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**ORGANIZATIONAL KNOWLEDGE IN WORK GROUPS: FACTORS
CONTRIBUTING TO ITS FORMATION AND THE EFFECT OF ROLE
AMBIGUITY**

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DEDICATION

I would like to dedicate this project to my three girls, my wife, Paula and our two daughters, Kasydi and Kaitlyn. Thank you for your support, encouragement and patience when I had to shift my focus away from you. The time it has taken me to complete this project has been worth every minute. It has allowed me to share in so many experiences that I would not have been able to otherwise. This time has been a chance to grow, enjoy, experience, and rest all at the same time. Even though there were times when I felt stretched and unable to complete the task at hand, the time spent with all of you made it worth the struggle. When I hit a road block early on, you were all there to support and encourage me to continue. For these things and so much more, I thank and love each one of you deeply.

To my extended family, thank you for understanding my need for change and encouraging the adventure, even when it might have seemed strange or crazy.



ABSTRACT

This study investigated the moderating effect of role ambiguity on eight predictor variables and the formation of organizational knowledge in work groups. One hundred and seventy one individuals in nine different industries within North America participated in a survey-based study of knowledge management, role ambiguity and group dynamics. Role ambiguity was found to have a significant relationship with five of eight predictor variables including the variable individual autonomy. Role ambiguity moderated the relationship between individual autonomy and organizational knowledge as predicted. Significant relationships were also found to exist between role ambiguity and the following factors: common language, clarity of organizational intent, mutual help, and lateral communication. These findings reveal the importance of clarifying the roles of individuals within a group and organization to best utilize interdependent behaviors which can potentially enhance organizational learning, and, ultimately, group performance.

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This process has been filled with excitement and discouragement. I was discouraged at times by my own lack of understanding and the lack of understanding by others which lead to the inability to finish my first project, due to data issues. I've been encouraged and excited by the response and patience of others when problems arose and my progress was slowed. I acknowledge and thank my supervisor, Dr. John Usher as he was often the external and credible source of patience and encouragement. He was there to lend an ear and offer advice when needed, and yet was supportively quiet when the time and space was required. The positive relationship that John provided throughout my program was a key factor in my completing this project. For all you have done, I thank you.

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Chapter I

I. *Introduction*

Introduction

“Where absolute superiority is not attainable, you must produce a relative one at the decisive point by making skillful use of what you have.” Carl von Clausewitz, *On War* (1832)

With this statement, Carl von Clausewitz (1832) addressed the strategy of war. In today’s highly competitive and fast paced global economy where changing technologies, enhanced communications, low cost operations, international mergers, and virtual organizations are a reality, this statement also applies to organizations as their fight to survive may seem somewhat like a war. According to Liu and Wilson, “the corporate failure rate is not only showing a trend increase but is increasingly more volatile across the business cycle” (2002, p. 4). The statement by Carl von Clausewitz also reveals a shift in strategy that parallels the shift in organizational focus as organizations strive for competitive advantage. The statement implies a shift from domination of their external environments (Porter, 1985) to a greater emphasis on internal resources as a means of success (Barney, 1991; Miller & Shamsie, 1996). Barney (1991) established the Resource Based View (RBV), which proposed that sustainable competitive advantage could be obtained by focusing on critical unique resources within an organization that could not easily be duplicated by the competition. By achieving and successfully exploiting competitive advantage, an organization is able to earn an average to above average return and continue to operate (Hitt, Ireland, Hoskisson, Rowe, & Shepard, 2002). Management

research literature has focused extensively on the subject of competitive advantage and the improvement of performance and/or the bottom line.

In 1994, Peter Drucker introduced a new twist in the quest for sustainable competitive advantage. He suggested that knowledge could be managed and declared that the knowledge possessed by individuals, is an organization's most valuable resource, more so than location, facilities, processes, or raw products. Nonaka & Takeuchi (1995) in their book "The Knowledge Creating Company" reinforce Drucker's statement about knowledge being the number one resource to be managed by an organization. This notion that knowledge is the number one resource, resulted in an evolution of the Resource Based View of the firm (RBV) to the Knowledge Based View (KBV) (Grant, 1996).

By no means was this the beginning of knowledge research. Knowledge was discussed and explored by ancient philosophers and empirical studies can be traced back to the 1950's when a multitude of valuable information began to emerge from the research performed in cognitive science. In 1966, Michael Polanyi brought forward two distinct dimensions of knowledge known as tacit and explicit knowledge. Explicit knowledge is that knowledge that is referred to as the "know-what", which can be easily articulated to others and codified to establish routines and process manuals. Tacit knowledge, on the other hand, is the "know-how" which is deeply embedded in the behaviors and routines of an individual and cannot or not easily be articulated or codified.

These two dimensions of knowledge have been somewhat separated in the literature as researchers emphasize different approaches to managing knowledge. In the areas of Management Information Systems (MIS) and Total Quality Management (TQM), explicit knowledge is dominant and the focus is on improving the method of

codifying and utilizing stored information. Other knowledge theorists, such as Nonaka, Takuechi, Drucker, and Von Krogh, who explore the creation and transfer of knowledge, are often focused on tacit knowledge and the interaction of individuals. The complementary theory of the firm suggests that an organization's fundamental ability to overcome market challenges is in its capabilities to create and transfer knowledge (Kogut & Zander, 1996). Learning theorists suggest that encoding, recombining, and utilizing existing knowledge can contribute to innovation (Brown & Duguid, 1998; March, 1991). Knowledge management has struggled with a way to holistically describe and define its influence, but researchers agree that it involves the processes to, acquire, integrate, store, distribute, and use knowledge within an organization to gain competitive advantage. These processes incorporate both tacit and explicit knowledge as key elements within the overall knowledge management activities.

Organizations that have successfully implemented a system of knowledge management have reaped the benefits. Bose (2004), while focused on information technology systems, illustrated the potential financial contributions of knowledge management initiatives by noting the estimated savings of three organizations: (a) Ford Motor Company saved 914 million US dollars in three years, (b) Texas Instruments saved 1 billion US dollars in approximately a 10-year period, and (c) Chevron saved 650 million in a 13-year period. In addition, numerous organizations such as Microsoft have experienced corporate valuation much greater than the sum of their individual asset bases due to the value placed on the knowledge of the organization to produce leading edge technology.

