2, Question 14 - Response 2, Question 15 - Response 3,Question 18 - Response 2	.849

Table 8.6-4: Cronbach's alpha for Education Institute in Bangalore (INDIA)

8.6.1.4. Chi-squared Test

A Chi-squared test was used as the analysis had nominal (categorical) data. The test helped determine whether an association (or relationship) between two categorical variables in a sample is likely to reflect a real association between these two variables in the population.

The Chi-squared test was carried out between the Availability and Accessibility of asynchronous and synchronous communications patterns. For Education Institute in Redmond (USA) and Bangalore (INDIA), the results are shown below in Table 8.6-5 and Table 8.6-6 respectively.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	361.171[a]	42	.000
Likelihood Ratio	205.304	42	.000
Linear-by-Linear Association	44.047	1	.000
N of Valid Cases	246		

Table 8.6-5: Chi-Square Tests for Availability and Accessibility for Education Institute in Redmond (USA)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	202.682[a]	36	.000
Likelihood Ratio	222.225	36	.000
Linear-by-Linear Association	101.448	1	.000
N of Valid Cases	250		

Table 8.6-6: Chi-Square Tests for Availability and Accessibility for Education Institute in Bangalore (INDIA)

The first hypothesis was based on the emergence of dynamic organization structure based on Availability and Accessibility in electronic asynchronous and synchronous communication. The null and alternate hypotheses are presented here for reference:

Hypothesis $H1_0$: **Dynamic organization structures ***do not emerge*** based on Availability and Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Hypothesis $H1_a$: **Dynamic organization structures ***do emerge*** based on Availability and Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Since $p < 0.001$, the null hypothesis was rejected and it is established that Dynamic organization structures do emerge based on Availability and Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.

Similarly, Chi-squared test was carried out between the Agreeability and Acceptability in asynchronous and synchronous collaboration patterns for Education Institute in Redmond (USA) and Bangalore (INDIA) and the results are shown below in Table 8.6-7 and Table 8.6-8 respectively.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	207.026[a]	30	.000
Likelihood Ratio	188.508	30	.000
Linear-by-Linear Association	55.067	1	.000
N of Valid Cases	250		

Table 8.6-7: Chi-Square Tests for Agreeability and Acceptability for Education Institute in Redmond (USA)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	304.006[a]	30	.000
Likelihood Ratio	201.178	30	.000
Linear-by-Linear Association	39.253	1	.000
N of Valid Cases	250		

Table 8.6-8: Chi-Square Tests for Agreeability and Acceptability for Education Institute in Bangalore (INDIA)

The second hypothesis was based on the emergence of dynamic organization structure based on Agreeability and Acceptability in electronic asynchronous and synchronous collaboration. The null and alternate hypotheses are presented here for reference:

Hypothesis $H2_0$: Dynamic organization structures ***do not emerge* based on Agreeability and Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Hypothesis $H2_a$: Dynamic organization structures ***do emerge* based on Agreeability and Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.**

Since $p < 0.001$, the null hypothesis was rejected and it is established that Dynamic organization structures do emerge based on Agreeability and Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.

Next Chi-squared test was carried out between the Rewards and Recognition and Quest for Knowledge in social communication and collaboration for Education Institute in Redmond (USA) and Education Institute in Bangalore (INDIA) and the results are shown below in Table 8.6-9 and Table 8.6-10 respectively.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	194.047[a]	35	.000
Likelihood Ratio	204.555	35	.000
Linear-by-Linear Association	50.001	1	.000
N of Valid Cases	250		

Table 8.6-9: Chi-Square Tests for Rewards and Recognition and Quest for Knowledge for Education Institute in Redmond (USA)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	194.047[a]	35	.000
Likelihood Ratio	204.555	35	.000
Linear-by-Linear Association	50.001	1	.000
N of Valid Cases	250		

Table 8.6-10: Chi-Square Tests for Rewards and Recognition, Quest for Knowledge for Education Institute in Bangalore (INDIA)

The third hypothesis was based on the emergence of dynamic organization structure based on Rewards and Recognition and Quest for Knowledge in social communication and collaboration. The null and alternate hypotheses are presented here for reference:

Hypothesis $H3_0$: Dynamic organization structures *do not emerge* based on Rewards and Recognition and Quest for Knowledge, which result from social collaboration and communication using electronic tools.

Hypothesis $H3_a$: Dynamic organization structures *do emerge* based on Rewards and Recognition and Quest for Knowledge, which result from social collaboration and communication using electronic tools.

Since $p < 0.001$, the null hypothesis was rejected and it is established that Dynamic organization structures do emerge based on Rewards and Recognition and Quest for Knowledge, which result from social collaboration and communication using electronic tools.

Next Chi-squared test was carried out between the Fear-Factor and Social Power in social communication and collaboration for Education Institute in Redmond (USA) and Education Institute in Bangalore (INDIA) and the results are shown below in Table 8.6-11 and Table 8.6-12 respectively.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	343.050[a]	35	.000
Likelihood Ratio	167.482	35	.000
Linear-by-Linear Association	37.747	1	.000
N of Valid Cases	250		

Table 8.6-11: Chi-Square Tests for Fear-Factor and Social Power for Education Institute in Redmond (USA)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	410.591[a]	36	.000
Likelihood Ratio	244.645	36	.000
Linear-by-Linear Association	54.817	1	.000
N of Valid Cases	250		

Table 8.6-12: Chi-Square Tests for Fear-Factor and Social Power for Education Institute in Bangalore (INDIA)

The final hypothesis was based on the emergence of dynamic organization structure based on Fear-Factor and Social Power in social communication and collaboration. The null and alternate hypotheses are presented here for reference:

Hypothesis $H4_0$: Dynamic organization structures *do not emerge* based on Fear-Factor and Social Power, which result from social collaboration and communication using electronic tools.

Hypothesis $H4_a$: Dynamic organization structures *do emerge* based on Fear-Factor and Social Power, which result from social collaboration and communication using electronic tools.

Since $p < 0.001$, the null hypothesis was rejected and it is established that Dynamic organization structures do emerge based on Fear-Factor and Social Power, which result from social collaboration and communication using electronic tools.

8.7. Research Question

In Chapter 1, the research foundation was established to answer two of the most critical research questions. Although these research questions do not directly impact this research study and it outcomes, it does provide significant insights and direction for future research.

For Education Institutes, the goal was to uncover the answer to the following questions.

- Are Communication and Collaboration primarily Asynchronous than Synchronous?
- Are Communication and Collaboration primarily Synchronous than Asynchronous?
- Are Communication and Collaboration equally Asynchronous and Synchronous?
- Is Social Communication and Collaboration leveraged as a primary medium?
- Is Social Communication and Collaboration leveraged as a secondary medium?

As evident from the ranked order of use of social, communication and collaboration tools in Table 8.4-5 and Table 8.4-8, shows that communication and collaboration mode most

preferred by Education institute respondents is asynchronous rather than synchronous medium and social collaboration and communication is indeed a primary medium.

8.8. Summary

This chapter provided the findings and analysis for Education Institutes in Redmond (USA) and Bangalore (INDIA). A survey questionnaire administered to 250 respondents each for the two industries. The study findings suggest the existence of factors that support the creation of dynamic organization structures. Factor analysis identified eight individual factors that were availability, accessibility, agreeability, acceptability, rewards & recognition, the quest for knowledge, fear factor, social power. The chi-squared test confirmed that the individual factors identified from the factor analysis were correlated indicating the link between organization structure and social, communication and collaboration patterns.

Chapter 9: Comparing, Contrasting Results of IT Industry and Education Institutes

9.1. Overview

The previous two chapters presented the findings from IT Industry groups in Redmond (USA) and Bangalore (INDIA) and Educational Institutes groups in Redmond (USA) and Bangalore (INDIA). This chapter draws together the results of both these chapters to summarize the main conclusions of the study.

9.2. Demographics

Section 1 of the survey questionnaire for IT Industry and Education Institutes gathered demographic data about the respondents. For IT Industry in Redmond (USA), the total male population was 85.2%, and female population was 14.8%. For IT Industry in Bangalore (India), the total male population was 73.2%, and female population was 26.8%. For Education Institute in Redmond (USA), 54% of respondents were male, and 46% were female. Similarly, for Education Institute in Bangalore (INDIA), 35% of respondents were male, and 65% were female.

Section 1 of the survey questionnaire also gathered data about the use of electronic communication tools in use by respondents. On categorizing the various tools based on their mode of communication i.e. social, asynchronous as well as synchronous, it is observed that Social, Asynchronous as well as Synchronous communication tools are used more than 71% of time by IT Industry in Redmond (USA) and Bangalore (India) as well Educational Institute in Redmond (USA) as shown in Table 9.2-1.

Mode of Electronic Communication Tools	IT Industry (Redmond)	IT Industry (Bangalore)	Education Institute (Redmond)	Education Institute (Bangalore)
Asynchronous	89.20%	88.20%	90.6%	75.4%
Synchronous	72.60%	71.60%	81.0%	56.2%
Social	78.60%	78.50%	81.1%	81.1%

Table 9.2-1: Use of electronic communication tools in IT Industry and Education Institute in Redmond (USA) and Bangalore (INDIA) respectively.

An interesting observation that emerges for Education Institute in Bangalore is the low use of Synchronous electronic communication tools (56.2% as shown in Table 9.2-1). This difference can be attributed to the different cultural setting and the spare use of Synchronous electronic tools.

The results in Table 9.2-1 provide a very broad understanding of the respondents and their usage of electronic communication tools; however, they are most useful when considered in conjunction with the results from the Section 2 of Survey Questionnaire which is outlined in the next section of this chapter.

9.3. Descriptive Statistics

For analysis involving descriptive statistics about all the questions and the items in "Section 2: Survey Questionnaire" frequency distribution was calculated since the response elements were mapped to nominal scales.

9.3.1. Availability Factor Frequency

The Availability factor frequencies for both IT Industry as well as Education Institutes in Redmond (USA), are shown below in Table 9.3-1.

Availability

	Valid								Missing	Total
	.00	2.00	3.00	4.00	5.00	6.00	7.00	Total	System	
Frequency	4	13	34	64	55	46	30	246	4	250
Percent	1.6	5.2	13.6	25.6	22.0	18.4	12.0	98.4	1.6	100.0
Valid Percent	1.6	5.3	13.8	26.0	22.4	18.7	12.2	100.0		
Cumulative Percent	1.6	6.9	20.7	46.7	69.1	87.8	100.0			

Frequency Distribution of Availability Factor for IT Industry in Redmond (USA)

	Valid								Missing	Total
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total	System	
Frequency	13	33	51	66	65	13	5	246	4	250
Percent	5.2	13.2	20.4	26.4	26.0	5.2	2.0	98.4	1.6	100.0
Valid Percent	5.3	13.4	20.7	26.8	26.4	5.3	2.0	100.0		
Cumulative Percent	5.3	18.7	39.4	66.3	92.7	98.0	100.0			

Frequency Distribution of Availability Factor for Education Institute in Redmond (USA)

Table 9.3-1: Frequency Distributions of Availability Factor for IT Industry and Education Institute in Redmond (USA)

For factors of both of these groups the dominant response selected by majority of respondents both IT Industry and Education Institute in Redmond (USA) is 4 which equates to answer “I will benefit if the tool could send my queries over e-mail or any other medium due to differences in geo locations and time”.