However, many organizations fall short when it comes to implementing knowledge management initiatives as most focus on building a knowledge repository to capture explicit knowledge (Grover & Davenport, 2001). Tacit knowledge is often the forgotten element in knowledge management within organizations as it is difficult to create an environment in which tacit knowledge is shared (Kogut & Zander, 1996). However, when tacit knowledge embedded in the minds of individuals is released through interactions with others and the knowledge is transformed into organizational knowledge, an essential part of knowledge management is fulfilled (Grant, 1996; Nonaka & Konno, 1998; Teece, 1998).

In order to help facilitate the process of transforming individual tacit knowledge into organizational knowledge, organizations are opting out of traditional structures and are moving towards flatter, more flexible structures composed of work groups (Jarvenpaa & Ives, 1994; McCalman, 1996; Sundstrom, Demeuse, & Futrell, 1990). The past two decades have seen a dramatic increase in the use of work teams in traditional organizations (Cohen & Ledford, 1994, Goodman, Devadas, & Griffith-Hughson, 1988; Kirkman & Rosen, 1999). Work teams or work groups have been identified as a preferred environment (Nonaka & Konno, 1998; Nonaka, Von Krogh, & Voelpel, 2006) in which individuals can interact for the purpose of sharing formally and informally their experiences, values, ideas and information. Such information is often the accumulation of all knowledge from past and present roles occupied by the individual. In this setting, when knowledge is shared freely and accepted by others and integrated with their own previous experiences, beliefs, values, and ideas, new knowledge is formed. The processes by which knowledge is shared freely and accepted without suspicion rely on many

complex social, organizational and cultural phenomena, which have positive or negative effects on the outcome of the interaction (Beesley, 2004). It is therefore vitally important that we understand the role of interpersonal dynamics, especially in a group setting, on the key processes of knowledge creation, transfer and integration.

Work groups have been associated with high performance, quality customer service, job satisfaction, organizational commitment, team commitment, (Kirkman & Rosen, 1999), and knowledge transfer (Nonaka & Takeuchi, 1995; Zarraga & Bonache, 2005; Zarraga & Garcia-Falcon, 2003). Work group cohesion (associated with trust, team commitment, and job satisfaction) is a key element in the transfer of knowledge. Group cohesion promotes the process in which individual's knowledge is combined to form a knowledge base greater than the sum of the individual part (Nonaka & Takeuchi, 1985), which exists only in the context of the group. This aggregated knowledge base is known as organizational knowledge (Walsh & Ungson, 1991). Work groups are the instrumental catalyst to facilitate the sharing of collective experiences, ideas and tacit knowledge sharing (Nonaka, Von Krogh, & Voelpel, 2006). Still, work teams are not all positive. Research has also touched upon negative associations between teams and lower performance (Chaston, 1998), a reluctance to share information (Moravec, Johannessen, & Hjelmas, 1997), and a lack of sharing due to low trust (Von Krogh, 1998).

Other research areas, such as role dynamic theory, have also touched on the negative outcomes of interactions between individuals. In particular, the negative outcomes associated with role ambiguity appear to be the counterparts of the positive outcomes of team or group work; decreased productivity vs. increased productivity, lack of organizational commitment vs. commitment, and job dissatisfaction vs. job

satisfaction. The fact that the building blocks of work groups are its members, (who are individuals with their own personalities, experiences and needs) would suggest that in order for a work group to function at its peak efficiency, all individuals must be clear regarding their roles within the group and organization in order to build a climate within the group that is conducive to sharing what each member knows. Therefore, it is not surprising that the effects of role ambiguity would be most dysfunctional when individuals roles are highly interdependent, such as in work groups (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964).

A recent review paper on organizational knowledge creation theory by Nonaka, Von Krogh, and Voelpel (2006) provides direction for future studies. One suggestion is to examine the environment or climate of groups in order to more fully understand the conditions that enable a team or group to share knowledge. In addition, the discovery of barriers that hinder such enabling conditions would be of equal value. Towards these ends, the current study explores the area in which knowledge management intersects with group and role dynamics theories by examining the moderating effect of role ambiguity on the relationship between work group knowledge factors and the formation of organizational knowledge.

Purpose of the Study

The purpose of this study is to investigate the impact of role ambiguity (RA) as a moderator in the relationship between several group level factors that have been found to contribute to the formation of organizational knowledge (Zarraga & Garcia-Falcon, 2003). Higher levels of organizational knowledge result in increased performance

(Nonaka & Takeuchi, 1995; Zarraga & Garcia-Falcon, 2003), which is the goal of most organizations. The goal of this study is to provide an empirical basis for improving work group knowledge outcomes by establishing the impact of an organization's responsibility to provide clear guidelines for each organizational role. This study gives an overview of the uncertainty facing organizations, describes how organizations are competing using knowledge as a resource, discusses how individual's perceptions of their roles can affect knowledge output, and summarizes the relevant literature to tie these different areas of study together. The final part of the study analyzes survey data in an attempt to answer the question: "What effect does subjective role ambiguity (RA) have on those group level factors that impact organizational knowledge in work groups?"

Importance of the Study

Since the early 1990s research in the area of knowledge management has exploded. A great deal of literature can be found on the benefits of knowledge management implementation, knowledge creation, knowledge systems, and organizational knowledge. The literature is thick with advice and theory formulation but is lacking in the area of empirical testing. This research project not only empirically tests specific behaviors associated with knowledge management activities, but also brings together knowledge management theory with role dynamic theory, a combination that is not currently present in the literature. By examining the factors that contribute to knowledge management in work groups, this research advances the understanding of group knowledge dynamics that may have an effect on knowledge management activities and ultimately work group performance. This research is important to academics as it provides empirical evidence to support previous

theory and research and is equally important to practitioners as it provides some areas of consideration relevant to constructing and managing work groups. This research adds to the already growing body of literature on knowledge management and role dynamics theory. Lastly, it provides a base for future research to explore specific knowledge management activities in association with other theoretical platforms such as organizational memory and conflict and organizational memory and personality types.

Chapter II

II. Literature Review and Hypotheses Development

From a strategic perspective, the most important asset to an organization is often the knowledge possessed by individuals, i.e. their intellectual capital. It follows, therefore, that knowledge creation, integration and transfer are key factors contributing to competitive advantage (Grant, 1996). Given this strategic significance of knowledge management, many organizations have pursued activities and structures which facilitate and support an environment in which individual can interact efficiently and effectively to make the most of what they know by sharing, acquiring, utilizing and interpreting knowledge (Mack, Ravin, & Byrd, 2001).