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well Hypothesis $H1a_{a.}$

Hypothesis H1a$_a$: Dynamic organization structures are ***dependent* on Availability status provided by asynchronous and synchronous communication and collaboration using electronic tools.**

The Availability factor frequencies for both IT Industry as well as Education Institutes in Bangalore (INDIA), are shown below in Table 9.3-2.

Availability

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	9	34	58	64	63	9	4	9	250
Percent	3.6	13.6	23.2	25.6	25.2	3.6	1.6	3.6	100.0
Valid Percent	3.6	13.6	23.2	25.6	25.2	3.6	1.6	3.6	100.0
Cumulative Percent	3.6	17.2	40.4	66.0	91.2	94.8	96.4	100.0	

Frequency Distribution of Availability Factor for IT Industry in Bangalore (INDIA)

	Valid								
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	7.00	Total
Frequency	17	15	34	22	70	47	45	9	250
Percent	6.8	6.0	13.6	8.8	28.0	18.8	18.0	3.6	100.0
Valid Percent	6.8	6.0	13.6	8.8	28.0	18.8	18.0	3.6	100.0
Cumulative Percent	6.8	12.8	26.4	35.2	63.2	82.0	100.0	100.0	

Frequency Distribution of Availability Factor for Education Institute in Bangalore (INDIA)

Table 9.3-2: Frequency Distributions of Availability Factor for IT Industry and Education Institute in Bangalore (INDIA)

For factors of both of these groups, the dominant response selected by majority of respondents of IT Industry in Bangalore (INDIA) is 4 which equates to answer “I will reach out my social network to get information required to accomplish task” as well as response 5 for respondents of Education Institute in Bangalore (INDIA) which is “I will benefit if the

tool could send my queries over e-mail or any other medium due to differences in geo locations and time".

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well our Hypothesis $H1a_{a.}$

Hypothesis $H1a_a$: Dynamic organization structures are *dependent* on Availability status provided by asynchronous and synchronous communication and collaboration using electronic tools.

9.3.2. Accessibility Factor Frequency

The Accessibility factor frequencies for both IT Industry as well as Education Institutes in Redmond (USA), are shown below in Table 9.3-3.

Accessibility

	Valid								
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	1.00	Total
Frequency	5	23	37	20	34	33	50	48	250
Percent	2	9.2	14.8	8	13.6	13.2	20	19.2	100
Valid Percent	2	9.2	14.8	8	13.6	13.2	20	19.2	100
Cumulative Percent	2	11.2	26	80.8	59.6	72.8	46	100	

Frequency Distribution of Accessibility Factor for IT Industry in Redmond (USA)

	Valid								
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	1.00	Total
Frequency	5	15	21	61	65	34	40	9	250
Percent	2.0	6.0	8.4	24.4	26.0	13.6	16.0	3.6	100
Valid Percent	2.0	6.0	8.4	24.4	26.0	13.6	16.0	3.6	100
Cumulative Percent	2.0	8.0	16.4	40.8	66.8	80.4	96.4	100.0	

Frequency Distribution of Accessibility Factor for Education Institute in Redmond (USA)

Table 9.3-3: Frequency Distributions of Accessibility Factor for IT Industry and Education Institute in Redmond (USA)

For factors of both of these groups, the dominant response selected by majority of respondents of IT Industry in Redmond (USA) is 6 which equates to answer "I tend to participate more in groups where I had a positive experience with former associates during prior interactions" as well as response 4 for respondents of Education Institute in Redmond (USA) which is "I will try to seek help outside my school".

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well Hypothesis $H1b_{a.}$

Hypothesis $H1b_a$: Dynamic organization structures are *dependent* on Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.

The Accessibility factor frequencies for both IT Industry as well as Education Institutes in Bangalore (INDIA), are shown below in Table 9.3-4.

Accessibility

	Valid							
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	15	39	42	31	37	73	13	250
Percent	6.0	15.6	16.8	12.4	14.8	29.2	5.2	100.0
Valid Percent	6.0	15.6	16.8	12.4	14.8	29.2	5.2	100.0
Cumulative Percent	6.0	21.6	38.4	50.8	65.6	94.8	100.0	

Frequency Distribution of Accessibility Factor for IT Industry in Bangalore (INDIA)

	Valid							
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	9	26	54	41	53	54	13	250
Percent	3.6	10.4	21.6	16.4	21.2	21.6	5.2	100.0
Valid Percent	3.6	10.4	21.6	16.4	21.2	21.6	5.2	100.0
Cumulative Percent	3.6	14.0	35.6	52.0	73.2	94.8	100.0	

Frequency Distribution of Accessibility Factor for Education Institute in Bangalore (INDIA)

Table 9.3-4: Frequency Distribution of Accessibility Factor for IT Industry and Education Institute in Bangalore (INDIA)

For factors of both of these groups, the dominant response selected by majority of respondents of both IT Industry and Education Institute in Bangalore (INDIA) is 6 which equates to answer "I tend to participate more in groups where I had a positive experience with former associates during prior interactions".

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well Hypothesis $H1b_{a.}$

Hypothesis $H1b_a$: Dynamic organization structures are *dependent* on Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.

As discussed in Chapter 7 and 8, Chi-squared test was carried out between the Availability and Accessibility of social communication and collaboration between IT Industry and Education Institute in Redmond (USA) and Bangalore (INDIA). Since $p < 0.001$, the null hypothesis was rejected, and the alternate hypothesis was established.

Hypothesis $H1_a$: Dynamic organization structures *do emerge* based on Availability and Accessibility status provided by asynchronous and synchronous communication and collaboration using electronic tools.

9.3.3. Agreeability Factor Frequency

The Agreeability factor frequency for both IT Industry as well as Education Institutes in Redmond (USA), are shown below in Table 9.3-5.

Agreeability

	Valid						
	1.00	2.00	3.00	4.00	5.00	6.00	Total
Frequency	4	4	53	60	69	60	250
Percent	1.6	1.6	21.2	24.0	27.6	24.0	100.0
Valid Percent	1.6	1.6	21.2	24.0	27.6	24.0	100.0
Cumulative Percent	1.6	3.2	24.4	48.4	76.0	100.0	

Frequency Distribution of Agreeability Factor for IT Industry in Redmond (USA)

	Valid						
	1.00	2.00	3.00	4.00	5.00	6.00	Total
Frequency	7	17	52	52	93	29	250
Percent	2.8	6.8	20.8	20.8	37.2	11.6	100.0
Valid Percent	2.8	6.8	20.8	20.8	37.2	11.6	100.0
Cumulative Percent	2.8	9.6	30.4	51.2	88.4	100.0	

Frequency Distribution of Agreeability Factor for Education Institute in Redmond (USA)

Table 9.3-5: Frequency Distributions of Agreeability Factor for IT Industry and Education Institute in Redmond (USA)

For factors of both of these groups, the dominant response selected by majority of respondents of both IT Industry and Education Institute in Redmond (USA) is 5 which

equates to answer "help learn from interactions as they in turn help me be successful at college or work".

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well Hypothesis $H2a_{a.}$

Hypothesis $H2a_a$: Dynamic organization structures are *dependent* on Agreeability provided by asynchronous and synchronous communication and collaboration using electronic tools.

The Agreeability factor frequency for both IT Industry as well as Education Institutes in Bangalore (INDIA), are shown below in Table 9.3-6.

Agreeability

	Valid							
	.00	1.00	2.00	3.00	4.00	5.00	6.00	Total
Frequency	4	12	64	102	43	12	13	250
Percent	1.6	4.8	25.6	40.8	17.2	4.8	5.2	100.0
Valid Percent	1.6	4.8	25.6	40.8	17.2	4.8	5.2	100.0
Cumulative Percent	1.6	6.4	32.0	72.8	90.0	94.8	100.0	

Frequency Distribution of Agreeability Factor for IT Industry in Bangalore (INDIA)

	Valid						
	1.00	2.00	3.00	4.00	5.00	6.00	Total
Frequency	19	52	93	61	16	9	250
Percent	7.6	20.8	37.2	24.4	6.4	3.6	100.0
Valid Percent	7.6	20.8	37.2	24.4	6.4	3.6	100.0
Cumulative Percent	7.6	28.4	65.6	90.0	96.4	100.0	

Frequency Distribution of Agreeability Factor for Education Institute in Bangalore (INDIA)

Table 9.3-6: Frequency Distributions of Agreeability Factor for IT Industry and Education Institute in Bangalore (INDIA)

For factors of both of these groups, the dominant response selected by majority of respondents of both IT Industry and Education Institute in Bangalore (INDIA) is 3 which equates to answer "I tend to proactive and become part of groups where I can contribute".

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well our Hypothesis $H2a_a$.

Hypothesis $H2a_a$: Dynamic organization structures are *dependent* on Agreeability provided by asynchronous and synchronous communication and collaboration using electronic tools.

9.3.4. Acceptability Factor Frequency

The Acceptability factor frequency for both IT Industry as well as Education Institutes in Redmond (USA), are shown below in Table 9.3-7.

Acceptability

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	8	22	59	34	63	35	16	13	250
Percent	3.2	8.8	23.6	13.6	25.2	14.0	6.4	5.2	100.0
Valid Percent	3.2	8.8	23.6	13.6	25.2	14.0	6.4	5.2	100.0
Cumulative Percent	3.2	12.0	35.6	49.2	74.4	88.4	94.8	100.0	

Frequency Distribution of Acceptability Factor for IT Industry in Redmond (USA)

	Valid							
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	25	53	62	48	49	4	9	250
Percent	10.0	21.2	24.8	19.2	19.6	1.6	3.6	100.0
Valid Percent	10.0	21.2	24.8	19.2	19.6	1.6	3.6	100.0
Cumulative Percent	10.0	31.2	56.0	75.2	94.8	96.4	100.0	

Frequency Distribution of Acceptability Factor for Education Institute in Redmond (USA)

Table 9.3-7: Frequency Distributions of Acceptability Factor for IT Industry and Education Institute in Redmond (USA)

For factors of both of these groups, the dominant response selected by majority of respondents of both IT Industry and Education Institute in Redmond (USA) is 4 which equates to answer "I tend to stay away from groups where the experience was not very positive due to behavior of group members".

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well our Hypothesis $H2b_a$.

Hypothesis $H2b_a$: Dynamic organization structures are *dependent* on Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.

The Acceptability factor frequency for both IT Industry as well as Education Institutes in Bangalore (INDIA), are shown below in Table 9.3-8.