This chapter focuses on literature from three distinct areas: role theory, group dynamics and knowledge management, areas which interconnect within organizations as work groups, made up of individuals, engage in interdependent activities in the hope of producing synergistic knowledge outcomes. The chapter first reviews the literature on roles and role ambiguity which is a part of the role dynamic theory established by Kahn et al. (1964). Group dynamics is then discussed as a preferred or popular environment in which individuals engage in interactive behaviors and dialogue to facilitate the sharing of knowledge. Following the group dynamic literature, I review the knowledge management literature culminating with the eight factors (multi-faceted dialogue, common language, individual autonomy, freedom of expression, clarity of organizational intent, existence and use of organizational memory, lateral communication and mutual help) established by the work of Zarraga and Garcia-Falcon (2003). Hypotheses are developed during this

part of the review with respect to the expected relationships among the eight factors associated with knowledge management and work groups, the formation of organizational knowledge, and the effect of role ambiguity on those relationships. The chapter concludes with a figure that summarizing the relationships and hypotheses.

Roles and Role Ambiguity

Researchers have defined a role as a set of expectations assigned to an individual who occupies a specific position within an organization (Kahn et al., 1964; Katz & Kahn, 1978). These expectations are determined by both the role incumbent and role senders. Role senders are comprised of individuals within the role set both internal and external to the organization (Banton, 1965) such as immediate supervisors, co-workers, competitive counterparts and customers. Roles are a critical component of organizations and social structures as a whole, viewed by some as the building blocks of society (Katz & Kahn, 1978). Identity theory establishes that an individual defines himself / herself (who am I?) and how to behave within the organization according to the roles in which he/she is involved (Thoits, 1982; 1991; Wickrama, Conger, Lorenz, & Matthews, 1995). An individual's role and its expectations, actions and outcomes direct and establish future behaviors, beliefs, and attitudes about the individual's role set and the organization. When role expectations are not clear, the role is said to be ambiguous. In their seminal research on role ambiguity, Kahn et al. (1964, p. 22) detail the level of required information necessary to avoid role ambiguity:

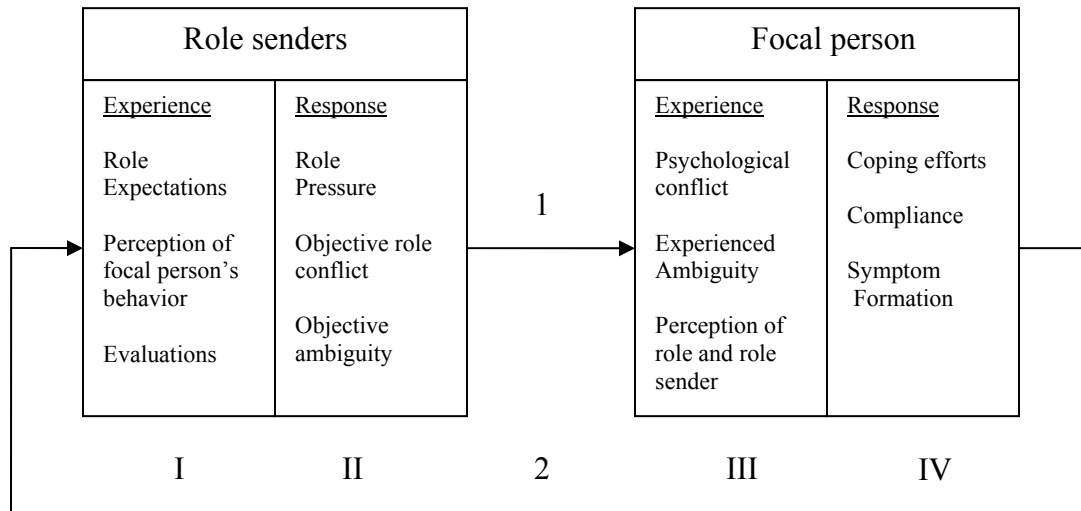
“Certain information is required for adequate role performance, that is, in order for a person to conform to the role expectations held by members of his role set. First of all, he must know what these expectations are: the rights, duties, and responsibilities of his office. Secondly, he must know something about what activities on his part will fulfill the responsibilities of office, and how these activities can best be performed. In other words, he requires various sorts of means-ends knowledge. He must also know the potential consequences of his role performance or nonperformance for himself, his role senders, and the organization in general.”

The information necessary to avoid role ambiguity is the foundation in which the role incumbent evaluates all of his past knowledge, experiences, beliefs and values to determine their relevance in the context of his current situation. Without the clear delivery of the goals, responsibilities, objectives, rewards and expectations of his current role, the incumbent has no guide as to what knowledge can help him meet the expectation and objective of his current role or his potential to act in a new situation for the betterment of the organization (Von Krogh, 1998). Therefore, he/she has no understanding of his contribution to other members of the organization. According to the constructivist point of view, the individual requires the knowledge of past and current situations to construct his true belief of his current reality (Von Krogh, 1998). Several researchers have emphasized the importance of having a clear understanding of one’s current reality, as well as a vision for the future, individually and shared with others, for organizations to effectively maneuver the competitive waters they face.

Senge (1990) introduces us to the principle of creative tension in which the tension created by the gap between vision and current reality in individuals, groups, or an organization, creates a motivation for change which will bring these two perspectives closer together. The opportunity for creative change associated with the principle is only available when the person, group or organization clearly sees where they wish to be

(vision or shared vision) but is equally clear on their current reality. Ambiguity in an individual's role is thus a barrier to the clarity of current reality as well as the potential future reality.

The Role Episode Model (see Figure 1) established by Kahn et al. (1964, p. 26) reveals a four-step process in which a role sender and focal person interact in an exchange of observations and dialogue, followed by a personal response to the message from their fellow participant in the process. This cycle continues between the two as they observe the response of the other and dialogue once again about the new adjustments in behaviors. In a complex organization, the role sender could be the focal person for an entirely different role set and so on throughout the organization. Therefore, if the focal person experiences role ambiguity due to the dialogue (or a lack thereof) with one or more of his role senders, he/she then is more likely to pass on ambiguous information as a role sender to another focal person and thus ambiguity spreads throughout the organization. Box III in Figure 1, represents the events in the role episode model in which the focal person evaluates and forms his perception of the role sender and his message. The focal person's perception of the message establishes his level of role ambiguity and contributes to his reactions to the role sender. The focal person makes adjustments to his behaviors, which manifest themselves as responses such as anxiety, withdrawal, job dissatisfaction, hostility, and reduced organizational commitment (see Box IV, Figure1). These responses in an individual facing experienced role ambiguity are most often negative.



Note: Adopted from Kahn et al. (1964, p.26)

Figure 1 A Model of Role Episode

Research based on the Role Episode Model and the definition put forth by Kahn et al. (1964) has consistently established a direct relationship between role ambiguity and negative outcomes such as; job-related tension, reduced organizational commitment, job dissatisfaction, impaired performance, absenteeism, low involvement, burnout, reduced autonomy, decreased motivation, increased turnover and anxiety (Acher, 2004; Barling & MacIntyre, 1993; Blau, 1981; Breif & Aldag, 1976; Dougherty & Pritchard, 1985; Fisher & Gitelson, 1983; Miles, 1975; Rizzo, House, & Lirtzman, 1970; Van Sell, Breif, & Schuler, 1981; Yousef, 2000). Role ambiguity research has focused mainly on individual's work roles associated with the organization as a whole (King & King, 1990) but little has been done to examine roles within small groups (Beauchamp & Bray, 2001). However some recent work has been done with sports teams which suggests that resulting outcomes are equal to that found in the work roles associated with the majority

of studies (Beauchamp & Bray, 2001; Beauchamp, Bray, Eys, & Carron, 2002; Eys, Carron, Bray, & Beauchamp, 2003).

Beehr, Walsh, and Taber (1976) surveyed 143 individuals from large mid-western manufacturing companies and found a .51 ($p < .05$) correlation between role ambiguity and job dissatisfaction. Their results also indicated a significant correlation between role ambiguity and reduced effort towards quality, low involvement, tension, and fatigue. Beehr et al. (1976) concluded that because workers were unclear as to their required tasks, they were no longer motivated to put an effort into maintaining quality, and therefore reduced their involvement with others in the work situations. As individuals reduce their involvement with others, their ability to interact and share knowledge is reduced and the level of ambiguity increases as additional information is not shared. This increase in ambiguity often results in anxiety and tension and other negative outcomes. For individuals to share and integrate knowledge they must be fully engaged in the process of interaction with others (Cegarra-Navarro & Rodrigo-Moya, 2005).

Rizzo, House, & Lirtzman (1970) developed the measurement instrument which has been used by the majority of researchers when exploring the effects of role conflict and role ambiguity. After the development of the instrument, it was utilized to survey two groups of workers. Sample A consisted of 199 individuals from a manufacturing firm's main plant and office. The second sample consisted of 91 individuals from the plant research and development department. Rizzo et al. (1970) found that role ambiguity was highly correlated to job dissatisfaction and to a lesser extent with anxiety and propensity to leave the organization. When individuals experience anxiety and job dissatisfaction, they lose the motivation to continue in their current roles and decide to leave the

organization (Acker, 2004). When they do so they take the knowledge that they have accumulated with them and the organization experiences a loss in intellectual capital (Walsh & Ungson, 1991). Therefore, role ambiguity costs both the individual and the organization.

Fisher and Gitelson (1983) performed a meta-analysis in which they examined the results of 43 past studies of the effects of role ambiguity. From their analysis of the data they concluded that role ambiguity was negatively related to organizational commitment, job involvement, and satisfaction. Organizational commitment is an important variable that impacts performance (Jamal, 1985). Individuals that are committed to the organization exhibit a willingness to put forth a greater effort to obtain the objectives of the organization and support the values and goals of the organization (Mowday, Steers, & Porter, 1979). This translates into a greater effort within the work group to share information and contribute to a group efficiencies (utilization of time and resources) if its values and goals are aligned with the organization. Job involvement implies a greater level of cooperation between organizational members and is negatively impacted by role ambiguity. Thus the level of cooperation and engagement of the role incumbent with the activities of an organization in which tacit knowledge might otherwise be shared with others is compromised. As a result, without organizational commitment and the reduced job involvement due to role ambiguity, group member efforts are lowered along with tacit knowledge sharing activities and performance declines.

Miles (1976) surveyed 148 participants using the scale developed by House and Rizzo (1972) which was a modification of the original scale developed by Rizzo et al. (1970). Miles examined four personal outcomes associated with role ambiguity: job

related tension, job satisfaction, attitude towards role sender, and performance. Miles found that role ambiguity was positively related to job related tension and negatively related to job satisfaction, positive attitude towards role sender, and performance. Participants faced with higher levels of role ambiguity displayed a negative attitude towards the role sender which could potentially result in emotional conflict. Conflict is associated with lower group performance and a break down in group cohesion. Cohesion is important as it is described as a key component of group learning or knowledge transfer and integration within groups.

Breif and Aldag (1976) surveyed 152 nursing aides and assistants from a hospital in a southern city of the USA. They found that there was a positive significant correlation between role ambiguity and four outcome variables: anxiety, tension, propensity to leave, and turnover. In addition they found a negative correlation between role ambiguity and performance. These findings support the received theory that role ambiguity has a negative effect on the ability of individuals to work efficiently in a cohesive group environment and that role ambiguity leads to a loss of organizational memory in the form of lost employees. These outcomes in turn lead to negative effects on work groups in their ability to make decisions and to create and transfer new knowledge (Grant, 1996; Zarraga & Bonache, 2005; Zarraga & Garcia-Falcon, 2003).

All of these studies indicate that role ambiguity comes at a cost to individuals in the form of tension, anxiety, dissatisfaction and hostility towards others and at a cost to the organization in the form of non-cohesiveness, decreased performance, loss of intellectual capital, and the real dollar expense of replacing lost workers. Without clarity in one's role it is difficult to function within an ever changing and very challenging

environment. With clarity, individuals can potentially establish a cohesive group environment that fosters the open exchange of ideas and knowledge, which can then be transformed into organizational knowledge for the improvement of group and organizational performance.