Acceptability

	Valid							
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	6	49	59	79	20	20	17	250
Percent	2.4	19.6	23.6	31.6	8.0	8.0	6.8	100.0
Valid Percent	2.4	19.6	23.6	31.6	8.0	8.0	6.8	100.0
Cumulative Percent	2.4	22.0	45.6	77.2	85.2	93.2	100.0	

Frequency Distribution of Acceptability Factor for IT Industry in Bangalore (INDIA)

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	4	15	37	80	39	62	13	4	250
Percent	1.6	6.0	14.8	32.0	15.6	24.8	5.2	1.6	100.0
Valid Percent	1.6	6.0	14.8	32.0	15.6	24.8	5.2	1.6	100.0
Cumulative Percent	1.6	7.6	22.4	54.4	70.0	94.8	100.0	1.6	

Frequency Distribution of Acceptability Factor for Education Institute in Bangalore (INDIA)

Table 9.3-8: Frequency Distributions of Acceptability Factor for IT Industry and Education Institute in Bangalore (INDIA)

For factors of both of these groups, the dominant response selected by majority of respondents of IT Industry in Bangalore (INDIA) is 4 which equates to answer "I tend to stay away from groups where the experience was not very positive due to behavior of group members" as well as response 3 for respondents of Education Institute in Bangalore (INDIA) which is "I only become part of groups when I am requested to join".

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well our Hypothesis $H2b_a$.

Hypothesis $H2b_a$: Dynamic organization structures are *dependent* on Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.

As discussed in Chapter 7 and 8, Chi-squared test was carried out between the Agreeability and Acceptability of social communication and collaboration between IT Industry and Education Institute in Redmond (USA) and Bangalore (INDIA). Since $p < 0.001$, the null hypothesis was rejected, and the alternate hypothesis was established.

Hypothesis $H2_a$: Dynamic organization structures *do emerge* based on Agreeability and Acceptability provided by asynchronous and synchronous communication and collaboration using electronic tools.

9.3.5. Rewards and Recognition Factor Frequency

The Rewards and Recognition factor frequency for both IT Industry as well as Education Institutes in Redmond (USA), are shown below in Table 9.3-9.

Rewards and Recognition

	Valid						
	.00	1.00	2.00	3.00	4.00	5.00	Total
Frequency	8	28	43	113	41	17	250
Percent	3.2	11.2	17.2	45.2	16.4	6.8	100.0
Valid Percent	3.2	11.2	17.2	45.2	16.4	6.8	100.0
Cumulative Percent	3.2	14.4	31.6	76.8	93.2	100.0	

Frequency Distribution of Rewards and Recognition Factor for IT Industry in Redmond (USA)

	Valid						
	.00	1.00	2.00	3.00	4.00	5.00	Total
Frequency	11	25	40	65	63	46	250
Percent	4.4	10.0	16.0	26	25.2	18.4	100.0
Valid Percent	4.4	10.0	16.0	26	25.2	18.4	100.0
Cumulative Percent	4.4	14.4	30.4	81.6	55.6	100.0	

Frequency Distribution of Rewards and Recognition Factor for Education Institute in Redmond (USA)

Table 9.3-9: Frequency Distributions of Rewards and Recognition Factor for IT Industry and Education Institute in Redmond (USA)

For factors of both of these groups, the dominant response selected by majority of respondents of both IT Industry and Education Institute in Redmond (USA) is 3 which equates to answer “I get both intrinsic and extrinsic rewards”.

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well Hypothesis $H3a_a$.

Hypothesis $H3a_a$: Dynamic organization structures are *dependent* on Rewards and Recognition, which result from social collaboration and communication using electronic tools.

The Rewards and Recognition factor frequency for both IT Industry as well as Education Institutes in Bangalore (INDIA), are shown below in Table 9.3-10.

Rewards and Recognition

	Valid						
	.00	1.00	2.00	3.00	4.00	5.00	Total
Frequency	12	13	46	70	42	67	250
Percent	4.8	5.2	18.4	28.0	16.8	26.8	100.0
Valid Percent	4.8	5.2	18.4	28.0	16.8	26.8	100.0
Cumulative Percent	4.8	10.0	28.4	56.4	73.2	100.0	

Frequency Distribution of Rewards and Recognition Factor for IT Industry in Bangalore (INDIA)

	Valid						
	.00	1.00	2.00	3.00	4.00	5.00	Total
Frequency	8	19	93	105	8	13	250
Percent	3.2	7.6	37.2	42.0	3.2	5.2	100.0
Valid Percent	3.3	7.7	37.8	42.7	3.3	5.3	100.0
Cumulative Percent	3.3	11.0	48.8	91.5	94.7	100.0	

Frequency Distribution of Rewards and Recognition Factor for Education Institute in Bangalore (INDIA)

Table 9.3-10: Frequency Distributions of Rewards and Recognition Factor for IT Industry and Education Institute in Bangalore (INDIA)

For factors of both of these groups, the dominant response selected by majority of respondents of both IT Industry and Education Institute in Bangalore (INDIA) is 3 which equates to answer "I get both intrinsic and extrinsic rewards".

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well Hypothesis $H3a_a$.

Hypothesis $H3a_a$: Dynamic organization structures are *dependent* on Rewards and Recognition, which result from social collaboration and communication using electronic tools.

9.3.6. Quest for Knowledge Factor Frequency

The Quest for Knowledge factor frequency for both IT Industry as well as Education Institutes in Redmond (USA), are shown below in Table 9.3-11.

Quest for Knowledge

	Valid						
	1.00	2.00	3.00	4.00	5.00	8.00	Total
Frequency	59	76	45	31	30	9	250
Percent	23.6	30.4	18.0	12.4	12.0	3.6	100.0
Valid Percent	23.6	30.4	18.0	12.4	12.0	3.6	100.0
Cumulative Percent	23.6	54.0	72.0	84.4	96.4	100.0	

Frequency Distribution of Quest for Knowledge Factor for IT Industry in Redmond (USA)

	Valid								
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	Total
Frequency	8	40	48	27	61	29	20	17	250
Percent	3.2	16.0	19.2	10.8	24.4	11.6	8.0	6.8	100.0
Valid Percent	3.2	16.0	19.2	10.8	24.4	11.6	8.0	6.8	100.0
Cumulative Percent	3.2	19.2	38.4	49.2	73.6	85.2	93.2	100.0	

Frequency Distribution of Quest for Knowledge Factor for Education Institute in Redmond (USA)

Table 9.3-11: Frequency Distributions of Quest for Knowledge Factor for IT Industry and Education Institute in Redmond (USA)

For factors of both of these groups, the dominant response selected by majority of respondents of IT Industry in Redmond (USA) is 2 which equates to answers “I will create my own groups / network to accomplish a task” as well as response 5 for respondents of

Education Institute in Redmond (USA) which is "I tend to shy away from group and seek participation in other groups where I am more openly accepted".

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well Hypothesis $H3b_a$.

Hypothesis $H3b_a$: Dynamic organization structures are *dependent* on Quest for Knowledge, which result from social collaboration and communication using electronic tools.

The Quest for Knowledge factor frequency for both IT Industry as well as Education Institutes in Bangalore (INDIA), are shown below in Table 9.3-12.

Quest for Knowledge

	Valid								
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	Total
Frequency	21	33	28	48	74	33	8	5	250
Percent	8.4	13.2	11.2	19.2	29.6	13.2	3.2	2.0	100.0
Valid Percent	8.4	13.2	11.2	19.2	29.6	13.2	3.2	2.0	100.0
Cumulative Percent	8.4	21.6	32.8	52.0	81.6	94.8	98.0	100.0	

Frequency Distribution of Quest for Knowledge Factor for IT Industry in Bangalore (INDIA)

	Valid								
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	Total
Frequency	4	12	53	41	36	60	20	24	250
Percent	1.6	4.8	21.2	16.4	14.4	24.0	8.0	9.6	100.0
Valid Percent	1.6	4.8	21.2	16.4	14.4	24.0	8.0	9.6	100.0
Cumulative Percent	1.6	6.4	27.6	44.0	58.4	82.4	90.4	100.0	

Frequency Distribution of Quest for Knowledge Factor for Education Institute in Bangalore (INDIA)

Table 9.3-12: Frequency Distributions of Quest for Knowledge Factor for IT Industry and Education Institute in Bangalore (INDIA)

For factors of both of these groups, the dominant response selected by majority of respondents of IT Industry in Bangalore (INDIA) is 5 which equates to answer "I tend to shy away from group and seek participation in other groups where I am more openly accepted" as well as response 6 for respondents of Education Institute in Bangalore (INDIA) which is "I get monetary benefits e.g. better scholarship, etc".

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well Hypothesis $H3b_a$.

Hypothesis $H3b_a$: Dynamic organization structures are *dependent* on Quest for Knowledge, which result from social collaboration and communication using electronic tools.

As discussed in Chapter 7 and 8, Chi-squared test was carried out between the Rewards and Recognition and Quest for Knowledge in social communication and collaboration between IT Industry and Education Institute in Redmond (USA) and Bangalore (INDIA). Since $p < 0.001$, the null hypothesis was rejected, and the alternate hypothesis was established.

Hypothesis $H3_a$: Dynamic organization structures *do emerge* based on Rewards and Recognition and Quest for Knowledge, which result from social collaboration and communication using electronic tools.

9.3.7. Fear-Factor Factor Frequency

The Fear-Factor factor frequency for both IT Industry as well as Education Institutes in Redmond (USA), are shown below in Table 9.3-13.

Fear-Factor

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	5	27	39	36	79	51	8	5	250
Percent	2.0	10.8	15.6	14.4	31.6	20.4	3.2	2.0	100.0
Valid Percent	2.0	10.8	15.6	14.4	31.6	20.4	3.2	2.0	100.0
Cumulative Percent	2.0	12.8	28.4	42.8	74.4	94.8	98.0	100.0	

Frequency Distribution of Fear-Factor Factor for IT Industry in Redmond (USA)

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	13	14	44	46	61	46	17	9	250
Percent	5.2	5.6	17.6	18.4	24.4	18.4	6.8	3.6	100.0
Valid Percent	5.2	5.6	17.6	18.4	24.4	18.4	6.8	3.6	100.0
Cumulative Percent	5.2	10.8	28.4	46.8	71.2	89.6	96.4	100.0	

Frequency Distribution of Fear-Factor Factor for Education Institute in Redmond (USA)

Table 9.3-13: Frequency Distributions of Fear-Factor Factor for IT Industry and Education Institute in Redmond (USA)

For factors of both of these groups, the dominant response selected by majority of respondents of both IT Industry and Education Institute in Redmond (USA) is 4 which equates to answer “I like to be part of groups where I learn and grow by learning from experiences of other group members”.

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well Hypothesis $H4a_a$.

Hypothesis $H4a_a$: Dynamic organization structures are ***dependent* on Fear-Factor, which result from social collaboration and communication using electronic tools.**

The Fear-Factor factor frequency for both IT Industry as well as Education Institutes in Bangalore (INDIA), are shown below in Table 9.3-14.