Group Dynamics

Organizations continue to increase the usage of work teams or work groups to accomplish specific tasks as well as daily routines (Barrick, Stewart, Neubert, & Mount, 1998). The term work teams or work groups can generally be defined as an interdependent collection of individuals, each of whom share responsibility for organizational outcomes (Jans, Coloquitt, & Noe, 1997). The terms ‘team’ and ‘group’ are used interchangeably in much of the literature (Norbert & Tindale, 2004). However, depending on the configuration, level of authority, and task specificity given to a particular set of employees, they may be labeled in different ways such as project team, self-managed team, or semi-autonomous group (Hackman & Oldham, 1980; Sundstrom, Demeuse, & Futrell, 1990). Groups have also been described as less formal than teams. In this study a general definition that aggregates work groups and work teams will be used and the terms used interchangeably to describe an interdependent collection of organizational members responsible for common organizational outcomes.

Why are there so many groups? Organizations may be flocking to the group concept with hopes of sharing in benefits such as more robust decision making, more effective work processes, competitive advantage, increased innovation and creativity, increased employee satisfaction, and/or organizational and group commitment (Becker-

Reems, 1994; Coppersmith & Grubbs, 1998; Goldstein, 1996; Stewart & Barrick, 2000). Other benefits include increased productivity, flexibility, and innovation, as well as a decrease in production costs, turn over and absenteeism (Goodman, Ravlin, & Schminke, 1987; West, Borrill, & Unsworth, 1998). These benefits do not automatically materialize when groups are formed; it is not enough to throw a number of people together and lay out a common goal. According to Swieringa and Wierdsma (1992), cohesion is the key ingredient in formulating an environment conducive to individual and organizational learning. Cohesion also enhances the flow of knowledge between individual members of a team (Marquardt, 1996). Nonaka and Takeuchi (1995) and Nonaka (1991) suggested that cohesion involves and influences socialization within an organization. Informal interaction establishes an environment conducive to sharing knowledge and creating knowledge. It is the establishment of cohesion and socialization that produces unique resources which are difficult for competitors to imitate. Montes, Moreno, and Morales (2005) surveyed 202 managers from a randomly selected group of 1500 organizations in Spain. They concluded that team cohesion was significantly and positively related to organization learning and organizational performance. There is a plethora of literature in the areas of team effectiveness, organizational learning, and group dynamics that prescribe the right mix of personal traits, group variables, intragroup variables, and structural traits to achieve the benefits of work teams over non work teams (Gassop, 2002).

Although the benefits of teams are documented in empirical studies too numerous to count, not all work groups are effective in that they create higher productivity, satisfy members and are viable. Some group display signs of dysfunction. For example, Jehn,

Northcraft, and Neale (1999) and Pelled (1996) address the dysfunctional behaviors that can arise in work group when demographic diversity arouses emotional conflict. Janz, Colquitt, and Noe (1997) suggest that a lack of clarity, organization and cohesion within a group can reduce the exchange of information and both helping and innovating behaviors among team members leading to a dysfunctional team environment. Cegarra-Navarro and Rodrigo-Moya (2005) indicate that the culture of the team establishes the norms, rules and procedures which govern the behavior of the members and clarify their expectations. If a member violates those norms, the response of other members can include criticism, expulsion and social ostracism contributing to group dysfunction. Role ambiguity may be one factor that can affect clarity within a group, as well as create an inappropriate response to group norms and expectations by a group member due to a lack of information about those norms and expectations.

Zarraga and Bonache (2005) describe the work group climate as a “Black Box” of known importance, inexact or even unknown dimensions. Nonaka, Von Krogh, and Voelpel, (2006) and Janz, Colquitt, and Noe (1997) both call for future research to examine group climate and the within group dynamics that influence group outcomes. This study explores a small corner of that box, to shed light on the factors that contribute to knowledge management in work groups and the effect of role ambiguity on those factors.

Knowledge Management

Knowledge management is a relatively new area of study having gained a tremendous amount of popularity in recent years. Even so, the literature remains much

indebted to the theoretical base of Michael Polanyi's seminal work on knowledge from the early to mid-sixties. In this work, he distinguishes between the two dimensions of knowledge: explicit and tacit. Knowledge theory has since entered the strategic management literature with knowledge management seen as a core competency within the resource based view of the firm (Barney, 1991). This perspective has formed the basis upon which organizational researchers have begun to explore knowledge as a key resource, focusing on its origin, mobility, influence, and competitive attributes (Conner & Prahalad, 1996). Empirical testing of the theoretical assumptions of knowledge management in the strategic management literature is limited, however, and there are calls for more empirical testing in all areas of knowledge management.

What is knowledge management? Although numerous researchers have identified knowledge management as an important and perhaps the most important resource available to organizations, there is no consistent definition of knowledge management used in the literature. However, researchers have agreed that it focuses on the process of managing the creation, storage, distribution and utilization of organizational knowledge (Argyris & Schon, 1978; Grover & Davenport, 2001). Organizational knowledge consists of the aggregated beliefs, experiences, values and ideas of individuals within an organization that are greater than the sum of the individual parts. This knowledge is captured in the artifacts, culture, structure, and individuals within an organization (Walsh & Ungson, 1991). There are many typologies or themes of knowledge management emerging in the literature (Argote, McEvily, & Reagans, 2003; Shipton, 2006). Two of these main themes of knowledge management research are loosely based on the four focal areas of knowledge management and the knowledge dimensions. Knowledge

management research as it applies to the storage, distribution and use of organizational knowledge is primarily focused on explicit knowledge, or knowledge that is easily codified. Management Information System researchers and practitioners tend to gravitate towards this stream and define knowledge as an object that can be measured and collected. Another stream of knowledge research has focused on the formation of organizational knowledge and is primarily interested in the tacit knowledge possessed by individuals. Management theorists address knowledge as a process based on individual and organizational competencies such as skills and know-how (Davenport & Prusak, 1998; Leonard & Sensiper, 1998; Nonaka & Takeuchi, 1995; Sveiby, 1997; Von Krogh, 1998; Winter, 1998). These different perspectives have led to different definitions regarding knowledge management. The current research focuses on knowledge as a process and seeks to understand how those factors that influence group dynamics impact that process.

Nonaka and Konno (1998) introduce the concept of the “Ba” which was modified from a concept originally proposed by the Japanese philosopher Kitaro Nishida. The “Ba” loosely translates into “space”, representing a shared space in which the knowledge of individuals could interact to create new knowledge. The “Ba” exists in physical, mental and virtual spaces. The “Ba” is the mechanism of facilitating the four modes of knowledge conversion, such as tacit to explicit or explicit to tacit, that takes place in the knowledge spiral (see Figure 2). Socialization is the mode in which tacit knowledge is shared through the interactions of individuals. In this sense tacit knowledge is only shared in a group setting in which individuals share activities to facilitate the transfer of embedded knowledge. Externalization is the mode in which tacit knowledge is converted

to explicit knowledge and requires the knower to express her know-how to the group in a comprehensible way. In this way the individual commits to the group and becomes a part of the group. Combination is the mode in which explicit knowledge is shared within the group and collected from outside to group to enlarge the individual and collective knowledge base. Internalization is the mode in which the individual and the group integrate the new knowledge as it applies to the values and beliefs of the organization and the individual to form new knowledge.

The process posed by Nonaka and Konno (1998) emphasizes the importance of the climate and interaction of individuals as a key element in the process of sharing tacit knowledge to create organizational knowledge. This literature is picked up and expanded by Nonaka, Von Krogh, and Veolpel (2006) as they review and call for more investigation into the climate of groups to facilitate organizational knowledge. If individuals can build on the prior work of others by integrating the knowledge of others with their own prior knowledge to reuse and create new knowledge, they can increase their productivity dramatically (Davenport, Thomas, & Desouza, 2003).

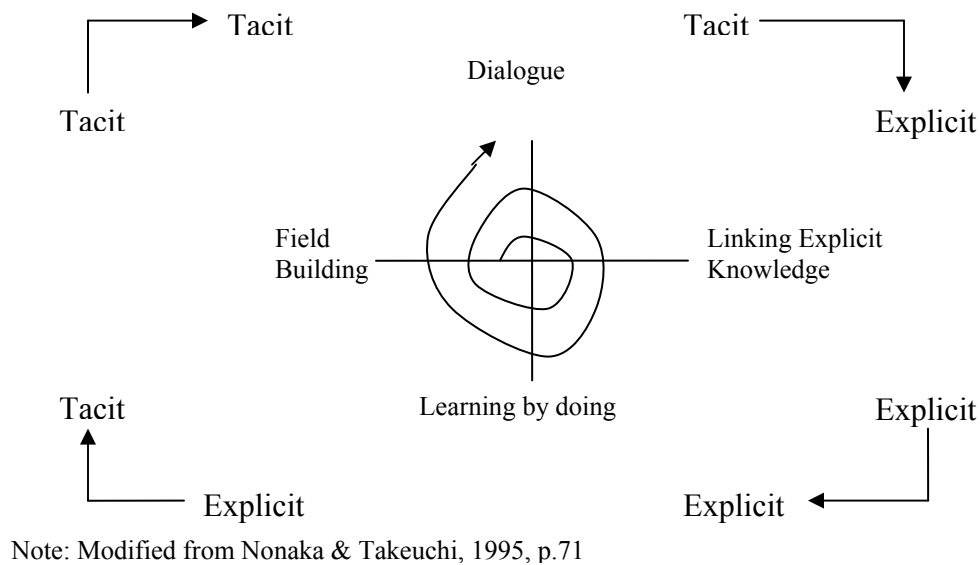


Figure 2 The Knowledge Spiral

Von Krogh (1998) expressed the need for high care within groups to facilitate a climate of trust in which an individual openly shares and responds to the needs of others. Indwelling is the idea of cooperation or belonging to the group, in which individuals look with others at the tasks at hand, rather than at others for a solution. Leonard and Rayport (1997) pose a similar concept in the form of “empathic design” in which they postulate a greater understanding of customers’ unarticulated needs by interacting and collaborating with customers in their work environments. Nonaka (1991) outlined a practical application of “indwelling”, “empathetic design” and the “Ba” concepts in the development of the bread maker by the Matsushita Electric Company in 1985. The importance of tacit knowledge has been understood since the 1960’s but only a small number of studies have empirically examined its effects in organizations. The following three studies are some of the recent work to uncover those effects.

Lin (2007) surveyed 212 business administration students at a university in Taiwan and concluded that there was a positive and significant relationship between organizational commitment and tacit knowledge transfer as well as a positive and significant relationship between trust in coworker and tacit knowledge transfer. These findings empirically support the theoretical literature which suggests that the climate and connection to the process and individuals is important to the process of organizational knowledge creation and knowledge management.

Lee and Choi (2003) surveyed 451 individuals in 63 different companies in Korean and found that trust and collaboration were significantly and positively related to organizational knowledge creation. They also concluded that knowledge creation was positively related to organizational creativity and performance.

Zarraga and Garcia-Falcon (2003) surveyed 363 individuals in 12 Spanish companies and established eight factors: multi-faceted dialogue, common language, individual autonomy, freedom of expression, mutual help, clarity of organizational intent, existence and use of organizational memory, and lateral communication were all positively related to the formation of organizational knowledge. Several of these factors contribute to a climate recognized by many researchers as being essential to the sharing of tacit knowledge and the formation of organizational knowledge. Zarraga and Bonache (2005) reinforced Zarraga's prior research with the finding that a climate of high care in a team is positively related to the formation of organizational knowledge.

The previous empirical studies have substantiated the claims of the theorists by empirically testing some of the assumptions about the importance of individual and group level factors on knowledge management outcomes. Theorists continue to stress the

importance of knowledge management and the formation of organizational knowledge (Nonaka, Von Krogh, & Voelpel, 2005). The literature is still very heavily weighted to the theoretical side and further investigation into the climate and variables that affect organizational knowledge formation is called for. The marketing literature has provided extensive empirical studies under the terminology of “Market Orientation”, but they too call for more empirical studies regarding organizational knowledge (Lopez, Peon, & Ordas, 2006; Templeton, Morris, Snyder, & Lewis, 2004). The shift from theoretical to empirical investigation sometimes comes at a cost. In the process of establishing measurable variables, the recognition and distinction of more abstract concepts, such as explicit and tacit knowledge, within those variables is lost. This research further investigates the components of organizational knowledge formation as established by Zarraga and Garcia-Falcon (2003) but explores the effect of role ambiguity, the relationship between the eight factors that contribute to the formation of organizational knowledge, and the actual creation of that knowledge. Role ambiguity is known to produce negative behaviors in individuals which would affect the group climate in which organizational knowledge formation is nascent.