Fear-Factor

	Valid								Missing	Total
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total	System	
Frequency	4	20	51	59	56	43	13	246	4	250
Percent	1.6	8.0	20.4	23.6	22.4	17.2	5.2	98.4	1.6	100.0
Valid Percent	1.6	8.1	20.7	24.0	22.8	17.5	5.3	100.0		
Cumulative Percent	1.6	9.8	30.5	77.2	53.3	94.7	100.0			

Frequency Distribution of Fear-Factor Factor for IT Industry in Bangalore (INDIA)

	Valid							
	.00	1.00	2.00	3.00	4.00	5.00	6.00	Total
Frequency	31	64	50	51	29	16	9	250
Percent	12.4	25.6	20.0	20.4	11.6	6.4	3.6	100.0
Valid Percent	12.4	25.6	20.0	20.4	11.6	6.4	3.6	100.0
Cumulative Percent	12.4	38.0	58.0	78.4	90.0	96.4	100.0	

Frequency Distribution of Fear-Factor Factor for Education Institute in Bangalore (INDIA)

Table 9.3-14: Frequency Distribution of Fear-Factor Factor for IT Industry and Education Institute in Bangalore (INDIA)

For factors of both of these groups, the dominant response selected by majority of respondents of IT Industry in Bangalore (INDIA) is 4 which equates to answer "I like to be part of groups where I learn and grow by learning from experiences of other group members" as well as response 1 for respondents of Education Institute in Bangalore (INDIA) which is "I

will not be very effective at school if social network communication is removed or restricted".

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well Hypothesis $H4a_a$.

Hypothesis $H4a_a$: Dynamic organization structures are *dependent* on Fear-Factor, which result from social collaboration and communication using electronic tools.

9.3.8. Social Power Factor Frequency

The Social Power factor frequency for both IT Industry as well as Education Institutes in Redmond (USA), are shown below in Table 9.3-15.

Social Power

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	9	8	19	42	60	43	60	9	250
Percent	3.6	3.2	7.6	16.8	24.0	17.2	24.0	3.6	100.0
Valid Percent	3.6	3.2	7.6	16.8	24.0	17.2	24.0	3.6	100.0
Cumulative Percent	3.6	6.8	14.4	31.2	55.2	72.4	96.4	100.0	

Frequency Distribution of Social Power Factor for IT Industry in Redmond (USA)

	Valid						
	1.00	2.00	3.00	4.00	5.00	7.00	Total
Frequency	8	61	51	65	56	9	250
Percent	3.2	24.4	20.4	26.0	22.4	3.6	100.0
Valid Percent	3.2	24.4	20.4	26.0	22.4	3.6	100.0
Cumulative Percent	3.2	27.6	48.0	74.0	96.4	100.0	

Frequency Distribution of Social Power Factor for Education Institute in Redmond (USA)

Table 9.3-15: Frequency Distributions of Social Power Factor for IT Industry and Education Institute in Redmond (USA)

For factors of both of these groups, the dominant response selected by majority of respondents of IT Industry in Redmond (USA) is 4 and 6 which equates to answers "I will seek help from expert from industry, provided their details are published and made available" and "helps me understand where I can make a great impact due to my unique position within the group" respectively, as well as response 4 for respondents of Education Institute in Redmond (USA) which is "I will seek help from expert from industry, provided their details are published and made available".

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well our Hypothesis $H4b_a$.

Hypothesis $H4b_a$: Dynamic organization structures are *dependent* on Social Power, which result from social collaboration and communication using electronic tools.

The Social Power factor frequency for both IT Industry as well as Education Institutes in Bangalore (INDIA), are shown below in Table 9.3-16.

Social Power

	Valid								
	.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	8	8	39	44	33	39	51	28	250
Percent	3.2	3.2	15.6	17.6	13.2	15.6	20.4	11.2	100.0
Valid Percent	3.2	3.2	15.6	17.6	13.2	15.6	20.4	11.2	100.0
Cumulative Percent	3.2	6.4	22.0	39.6	52.8	68.4	88.8	100.0	

Frequency Distribution of Social Power Factor for IT Industry in Bangalore (INDIA)

	Valid							
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Frequency	8	65	65	55	30	18	9	250
Percent	3.2	26.0	26.0	22.0	12.0	7.2	3.6	100.0
Valid Percent	3.2	26.0	26.0	22.0	12.0	7.2	3.6	100.0
Cumulative Percent	3.2	29.2	55.2	77.2	89.2	96.4	100.0	

Frequency Distribution of Social Power Factor for Education Institute in Bangalore (INDIA)

Table 9.3-16: Frequency Distributions of Social Power Factor for IT Industry and Education Institute in Bangalore (INDIA)

For factors of both of these groups, the dominant response selected by majority of respondents of IT Industry in Bangalore (INDIA) is 6 which equates to answer "helps me understand where I can make a great impact due to my unique position within the group" as well as response 2 and 3 for respondents of Education Institute in Bangalore (INDIA) which equates to answers "I will serve as an expert in my area of interest" and "it will help me understand who is actively contributing as a subject matter expert" respectively.

The same ties into the research question that formation of organization structures is dependent on the experience of people in groups as well our Hypothesis $H4b_a$.

Hypothesis $H4b_a$: Dynamic organization structures are *dependent* on Social Power, which result from social collaboration and communication using electronic tools.

As discussed in Chapter 7 and 8, Chi-squared test was carried out between the Fear-Factor and Social Power in social communication and collaboration between IT Industry and Education Institute in Redmond (USA) and Bangalore (INDIA). Since $p < 0.001$, the null hypothesis was rejected, and the alternate hypothesis was established.

Hypothesis $H4_a$: Dynamic organization structures *do emerge* based on Fear-Factor and Social Power, which result from social collaboration and communication using electronic tools.

9.4. Summary

This chapter provided the findings and analysis as well as compared and contrasted the results of survey conducted for both IT Industry as well as Education Institutes in Redmond (USA) and Bangalore (INDIA) respectively. An equal number of responses were analyzed for the four sets of data that received as part of the survey questionnaire administered to respondents.

The analysis findings suggest the existence of factors that support the creation of dynamic organization structures in both the sectors. However, there are also subtle differences observed between these sectors concerning the technology being used as well as usage of electronic tools for social, communication and collaboration in both asynchronous as well as synchronous modes. Eight individual factors of availability, accessibility, agreeability, acceptability, rewards & recognition, the quest for knowledge, fear factor, social power confirm the link between organization structure and social, communication and collaboration patterns.

Chapter 10: Conclusions &Future Research

10.1. Overview

The previous chapters presented the findings from IT Industry groups in Redmond (USA) and Bangalore (INDIA) and Educational Institutes groups in Redmond (USA) and Bangalore (INDIA). This chapter draws together the results of these chapters while referring to the literature and the research questions to summarize the main conclusions of the study.

10.2. Summary of research findings

Based on the literature review that evolved through Chapters 3 and 4, a conceptual framework was developed to serve as a guide of this research. As the Pilot Phase progressed, a framework for organizational development and organization structure evolved. This framework developed further into the individual sections of Social, Communication and Collaboration components of the conceptual framework.

Figure 10.2-1 shows the framework with the factors identified during the analysis of IT Industry and Educational Institutes groups in Redmond (USA) and Bangalore (INDIA) respectively. Through color-coded groupings, the framework shown in Figure 10.2-1 provides insight into how this framework emerged from the individual element of the conceptual framework and drew on the potential influencing factors.

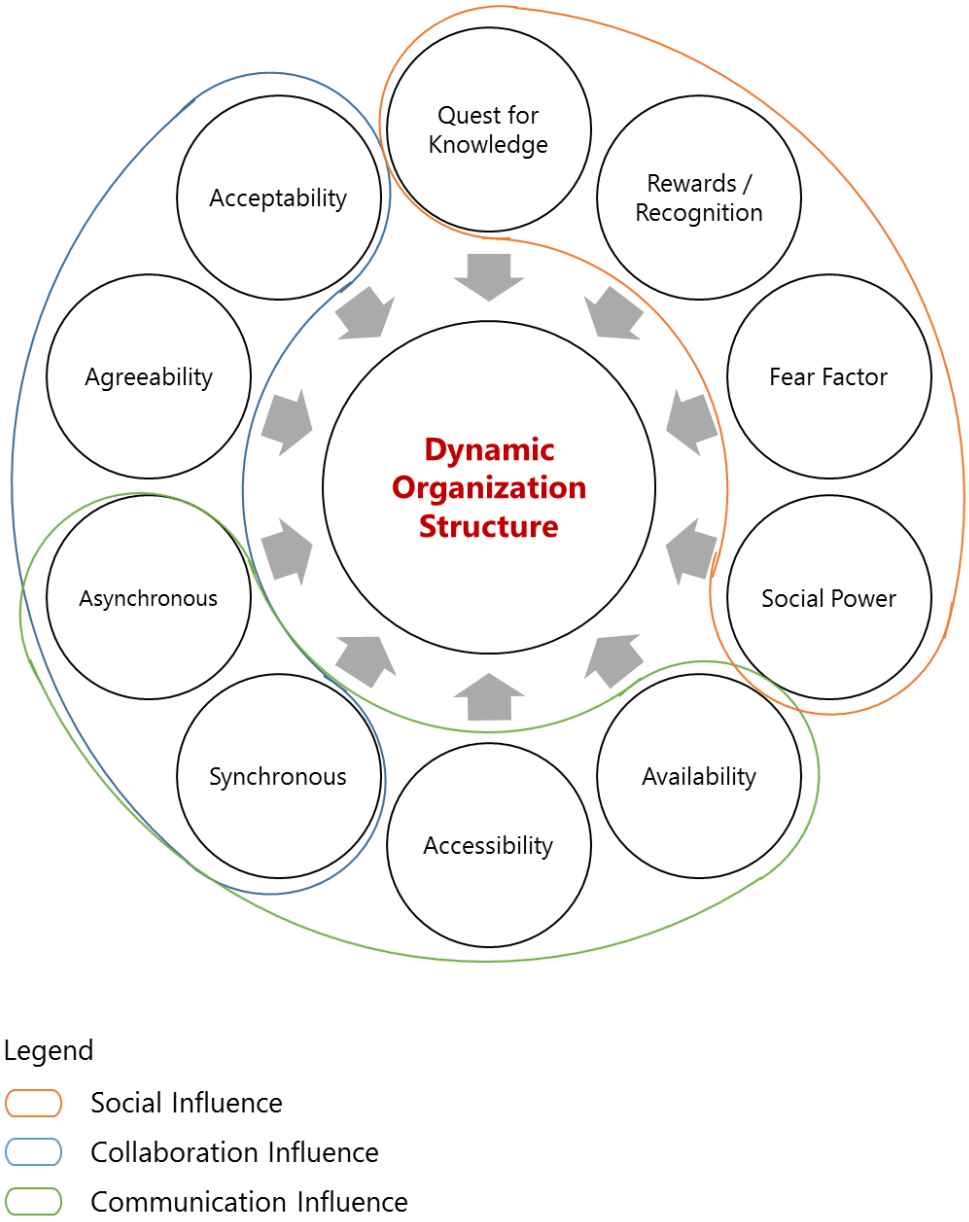


Figure 10.2-1: Framework for Dynamic Organization Structures Based on Social, Asynchronous and Synchronous Communication and Collaboration Patterns

Reviewing the framework, Communication, as an electronic medium, has four factors that define it: Asynchronous, Synchronous, Availability, and Accessibility (highlighted in Green). Similarly, Collaboration, as an electronic medium, has four factors that define it: Asynchronous, Synchronous, Acceptability, and Agreeability (highlighted in Blue). Finally,

Social, as an electronic medium, has four factors that define it: Quest for Knowledge, Rewards and Recognition, Fear Factor and Social Power (highlighted in Orange).