Each of Zarraga and Garcia-Falcon’s (2003) eight factors and their influence on organizational knowledge outcomes is now explored below in detail and the anticipated impact of role ambiguity hypothesized for each factor.

H1: Multi-faceted dialogue. Multi-faceted dialogue is the difference in individuals experience, education and training, and skills that create intellectual conflict (Zarraga & Garcia-Falcon, 2003) and can best be understood as a subset of diversity. Diversity, in

general, is defined by Webster's New Collegiate Dictionary (1974) as either the condition of being different or having differences or as an instance or point of difference. These definitions do not distinguish any specific characteristic which make up the differences. However, within the diversity literature we find terms such as value diversity, categorical diversity, and informational diversity (Jehn, Northcraft, & Neale, 1999), demographic diversity and functional diversity (Pelled, Eisenhardt, & Xin, 1999), and demographic diversity and cognitive diversity (Van der Vegt & Janssen, 2003). Each term represents characteristics of individuals which make up a subset of diversity. Demographic diversity usually refers to those differences that are highly visible and can be easily distinguished such as age, race, and, gender. Cognitive diversity refers to those differences associated with cognitive resources that are somewhat invisible and take more effort to identify with a given individual. Cognitive diversity includes experiences, skills, education and training. Multi-faceted dialogue is seen to arise from these same cognitive attributes as opposed to demographic diversity.

Multi-faceted dialogue is associated with the attributes of individuals that create intellectual conflict (Zarraga & Garcia-Falcon, 2003). The diversity literature makes a distinction in subset characteristics when examining their effects on interrelationships. Williams and O'Reilly (1998) call for future research to examine in closer detail the differences in diversity characteristics and their effects on group outcomes. Thus, multi-faceted dialogue focuses on the differences in individuals which relate to experience, education and training, and skills which are associated with task conflict and higher group productivity. In addition, researchers dealing with knowledge creation have found that groups with greater levels of variety within their members yield higher levels of

knowledge creation than those groups with lower levels of variety (Ashby, 1956; Nelson & Winters, 1982; Nonaka & Takeuchi, 1995).

If we step back for a minute and look at the changing paradigms associated with diversity we will discover that researchers have shifted their thinking regarding homogeneity in work groups and its influence on group outcomes (Kulik, 2004). In 1938, Barnard commented that work groups should be homogeneous in order to maximize group harmony and performance. This concept seems rational enough, but more current research in the area of conflict and diversity management has revealed cognitive diversity to be positively associated with task conflict, which in turn has been associated with higher group productivity (Van der Vegt & Janssen, 2003). Others suggest that homogeneous groups are more susceptible to group think (Janis, 1972) which limits a group's ability to innovate and deal with new ideas. Current research suggests that heterogeneous work groups are a greater source of competitive advantage, if they are managed properly, and groups are given time to develop cohesion (Estry, Griffin, & Hirsch, 1995; Gardenswartz & Rowe, 1994; Northcraft, Polzer, Neale, & Kramer, 1995). This shift in thinking came as the consequences of sub-types of diversity were examined and understood more thoroughly, specifically the effect each sub-type has on group conflict.

This shift is primarily due to the influence of the particular category of diversity on the type of conflict in the work group (Pelled, 1996). Two types of conflict have been examined in the literature regarding diversity: emotional conflict and task conflict (Eisenhardt, Kahwajy, & Bourgeois, 1997; Jehn, 1994; Pelled, Eisenhardt, & Xin, 1999). Emotional conflict is defined as “a condition in which group members have interpersonal

clashes characterized by anger” and task conflict is defined as “a condition in which group members disagree about task issues, including goals, key decision areas, procedures, and the appropriate choice of action” (Pelled, Eisenhardt, & Xin, 1999, p.2). When a group has conflict associated with what to do or how to do it and the source of this conflict is based on the differing perspectives of the individual members due to their varied past, the resulting outcomes from the group have proved themselves to be greater than that of a group that is homogeneous and does not engage in such conflict (Jehn, Northcraft, & Neale, 1999). There are also those situations in which a group experiences conflict which is personal in nature. Members direct their frustration about a problem or a result at the personal attributes or attitudes of other members of the group. These emotional conflicts are often associated with demographic (highly visible, non-job-related) diversity such as age, race, and gender (Pelled, 1996), which are often the source of stereotypical generalizations that lead to clashes of anger, resentment, and other negative feelings.

Zarraga and Garcia-Falcon (2003) found that multi-faceted dialogue led to the generation of more organizational knowledge as well as overall performance of the work group. This finding is consistent with other research results regarding cognitive diversity as it relates to task conflict and higher output. This research examines the same relationship between multi-faceted dialogue and the formation of organizational knowledge but introduces role ambiguity as a moderator of the relationship. Role ambiguity has been found to produce anxiety, stress, and employee withdrawal in an attempt to deal with or insulate oneself from the source of anxiety (Ilardo, 1973; Lyons, 1971). In the case of multi-faceted dialogue there are two considerations that would lead to the first research hypothesis. First,

there is a general lack of information available to an employee experiencing role ambiguity making it difficult to properly assess his / her contribution to a diverse group or to assess where he /she can best make a contribution to the group. As a consequence, the individual will likely withdraw from dialogue and be a passive spectator, hoping to observe group signals which would clarify his / her role in the group, eliminating the benefit of his / her past experience from the group decision process as well as potentially spreading ambiguous messages to others in the group and increasing the overall anxiety in the group. Second, the frustration and anxiety associated with not knowing how others see their contribution or how they will be evaluated by their group members may lead to hostility and emotional conflict resulting in decreased work group output. Diversity in the work group may add to the already uncertain perceptions of the employee facing role ambiguity and push it to a higher level of dysfunction. This leads to the first hypothesis:

Hypothesis 1: Role ambiguity, as a moderating variable, will weaken the effectiveness of multi-faceted dialogue to formulate organizational knowledge in work groups.