10.3. Contributions of research findings

10.3.1. Theoretical contributions

The all-encompassing literature reviews in Chapters 3 and 4 outlines the existing models and theories relating to organization development and organization structure. The existing theories, described in Chapters 3 and 4, provide a useful framework for beginning the discussion about organization structures. However, they are not adequate to explain how the process of emergence of dynamic organization structures occurs and what might impact this process. This study proposes depth to the current body of OD theory by providing a more detailed explanation of how modern organization structures depend on social, communication and collaboration patterns. Additionally this study has developed a model of organization structures based on social, communication and collaboration (shown as Figure 10.2-1).

10.3.2. Implications for practice

The implication for management practice of this research is related strongly to change management strategies implemented within organizations. The key enabling factor emerging from the research is within the planning component of the organizational change process. The planning component within the change management must occur for adequate formal and informal support measures to be used as part of the change process. The organizations studied during the pilot, and other phases of research presented effectively of the emergence of dynamic organization structure. The final element of interest to practitioners is the continued resistance to change that is evident in most change management processes.

10.4. Research Limitations

As with any study, this research has limitations that must be acknowledged when interpreting the reported results as well as ensures that readers appreciate and understand the boundaries of the study. The focus of the study was on understanding the emergence of dynamic organization structures based on social, asynchronous and synchronous communication and collaboration patterns. It is also important to reinforce that no link is being inferred to organizational effectiveness, efficiency or profitability.

The limitations of the research have been grouped into three categories: research design, research participants and conduct, and research outcomes. In terms of research design, some limitations exist. Firstly, it is recognized that in both studies of IT Industry and Educational Institutes, the use of self-reporting carries with it limitations in terms of bias and socially desirable responses. In particular, the study aimed to collect attitudinal data as opposed to the observation of actual behavior, so if individuals' perceptions do not match their behavior, the study was not able to identify this anomaly.

It is recognized that designing the research around the use of convenience sampling can introduce issues in terms of the representativeness of the sample, and therefore generalization of the findings is not claimed. For Educational Institutes, using only one organization in Redmond (USA) and one in Bangalore (INDIA) is also recognized as a limitation of the study because the results do not allow for comparisons between organizations of different sizes, which may also have an impact. To improve the output analysis, this study combines descriptive and prescriptive research, and uses mixed methodological approach. This research is not the definitive work, and in areas of future research, possible approaches to building dynamic organization structures will be highlighted.

The research participants as well as the way the research was conducted represent some limitations. It is acknowledged that with any research, the researcher brings biases and prior experiences that might impact the research outcomes. The researcher, in this case, was familiar with the IT Industry and, therefore, was able to relate to terminologies and concepts discussed. This familiarity brings forth both benefits and drawbacks. A key advantage was that the researcher was able to establish a level of credibility with the participants. However, it also meant that the researcher had pre-existing knowledge with the potential of impact on research outcomes.

It is acknowledged that within the organizations in question, the gender mix is biased towards a substantial representation of the male population. It is therefore noted that generalizing to industries with a significant female population is not appropriate.

10.5. Directions for future research

This research can be seen as a commencement of a journey into better understanding of dynamic organization structures and raises additional questions best addressed by further studies. In particular, there are other factors of influence for social, communication and collaboration tools that emerged from the pilot study but could not be tested to any significant extent and are an excellent candidate for subsequent studies. Other forms of data collection should be considered to improve the depth or breadth of the research. Longitudinal studies measuring perspectives and attitudes before, during and after the survey would help enable this and should be considered during further research.

In the analysis, a range of data analysis techniques was used to identify preliminary findings. While the study predominantly used the exploratory factor analysis, future research

would require confirmatory factor analysis on a larger and more diverse sample, and the use of techniques such as Structured Equation Modeling may assist to explore further emerging models.

Finally, there is a range of other individual factors that may influence social, communication and collaboration that have not been subject to testing by this research. Demographic data such as age, gender, cultural background and other social, communication and collaboration styles may also provide further understanding of the emergence of dynamic organization structures. Organizational variances such as industry, organizational size, and organizational culture may also show additional organizational factors for consideration. As explained previously, this level of analysis was not possible due to the size and nature of the sample used.

10.6. Summary

The increasing need for all organizations to innovate and remain agile is widely recognized. Often, organization development and specifically the processes that define organization structure are devoid of serious consideration of the impact of such changes at the level of individuals within the organization.

This thesis highlights, above all else, the critical importance of elements of a more personal and affective nature, often referred to as “soft” issues. However, the hard reality is that these issues make a real difference. Many organization efforts will fail due of lack of attention to individuals, how they collaborate and communicate and the social interactions and expectations that accompany them. Organizations committed to genuine development and innovation must recognize these in real terms. As demonstrated by this research, these

organizations must understand how their most important resource – people, both in supervisory roles and in individual contributor roles can demonstrate dynamic organization structures that are best aligned and targeted to meet organizational goal of growth and prosperity.

References

1. Abatecola, G. (2014). Research in organizational evolution. What comes next? *European Management Journal, 32(3),* 434–443.
2. Adams, P. (2007). Communication mapping: understanding anyone's social network in 60 minutes. *Proceedings of the 2007 conference on Designing for User eXperiences. ACM*.
3. Akoumianakis, D., Vidakis, N., Vellis, G., Kotsali, D., Milolodakis, G., Plemenos, A., Stefanakis, D. (2011). Transformable boundary artifacts for knowledge-based work in cross-organization virtual communities spaces.". *Intelligent Decision Technologies 5.1,* 65-82.
4. Babbie, E. (1989). *The practice of social research (5th ed.).* Belmont: Wadsworth Publishing Company.
5. Barley, S. (1994). The Turn to a Horizontal Division of Labor: On the Occupationalization of Firms and the Technization of Work. *National Center for the Educational Quality of the Workforce, University of Pennsylvania*.
6. Baum, J. A. (2002). *The Blackwell companion to organizations.* Oxford: Blackwell Publishing.
7. Bedeian, A. G., Wren, D. A., & Breeze, J. D. (2002). The foundations of Henri Fayol's administrative theory. *Management Decision, Volume 40 issue 9,* 906-918.
8. Belussi, F., Abatecola, G., Breslin, D., & Filatotchev, I. (2015). Darwinism, organizational evolution, and survival: key challenges for future research. *Springer Science+Business Media*.
9. Bradford, D. L., & Burke, W. W. (2005). *Reinventing organization development new approaches to change in organizations.* San Francisco: John Wiley & Sons.

10. Breslin, D. (2014). Calm in the storm: Simulating the management of organizational co-evolution. *Futures, 57(1)*, 62–77.
11. Burns, R. B. (2000). *Introduction to Research Methods (4th ed.).* Sydney: Pearson Education Australia.
12. Butler, B. S. (2001). Membership size, communication activity, and sustainability: A resource-based model of online social structures. *Information Systems Research 12.4*, 346-362.
13. Cameron, K. S., & Quinn, R. E. (1999). *Diagnosing and Changing Organizational Culture; based on the competing values framework.* Massachusetts: Addison Wesley.
14. Carmel, D., &et, a. (2009). Personalized social search based on the user's social network. *Proceedings of the 18th ACM conference on Information and knowledge management. ACM.*
15. Cascio, W. F., & Aguinis, H. (2005). *Applied Psychology in Human Resource Management (6th ed.).* Upper Saddle River, New Jersey: Prentice Hall.
16. Chaminade, B. (2005). Generation Gap. *HR Monthly, October*, 26-29.
17. Chatfield, C., & Collins, A. J. (1980). *Introduction to multivariate analysis.* London: Chapman & Hall.
18. Chirkov, V., Ryan, R. M., Kim, Y., & Kaplan, U. (2003). Differentiating autonomy from individualism and independence: A self - determination theory perspective on internalization of cultural orientations and well-being. *Journal of Personality and Social Psychology 84(1)*, 97-110.
19. Choi, J., Seongkook, J. H., Geehyuk, L., & Song, J. (2013). Mining social relationship types in an organization using communication patterns. *Proceedings of the 2013 conference on Computer supported cooperative work, ACM*.

20. Coakes, S. J., Steed, L., & Dzidic, P. (2006). *SPSS Version 13.0 for Windows: analysis without anguish.* Milton: John Wiley & Sons.
21. Conway, J. M., & Huffcutt, A. I. (2003). A review and evaluation of exploratory factor analysis practices in organizational research. *Organizational Research Methods, 6(2),* 147-168.
22. Creswell, J. W. (2003). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* Thousand Oaks: Sage.
23. Creswell, J. W. (2005). *Educational research: planning, conduction, and evaluating quantitative and qualitative research (2nd ed.).* Upper Saddle River NJ: Prentice Hall.
24. Deci, E., Koestner, R., & Ryan, R. (2001). Extrinsic Rewards and Intrinsic Motivation in Education: Reconsidered Once Again. *Review of Educational Research, 71(1),* 1-27.
25. Dent, E. B., & Powley, E. H. (2002). Employees actually embrace change: The chimera of resistance. *Journal of Applied Management and Entrepreneurship, 7(2),* 56-69.
26. Dosi, G., Levinthal, D. A., & Marengo, L. (2003). Bridging contested terrain: Linking incentive-based and learning perspectives on organizational evolution. *Industrial and Corporate Change, 12(2),* 413–436.
27. Durand, R. (2006). *Organizational evolution and strategic management.* London: Sage Publications.
28. Evans, J. R., & Mathur, A. (2005). The Value of Online Surveys. *Internet Research, 15(2),* 195-219.
29. Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor. *Psychological Methods, 4(3),* 272-299.
30. Field, A. P. (2005). *Discovering statistics Using SPSS.* London: Sage.

31. French, W. L., & Bell Jr., C. H. (1999). *Organization development behavioral science interventions for organization improvement (6th ed.).* Upper Saddle River, New Jersey: Prentice Hall.
32. Gerth, H. H., & Mills, C. W. (1948). *Max Weber: Essays in Sociology.* London: Routledge and Kegan Paul.
33. Greene, J. C., & Caracelli, V. J. (1997). *Advances in Mixed-Method Evaluation: The Callenges and Benefits of Integrating Diverse Paradigms.* San Francisco: Jossey-Bass Publishers.
34. Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a Conceptual Framework for Mixed-Method Evaluation Designs. *Educational Evaluation and Policy Analysis, 11 (3),* 255-274.
35. Gunn, H. (2002). Web-based surveys: Changing the survey process. *First Monday, 7 (12).*
36. Hair (Jnr), J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate Data Analysis (6th ed.).* Upper Saddle River: Pearson International Education.
37. Harreld, J., & Tushman, M. (2009). *"Emerging Business Opportunities" at IBM.* O'Reilly.
38. Hayton, J. C., Allen, D. G., & Scarpello, V. (2004). Factor Retention Decisions in Exploratory Factor Analysis: A Tutorial on Parallel Analysis. *Organizational Research Methods, 7(2),* 191-205.
39. Heckscher, C., & Donnellon, A. (1994). *The Post-Bureaucratic Organization: New Perspectives on Organizational Change.* Sage Publications.

40. Hinds, P., & Kiesler, S. (1995). Communication across boundaries: Work, structure, and use of communication technologies in a large organization. *Organization Science 6.4*, 373-393.
41. Hinds, P., & McGrath, C. (2006). Structures that work: social structure, work structure and coordination ease in geographically distributed teams. *Proceedings of the 2006 20th anniversary conference on Computer supported cooperative work*.
42. Hodgson, G. M. (2013). Understanding organizational evolution: Toward a research agenda using generalized Darwinism. *Organization Studies, 34(7)*, 973–992.
43. Hurley, A. E., Scandura, T. A., Schriesheim, C. A., Brannick, M. T., Seers, A., Vandenberg, R. J., & Williams, L. J. (1997). Exploratory and confirmatory factor analysis: guidelines, issues, and alternatives. *Journal of Organizational Behavior, 18(6)*, 667-683.
44. Ilieva, J., Baron, S., & Healey, N. M. (2002). Online surveys in marketing research: pros and cons. *International Journal of Market Research, 44(3)*, 361-376.
45. Jones, B. B., & Brazzel, M. (2005). *The NTL handbook of organization development and change principles, practices, and perspectives.* San Francisco, CA: Pfeiffer.
46. Kordaki, M., & Thanasis, D. (2009). Critical Thinking as a Framework for Structuring Synchronous and Asynchronous Communication within Learning Design-Based E-Learning Systems. *Intelligent Collaborative e-Learning Systems and Applications*, 83-98.
47. Levesque, C., & Brown, K. W. (2007). Mindfulness as a moderator of the effect of implicit motivational self-concept on day-to-day behavioral motivation. *Motivation & Emotion, 31(4)*, 284–299.

48. Lewin, A. Y., & Koza, M. P. (2001). Empirical research in co-evolutionary processes of strategic adaptation and change: The promise and the challenge. *Organization Studies, 22(6),* 5-12.

49. Lewin, A. Y., & Volberda, H. K. (2005). *The future of organization studies: Beyond the selection-adaptation debate. In H. Tsoukas & C. Knudsen (Eds.), The Oxford handbook of organization theory.* Oxford: Oxford University Press.

50. Lim, F. J., & Benbasat, I. (1991). A communication-based framework for group interfaces in computer-supported collaboration. *Proceedings of the Twenty-Fourth Annual Hawaii International Conference on. Vol. 3. IEEE*.

51. Lim, M., Griffiths, G., & Sambrook, S. (2010). Organizational structure for the twenty-first century. *Presented at the annual meeting of The Institute for Operations Research and The Management Sciences.* Austin.

52. Lim, M., Griffiths, G., & Sambrook, S. (2010). Organizational structure for the twenty-first century. *Presented at the annual meeting of The Institute for Operations Research and The Management Sciences, Austin*.

53. MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods, 4(1),* 84-99.

54. McClelland, S. B. (1994). Training needs assessment data-gathering methods: Part 1, Survey questionnaires. *Journal of European Industrial Training, 18(1),* 22-26.

55. McClelland, S. B. (1994). Training needs assessment data-gathering methods: Part 1, Survey questionnaires. *Journal of European Industrial Training, 18(1),* 22-26.

56. Michinov, N., Michinov, E., & Toczek-Capelle, M.-C. (2004). Social identity, group processes, and performance in synchronous computer-mediated communication. *Group Dynamics 8*, 27-39.

57. Nichols, D. P. (2014, Dec 21). *My coefficient alpha is negative!* Retrieved from http://www.ats.ucla.edu/: http://www.ats.ucla.edu/STAT/SPSS/library/negalpha.htm
58. Ocker, R. J., & Yaverbaum, G. J. (1999). Asynchronous computer-mediated communication versus face-to-face collaboration: Results on student learning, quality, and satisfaction. *Group Decision and Negotiation 8.5*, 427-440.
59. Powell, W. W. (1990). Neither Market nor Hierarchy: Network Forms of Organization. *Research in Organizational Behavior*, 295-336.
60. Pugh, D. S. (1990). *Organization Theory: Selected Readings.* Penguin.
61. Raymond, D., Kanenishi, K., Matsuura, K., Baudin, V., Gayraud, T., Yano, Y., & Diaz, M. (2005). A model for content and communication management in synchronous learning. *Journal of Educational Technology and Society 8.3*, 187-205.
62. Ritter, L., & Sue, V. (2007). Using online surveys in evaluation. *American Evaluation Association (Vol 115, Fall)*.
63. Scheaffer, R. L., Mendenhall, W., & Ott, L. (1990). *Elementary survey sampling (4th ed.).* Boston: PWS-Kent Publishing Company.
64. Schonlau, M., Fricker, R., & Elliott, M. (2002). *Conducting research surveys via e-mail and the web.* RAND research group.
65. Sekaran, U. (2003). *Research Method for Business: A Skill Building Approach (4th ed.).* New York: John Wiley & Sons.
66. Shirani, A. I., Tafti, M. H., & Affisco, J. F. (1999). Task and technology fit: a comparison of two technologies for synchronous and asynchronous group communication. *Information & Management 36.3*, 139-150.
67. Singh, P. J., & Smith, A. J. (2000). Process of Validating a Quality Management Measurement Instrument. *4th International and 7th National Research Conference on Quality Management.* Sydney.

68. Spender, J. C. (1996). Organizational knowledge, learning and memory: three concepts in search of a theory. *Journal of Organizational Change Management, 9(1),* 63-78.

69. Sun, P. Y., & Scott, J. L. (2003). Exploring the divide - organizational learning and learning organization. *The Learning Organization, 10(4),* 202-215.

70. Sundararajan, B. (2009). Impact of Communication Patterns, Network Positions, and Social Dynamics Factors on Learning among Students in a CSCL Environment. *Electronic Journal of e-Learning Volume 7 Issue 1,* 71-84.

71. Tabachnick, B. G., & Fidell, L. S. (1989). *Using multivariate statistics (2nd ed.).* New York: Harper Collins.

72. Tashakkori, A., & Teddlie, C. (2003). *Handbook of Mixed Methods in Social & Behavioral Research.* Thousand Oaks: Sage Publications.

73. Taylor, F. W. (1911). *The Principles of Scientific Management.* New York: Harper Bros.

74. Teece, D. J. (2007). Explicating Dynamic Capabilities: The Nature and Microfoundations of (Sustainable) Enterprise Performance. *Strategic Management Journal*.

75. Tirado, R., Aguaded, I., & Hernando, A. (2011). Collaborative learning processes in an asynchronous environment: an analysis through discourse and social networks. *Journal of Latin American Communication Research 2.1,* 115-146.

76. Tsang, E. W. (1997). Organizational Learning and the Learning Organization: A Dichotomy Between Descriptive and Prescriptive Research. *Human Relations, 50(1),* 73-89.

77. Waddell, D. M., & Sohal, A. S. (1998). Resistance: a constructive tool for change management. *Management Decision, 36(8),* 543-548.

78. Walker, K. L., & Stohl, C. (2012). Communicating in a Collaborating Group: A Longitudinal Network Analysis. *Communication Monographs 79.4*, 448-474.

79. Weber, M. (1938). *Wirtschaft und Gesellschaft, part III.*

80. Weisbord, M. R. (1978). *Organizational Diagnosis: A Workbook Of Theory And Practice.* Perseus Books.

81. Zikmund, W. G. (2000). *Business Research Methods (6th ed.).* Orlando: Dryden Press.

82. Zimitat, C., & Crebert, G. (2002). Conducting online research and evaluation. *Annual International Higher Education Research and Development Society of Australasia (HERDSA).* Perth.

Appendices

Appendix I – Pilot Survey

Dear Respondent,

Thank you so much for participating in our survey. The objective of our survey is to understand the use of electronic communication tools for Social, Asynchronous and Synchronous Communication and Collaboration and understand patterns of communication. The expected outcome of this study is creation of Dynamic Organization Structures. We would appreciate your valued opinion and request you to kindly respond to this questionnaire.

To complete this short survey, visit the following location:

Thank you!

Survey on Usage of Electronic Tools for Social, Asynchronous and Synchronous Communication and Collaboration

Section 1: Participant Information

First Name		Last Name	
Gender	◯ Male ◯ Female	E-Mail	
Marital Status	◯ Single ◯ Married	Age	
Occupation	◯ Student ◯ Employed ◯ Business Owner ◯ Unemployed		
Highest Education	◯ Under Graduate ◯ Graduate ◯ Post Graduate ◯ Doctorate		
Which of the following programs do you use?			
Instant Message Chat	◯ Yes ◯ No	Audio Chat	◯ Yes ◯ No
E-Mail	◯ Yes ◯ No	Video Chat	◯ Yes ◯ No
Web Conference	◯ Yes ◯ No	White Boarding	◯ Yes ◯ No
Text Messaging	◯ Yes ◯ No	Cloud Tools	◯ Yes ◯ No
Forums	◯ Yes ◯ No	Social Tools	◯ Yes ◯ No
Wiki's	◯ Yes ◯ No		

Section 2: Survey Questionnaire

Statement	Select All Applicable Responses		
Overall are you satisfied with your experience of using Electronic Tools for Social Communication and Collaboration to achieve your goals and objectives	Yes	No	Yes, but there's room for improvement
If you answered "Yes, but there's room for improvement", please provide your opinion			

Statement	Select All Applicable Responses		
Having instant communication (online) dialog or interaction with experts	helps me accomplish my task faster	helps create a bond of trust and reach out to same experts again and again	urges me to reach out to them as it is easy
If the tool can rank the participants based on free/busy information	it will help me reach out to experts who are accessible and not busy	it will help me effectively manage my communication and reply time expectations	it will help me create my own ranking of when to reach which expert
If various collaboration tools can share information between them then	I will be more successful as I will reach out to folks outside of my work	I will create my own groups / network to accomplish a task	I will spend less time searching for information and more time using information
If there was a classification or tag available to identify experts in communication tool	it will help me accomplish my task faster	I will engage in discussions in other areas of my interest	I will serve as an expert in my area of interest
If the tool can list the most active group communications	it will help me to identify where most experts are engaged	it will help get an estimate on how long will it take to get responses to my queries	it will help me understand who is actively contributing as a subject matter expert
If the tool can help establish location of experts	I will benefit if the tool could send my queries over e-mail or any other medium due to differences in geo locations and time	it would be great if I can get update if the recipient read my message	it would be great if I can get an idea on when experts would be available online
If the participants at work do not engage in information sharing	I will reach out my social network to get information required to accomplish task	I will not participate in groups when others are not helping me	I will not be very effective at my work if social network communication is removed or restricted

Statement	Select All Applicable Responses		
If I only get negative or unusable information from participants	I will stay away from group and seek help from other groups at my work	I will try to seek help outside my work	I will try to post queries in open forums
If the participants in a discussion do not agree to reach a consensus	I will take the advice from the most reputed participant and use that information	I will try to reach out to experts outside of my work group	I will seek help from expert from industry, provided their details are published and made available
During formation of groups	I tend to lead the creation of groups	I tend to proactive and become part of groups where I can contribute	I only become part of groups when I am requested to join
During discussions within the group	I am more open and contribute a lot if the group provides inclusiveness and positive feedback	I tend to shy away from group and seek participation in other groups where I am more openly accepted	I am more creative and participative when I can provide new contributions or unique points of view to discussions
During winding down of groups and creation of new ones	I tend to participate more in groups where I had a positive experience with former associates during prior interactions	I tend to stay away from groups where the experience was not very positive due to behavior of group members	I like to be part of groups where I learn and grow by learning from experiences of other group members
My communication and collaboration is primarily driven by	need to get recognized in community as an expert	help learn from interactions as they in turn help me be successful at work	need to gain better exposure to experts whose association will help me in future
I participate in groups as	I get both intrinsic and extrinsic rewards	I get monetary benefits e.g. higher pay, company sponsored rewards, better scholarship etc.	it helps me prepare for a better career as I gain lot of experience by learning from experts
Communication and Collaboration is essential	for me to function in my job as I am not the most skilled and experienced person	helps me gain trust of my team members when I can bring in external perspective	helps me in driving initiatives beyond my current scope, leading to mindshare with key stakeholders outside my sphere of influence

Statement	Select All Applicable Responses		
My communication and collaboration with my direct group	is limited and I feel I will expose my areas of development	is more expanded as I feel I will understand the areas of development of my team members	helps me understand where I can make a great impact due to my unique position within the group and use it as leverage
During my communication and collaboration	I am more outward thinking and try to bring in different viewpoints which might not be directly related to current discussion	I tend to stick to just the current discussions and only provide monosyllable responses e.g Yes, No, Agree, Disagree	I try to stay away from confrontational and directed discussions as I feel my inputs will negatively impact me immediately or in future
When I try to create a new group	I tend to include participants from outside my work as it helps contain my areas of exposure	I tend to stay away outside participants as I feel it will be detrimental for me due to exposure in community	I like to include only participants with whom I have a very positive and comfortable working relationship

Appendix II – Survey for IT Industry in Redmond, USA

Dear Respondent,

Thank you so much for participating in our survey. The objective of our survey is to understand the use of electronic communication tools for Social, Asynchronous and Synchronous Communication and Collaboration and understand patterns of communication. The expected outcome of this study is creation of Dynamic Organization Structures. We would appreciate your valued opinion and request you to kindly respond to this questionnaire.

To complete this short survey, visit the following location:

Thank you!

Survey on Usage of Electronic Tools for Social, Asynchronous and Synchronous Communication and Collaboration

Section 1: Participant Information

First Name		Last Name	
Gender	◯ Male ◯ Female	E-Mail	
Marital Status	◯ Single ◯ Married	Age	
Occupation	◯ Student ◯ Employed ◯ Business Owner ◯ Unemployed		
Highest Education	◯ Under Graduate ◯ Graduate ◯ Post Graduate ◯ Doctorate		
Which of the following programs do you use?			
Instant Message Chat	◯ Yes ◯ No	Audio Chat	◯ Yes ◯ No
E-Mail	◯ Yes ◯ No	Video Chat	◯ Yes ◯ No
Web Conference	◯ Yes ◯ No	White Boarding	◯ Yes ◯ No
Text Messaging	◯ Yes ◯ No	Cloud Tools	◯ Yes ◯ No
Forums	◯ Yes ◯ No	Social Tools	◯ Yes ◯ No
Wiki's	◯ Yes ◯ No		
If you win the draw for $5 (One in Three win), which one of the following would you choose?			
Starbucks Coffee	◯ Yes ◯ No	T-Mobile Airtime	◯ Yes ◯ No
PayPal Funds	◯ Yes ◯ No	AT&T Airtime	◯ Yes ◯ No
Subway Voucher	◯ Yes ◯ No	Verizon Airtime	◯ Yes ◯ No
McDonald's Voucher	◯ Yes ◯ No	Sprint Airtime	◯ Yes ◯ No

Section 2: Survey Questionnaire

Statement	Select All Applicable Responses		
Overall are you satisfied with your experience of using Electronic Tools for Social Communication and Collaboration to achieve your goals and objectives	Yes	No	Yes, but there's room for improvement
If you answered "Yes, but there's room for improvement", please provide your opinion			
Having instant communication (online) dialog or interaction with experts	helps me accomplish my task faster	helps create a bond of trust and reach out to same experts again and again	urges me to reach out to them as it is easy
If the tool can rank the participants based on free/busy information	it will help me reach out to experts who are accessible and not busy	it will help me effectively manage my communication and reply time expectations	it will help me create my own ranking of when to reach which expert
If various collaboration tools can share information between them then	I will be more successful as I will reach out to folks outside of my work	I will create my own groups / network to accomplish a task	I will spend less time searching for information and more time using information
If there was a classification or tag available to identify experts in communication tool	it will help me accomplish my task faster	I will engage in discussions in other areas of my interest	I will serve as an expert in my area of interest
If the tool can list the most active group communications	it will help me to identify where most experts are engaged	it will help get an estimate on how long will it take to get responses to my queries	it will help me understand who is actively contributing as a subject matter expert
If the tool can help establish location of experts	I will benefit if the tool could send my queries over e-mail or any other medium due to differences in geo locations and time	it would be great if I can get update if the recipient read my message	it would be great if I can get an idea on when experts would be available online
If the participants at work do not engage in information sharing	I will reach out my social network to get information required to accomplish task	I will not participate in groups when others are not helping me	I will not be very effective at my work if social network communication is removed or restricted

Statement	Select All Applicable Responses		
If I only get negative or unusable information from participants	I will stay away from group and seek help from other groups at my work	I will try to seek help outside my work	I will try to post queries in open forums
If the participants in a discussion do not agree to reach a consensus	I will take the advice from the most reputed participant and use that information	I will try to reach out to experts outside of my work group	I will seek help from expert from industry, provided their details are published and made available
During formation of groups	I tend to lead the creation of groups	I tend to proactive and become part of groups where I can contribute	I only become part of groups when I am requested to join
During discussions within the group	I am more open and contribute a lot if the group provides inclusiveness and positive feedback	I tend to shy away from group and seek participation in other groups where I am more openly accepted	I am more creative and participative when I can provide new contributions or unique points of view to discussions
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I participate in groups as	I get both intrinsic and extrinsic rewards	I get monetary benefits e.g. higher pay, company sponsored rewards, better scholarship etc.	it helps me prepare for a better career as I gain lot of experience by learning from experts
Communication and Collaboration is essential	for me to function in my job as I am not the most skilled and experienced person	helps me gain trust of my team members when I can bring in external perspective	helps me in driving initiatives beyond my current scope, leading to mindshare with key stakeholders outside my sphere of influence

Statement	Select All Applicable Responses		
My communication and collaboration with my direct group	is limited and I feel I will expose my areas of development	is more expanded as I feel I will understand the areas of development of my team members	helps me understand where I can make a great impact due to my unique position within the group and use it as leverage
During my communication and collaboration	I am more outward thinking and try to bring in different viewpoints which might not be directly related to current discussion	I tend to stick to just the current discussions and only provide monosyllable responses e.g Yes, No, Agree, Disagree	I try to stay away from confrontational and directed discussions as I feel my inputs will negatively impact me immediately or in future
When I try to create a new group	I tend to include participants from outside my work as it helps contain my areas of exposure	I tend to stay away outside participants as I feel it will be detrimental for me due to exposure in community	I like to include only participants with whom I have a very positive and comfortable working relationship

Appendix III – Survey for IT Industry in Bangalore, INDIA

Dear Respondent,

Thank you so much for participating in our survey. The objective of our survey is to understand the use of electronic communication tools for Social, Asynchronous and Synchronous Communication and Collaboration and understand patterns of communication. The expected outcome of this study is creation of Dynamic Organization Structures. We would appreciate your valued opinion and request you to kindly respond to this questionnaire.

To complete this short survey, visit the following location:

Thank you!

Survey on Usage of Electronic Tools for Social, Asynchronous and Synchronous Communication and Collaboration

Section 1: Participant Information

First Name		Last Name	
Gender	◯ Male ◯ Female	E-Mail	
Marital Status	◯ Single ◯ Married	Age	
Occupation	◯ Student ◯ Employed ◯ Business Owner ◯ Unemployed		
Highest Education	◯ Under Graduate ◯ Graduate ◯ Post Graduate ◯ Doctorate		
Which of the following programs do you use?			
Instant Message Chat	◯ Yes ◯ No	Audio Chat	◯ Yes ◯ No
E-Mail	◯ Yes ◯ No	Video Chat	◯ Yes ◯ No
Web Conference	◯ Yes ◯ No	White Boarding	◯ Yes ◯ No
Text Messaging	◯ Yes ◯ No	Cloud Tools	◯ Yes ◯ No
Forums	◯ Yes ◯ No	Social Tools	◯ Yes ◯ No
Wiki's	◯ Yes ◯ No		
If you win the draw for Rs.250, which one of the following would you choose?			
Café Coffee Day	◯ Yes ◯ No	AirTel Airtime	◯ Yes ◯ No
PayPal Funds	◯ Yes ◯ No	Vodafone Airtime	◯ Yes ◯ No
Subway Voucher	◯ Yes ◯ No	BSNL Airtime	◯ Yes ◯ No
McDonald's Voucher	◯ Yes ◯ No	Idea Airtime	◯ Yes ◯ No
		Aircel Airtime	◯ Yes ◯ No

Section 2: Survey Questionnaire

Statement	Select All Applicable Responses		
Overall are you satisfied with your experience of using Electronic Tools for Social Communication and Collaboration to achieve your goals and objectives	Yes	No	Yes, but there's room for improvement
If you answered "Yes, but there's room for improvement", please provide your opinion			
Having instant communication (online) dialog or interaction with experts	helps me accomplish my task faster	helps create a bond of trust and reach out to same experts again and again	urges me to reach out to them as it is easy
If the tool can rank the participants based on free/busy information	it will help me reach out to experts who are accessible and not busy	it will help me effectively manage my communication and reply time expectations	it will help me create my own ranking of when to reach which expert
If various collaboration tools can share information between them then	I will be more successful as I will reach out to folks outside of my work	I will create my own groups / network to accomplish a task	I will spend less time searching for information and more time using information
If there was a classification or tag available to identify experts in communication tool	it will help me accomplish my task faster	I will engage in discussions in other areas of my interest	I will serve as an expert in my area of interest
If the tool can list the most active group communications	it will help me to identify where most experts are engaged	it will help get an estimate on how long will it take to get responses to my queries	it will help me understand who is actively contributing as a subject matter expert
If the tool can help establish location of experts	I will benefit if the tool could send my queries over e-mail or any other medium due to differences in geo locations and time	it would be great if I can get update if the recipient read my message	it would be great if I can get an idea on when experts would be available online
If the participants at work do not engage in information sharing	I will reach out my social network to get information required to accomplish task	I will not participate in groups when others are not helping me	I will not be very effective at my work if social network communication is removed or restricted

Statement	Select All Applicable Responses		
If I only get negative or unusable information from participants	I will stay away from group and seek help from other groups at my work	I will try to seek help outside my work	I will try to post queries in open forums
If the participants in a discussion do not agree to reach a consensus	I will take the advice from the most reputed participant and use that information	I will try to reach out to experts outside of my work group	I will seek help from expert from industry, provided their details are published and made available
During formation of groups	I tend to lead the creation of groups	I tend to proactive and become part of groups where I can contribute	I only become part of groups when I am requested to join
During discussions within the group	I am more open and contribute a lot if the group provides inclusiveness and positive feedback	I tend to shy away from group and seek participation in other groups where I am more openly accepted	I am more creative and participative when I can provide new contributions or unique points of view to discussions
During winding down of groups and creation of new ones	I tend to participate more in groups where I had a positive experience with former associates during prior interactions	I tend to stay away from groups where the experience was not very positive due to behavior of group members	I like to be part of groups where I learn and grow by learning from experiences of other group members
My communication and collaboration is primarily driven by	need to get recognized in community as an expert	help learn from interactions as they in turn help me be successful at work	need to gain better exposure to experts whose association will help me in future
I participate in groups as	I get both intrinsic and extrinsic rewards	I get monetary benefits e.g. higher pay, company sponsored rewards, better scholarship etc.	it helps me prepare for a better career as I gain lot of experience by learning from experts
Communication and Collaboration is essential	for me to function in my job as I am not the most skilled and experienced person	helps me gain trust of my team members when I can bring in external perspective	helps me in driving initiatives beyond my current scope, leading to mindshare with key stakeholders outside my sphere of influence

Statement	Select All Applicable Responses		
My communication and collaboration with my direct group	is limited and I feel I will expose my areas of development	is more expanded as I feel I will understand the areas of development of my team members	helps me understand where I can make a great impact due to my unique position within the group and use it as leverage
During my communication and collaboration	I am more outward thinking and try to bring in different viewpoints which might not be directly related to current discussion	I tend to stick to just the current discussions and only provide monosyllable responses e.g Yes, No, Agree, Disagree	I try to stay away from confrontational and directed discussions as I feel my inputs will negatively impact me immediately or in future
When I try to create a new group	I tend to include participants from outside my work as it helps contain my areas of exposure	I tend to stay away outside participants as I feel it will be detrimental for me due to exposure in community	I like to include only participants with whom I have a very positive and comfortable working relationship

Appendix IV – Survey for Education Institutes in Redmond, USA

Dear Respondent,

Thank you so much for participating in our survey. The objective of our survey is to understand the use of electronic communication tools for Social, Asynchronous and Synchronous Communication and Collaboration and understand patterns of communication. The expected outcome of this study is creation of Dynamic Organization Structures. We would appreciate your valued opinion and request you to kindly respond to this questionnaire.

To complete this short survey, visit the following location:

Thank you!

Survey on Usage of Electronic Tools for Social, Asynchronous and Synchronous Communication and Collaboration

Section 1: Participant Information

First Name		Last Name	
Gender	◯ Male ◯ Female	E-Mail	
Marital Status	◯ Single ◯ Married	Age	
Highest Education	◯ Under Graduate ◯ Graduate ◯ Post Graduate ◯ Doctorate		
Which of the following programs do you use?			
Instant Message Chat	◯ Yes ◯ No	Audio Chat	◯ Yes ◯ No
E-Mail	◯ Yes ◯ No	Video Chat	◯ Yes ◯ No
Web Conference	◯ Yes ◯ No	White Boarding	◯ Yes ◯ No
Text Messaging	◯ Yes ◯ No	Cloud Tools	◯ Yes ◯ No
Forums	◯ Yes ◯ No	Social Tools	◯ Yes ◯ No
Wiki's	◯ Yes ◯ No		
If you win the draw for $5 (One in Three win), which one of the following would you choose?			
Starbucks Coffee	◯ Yes ◯ No	T-Mobile Airtime	◯ Yes ◯ No
PayPal Funds	◯ Yes ◯ No	AT&T Airtime	◯ Yes ◯ No
Subway Voucher	◯ Yes ◯ No	Verizon Airtime	◯ Yes ◯ No
McDonald's Voucher	◯ Yes ◯ No	Sprint Airtime	◯ Yes ◯ No

Section 2: Survey Questionnaire

Statement	Select All Applicable Responses		
Overall are you satisfied with your experience of using Electronic Tools for Social Communication and Collaboration to achieve your goals and objectives	Yes	No	Yes, but there's room for improvement
If you answered "Yes, but there's room for improvement", please provide your opinion			
Having instant communication (online) dialog or interaction with experts	helps me accomplish my task faster	helps create a bond of trust and reach out to same experts again and again	urges me to reach out to them as it is easy
If the tool can rank the participants based on free/busy information	it will help me reach out to experts who are accessible and not busy	it will help me effectively manage my communication and reply time expectations	it will help me create my own ranking of when to reach which expert
If various collaboration tools can share information between them then	I will be more successful as I will reach out to folks outside of my college	I will create my own groups / network to accomplish a task	I will spend less time searching for information and more time using information
If there was a classification or tag available to identify experts in communication tool	it will help me accomplish my task faster	I will engage in discussions in other areas of my interest	I will serve as an expert in my area of interest
If the tool can list the most active group communications	it will help me to identify where most experts are engaged	it will help get an estimate on how long will it take to get responses to my queries	it will help me understand who is actively contributing as a subject matter expert
If the tool can help establish location of experts	I will benefit if the tool could send my queries over e-mail or any other medium due to differences in geo locations and time	it would be great if I can get update if the recipient read my message	it would be great if I can get an idea on when experts would be available online
If the participants at college do not engage in information sharing	I will reach out my social network to get information required to accomplish task	I will not participate in groups when others are not helping me	I will not be very effective at my college if social network communication is removed or restricted

Statement	Select All Applicable Responses		
If I only get negative or unusable information from participants	I will stay away from group and seek help from other groups at my college	I will try to seek help outside my college	I will try to post queries in open forums
If the participants in a discussion do not agree to reach a consensus	I will take the advice from the most reputed participant and use that information	I will try to reach out to experts outside of my college group	I will seek help from expert from industry, provided their details are published and made available
During formation of groups	I tend to lead the creation of groups	I tend to proactive and become part of groups where I can contribute	I only become part of groups when I am requested to join
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My communication and collaboration is primarily driven by	need to get recognized in community as an expert	help learn from interactions as they in turn help me be successful at college	need to gain better exposure to experts whose association will help me in future
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Statement	Select All Applicable Responses		
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When I try to create a new group	I tend to include participants from outside my college as it helps contain my areas of exposure	I tend to stay away outside participants as I feel it will be detrimental for me due to exposure in community	I like to include only participants with whom I have a very positive and comfortable working relationship

Appendix V – Survey for Education Institutes in Bangalore, INDIA

Dear Respondent,

Thank you so much for participating in our survey. The objective of our survey is to understand the use of electronic communication tools for Social, Asynchronous and Synchronous Communication and Collaboration and understand patterns of communication. The expected outcome of this study is creation of Dynamic Organization Structures. We would appreciate your valued opinion and request you to kindly respond to this questionnaire.

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Section 1: Participant Information

First Name		Last Name	
Gender	◯ Male ◯ Female	E-Mail	
Marital Status	◯ Single ◯ Married	Age	
Highest Education	◯ Under Graduate ◯ Graduate ◯ Post Graduate ◯ Doctorate		
Which of the following programs do you use?			
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E-Mail	◯ Yes ◯ No	Video Chat	◯ Yes ◯ No
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Forums	◯ Yes ◯ No	Social Tools	◯ Yes ◯ No
Wiki's	◯ Yes ◯ No		
If you win the draw for Rs.250, which one of the following would you choose?			
Café Coffee Day	◯ Yes ◯ No	AirTel Airtime	◯ Yes ◯ No
PayPal Funds	◯ Yes ◯ No	Vodafone Airtime	◯ Yes ◯ No
Subway Voucher	◯ Yes ◯ No	BSNL Airtime	◯ Yes ◯ No
McDonald's Voucher	◯ Yes ◯ No	Idea Airtime	◯ Yes ◯ No
		Aircel Airtime	◯ Yes ◯ No

Section 2: Survey Questionnaire

Statement	Select All Applicable Responses		
Overall are you satisfied with your experience of using Electronic Tools for Social Communication and Collaboration to achieve your goals and objectives	Yes	No	Yes, but there's room for improvement
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Statement	Select All Applicable Responses		
My communication and collaboration with my direct group	is limited and I feel I will expose my areas of development	is more expanded as I feel I will understand the areas of development of my team members	helps me understand where I can make a great impact due to my unique position within the group and use it as leverage
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Appendix VI – Publications of the Scholar in the Area of Research

1. Singh, R and Swain, S. (2015) RESEARCH IN PROGRESS PAPER on Comparison between Social, Asynchronous and Synchronous Communication and Collaboration Patterns between Senior Leaders and New Hires in IT Industry. PARIPEX - Indian Journal Of Research, Vol 4, Issue 6, pp.268-271, June 2015, ISSN 2250-1991.

2. Swain, S., Conway, S. & Singh, R. (2015) Emergence Of Dynamic Organization Structures Based On Social, Asynchronous And Synchronous Communication And Collaboration Patterns Between IT Industry In Redmond, USA And Bangalore, INDIA. International Journal of Recent Scientific Research Vol. 6, Issue, 5, pp.4117-4122, May 2015.ISSN 0976-3031.

3. Singh, R. (2013). Persona Driven IT System, IUJ Journal of Management, Vol. 1, Issue 1, pp. 76-81, Nov. 2013, ISSN: 2347 – 5080.

4. Singh, R. (2013). Corporate Social Responsibility: Cross Sectoral Perspective and Analysis in National Seminar on Corporate Social Responsibility in the Emerging Scenario: Issues and Challenges organized by Faculty of Management Studies, ICFAI University Jharkhand, Ranchi, India.

5. Singh, R. (2014). Enterprise of Future - Leveraging ICT and Social Interactions (SI) for Growth in The Next Leap!, International Conference on Exploring New Paradigms in

Business organized by Centre for Business Administration, Central University of Jharkhand, Ranchi, India.

6. Singh, R. (2014). Technology Options for Success of Entrepreneurs in National Seminar on Unleashing Entrepreneurship in India: Opportunities and Challenges organized by Faculty of Management Studies, ICFAI University Jharkhand, Ranchi, India.