H2: Common Language. Common language occurs when the majority of individuals within an organization can communicate effectively because there is a common understanding of the terminology associated with the processes and procedures (Grant, 1996). Grant also states that the greater the sophistication of the common knowledge, the higher the level of common language in an organization. At high levels of common knowledge less information will be lost when communications occur between specialists and non specialists (Grant, 1997). Common language goes beyond the use of a

single tongue; it embodies all form of communication, including symbols, attitudes, gestures, numerical, and speech. Common language could be associated with a common understanding of an operating system, financial ledgers, or operating manuals.

Not specifically associated with common language, but an important part of common knowledge, and a related understanding, is the recognition of individual knowledge domains. This refers to the awareness of individuals within an organization of “who knows what?” and “how might they access that information?” (Grant, 1996, p. 114). This idea of common language and common knowledge is similar to what Nonaka and Takeuchi (1995) referred to as “redundancy”. Grant (1996) sees redundancy or common knowledge as a paradox in that specialized knowledge is often of great importance as a competitive resource; it gives the individuals, group, or organization an advantage. A certain amount of overlap in information resources is thus required to share and integrate knowledge with others to create new knowledge and stay competitive. However, too much redundancy or overlap of that knowledge would potentially make it susceptible to duplication. Within an organization, common language is measured not solely by the breadth by which it covers the majority of workers, but also by the depth in which it penetrates all levels of knowledge and positions within the same organization.

Where does common language originate within an organization, group or between two individuals? Common language, according to Zenger and Lawrence (1989), can originate from similar experiences (work or non-work) or develop from frequent communication so that familiarity is developed within a group or between individuals. March and Simon (1958) proposed that the ease with which communication takes place is instrumental in increasing the frequency of the communication. In a situation in which an

individual experiences role ambiguity or uncertainty of their actions and outputs relating to their job, performance or effect on others, they are often reluctant to engage others (Ilardo, 1973), especially if initial attempts to communicate did not bring needed clarity to their situation (Kahn et al., 1964). Communication would in many cases be labored or infrequent as the person experiencing role ambiguity tries to resolve their role uncertainty before committing to interactions with others. This reaction is often counterproductive to bringing clarity to their role. Role ambiguity and a lack of common language can thus create a negative spiral: Role ambiguity will inhibit the creation and use of common language as the individual withdraws from communication and a lack of common language can increase role ambiguity as communication is misinterpreted or distorted from sender to receiver, as expressed by the role episode model of Kahn et al. (1964). Initial positive communication between individuals (one on one or in a group setting) based on a past commonality is important to establish a favorable and comfortable communication pattern to share knowledge and build trust (Katz, 1982; Weick, 1979). Past research has associated greater role ambiguity with increasing levels of anxiety, tendencies to withdraw from others, and feelings of hostility which in all likelihood would not contribute to a positive communication pattern. Zarraga and Garcia-Falcon (2003) found that common language had a positive effect on the formation of organizational knowledge in work groups, which supports the prior research. But if we introduce role ambiguity as a moderator of the relationship between common language and organizational knowledge, the literature leads us to our second hypothesis:

Hypothesis 2: Role ambiguity, as a moderating variable, will weaken the effectiveness of common language to formulate organizational knowledge in work groups.

H3: Individual Autonomy. “Autonomy is an integrating characteristic that connotes a relationship between an individual and the environment with regard to decision making and includes the two sub-concepts of inner regulation and independent behavior” (Dittman, 1976, p. 465). Dittman’s definition of autonomy touches on individual self regulation as well as behavioral outcomes where as others, such as Spender (1996), focus only on the behavioral aspects. Spender (1996) focuses more on an individual’s ability to try new approaches to the way in which he or she perform jobs, starts new projects, works independently and experiments with different solutions. All of these actions of individuals are specific ways in which independent behavior are expressed. Spender (1996) also touches on the aspect of inner regulation when he draws attention to the fact that assuming responsibility for one’s actions is equally important to autonomy. Nonaka and Takeuchi (1995), Fahey and Prusak (1998), Cohen and Sproull (1996), and Morgenson, Delaney-Klinger, and Hemingway (2005) all agree that individual autonomy leads to an increase in opportunity to create new knowledge within an organization. However, the literature is not consistent in this conclusion.

The literature surrounding the effects of autonomy is very diverse. Langfred (2004) suggests that individual autonomy in certain condition creates a liability to the work team performance. On the other hand, Morgenson, Delaney-Klinger, and Hemingway (2005) suggest that job autonomy leads to greater role breadth and thus

greater performance. In Langfred's work on trust, monitoring, autonomy and performance, he suggests that the relationship is dependent on coordination, communication and mutual adjustments. It is the dependence on communication of relevant information or an individual's need for information that this study explores regarding the relationship between autonomy and the formation of organizational knowledge, as a form of group output. Zarraga and Garcia-Falcon (2003) found that individual autonomy had a positive effect on the formation of organizational knowledge in work groups, which they regarded as an output of groups and also concluded that higher levels of knowledge output contributed to greater group performance. However, their findings suggested that autonomy is associated more favorably with the integration and transfer of knowledge as opposed to creating knowledge which seems contradictory to the literature. The literature suggests that freedom to experiment with assigned tasks, start new projects, try new methods, and to do things on a trial and error basis would lead to the creation of new knowledge in the sense that knowledge was entirely new to the organization. However, Nonaka and Takeuchi (1995) and Davenport, Thomas, and Desouza (2003) have suggested the rearrangement of previous knowledge through the integration and transfer of that knowledge can also lead to new knowledge. In this sense, the nature of the organization may have an effect on how autonomy affects the formation of organizational knowledge. In a situation where the individuals perceive the output of their group as entirely new creations, such as graphic design or project development, in which the mind set is that they are creating new work, autonomy may be related to the ability to seek new knowledge from sources outside the group to create new organizational knowledge. In other situations, work groups such as those focused on

process improvement where the output is a reconfiguration of the old knowledge may regard their autonomy as the ability to work with others to share existing internal knowledge to create new organizational knowledge.

The literature is clear that there is a conflicting relationship in groups between a need for interdependence and autonomy (Janz, Colquitt, & Noe, 1997). The very nature of a group suggests that there is an interdependency of its members towards a common purpose, but at the same time the individual perspectives and abilities are best utilized when individuals are not fully constrained by rules, processes and procedures. In the case of role ambiguity, a more defined the job description, clearly defined processes and procedures in regard to the job, specific job expectations, and clearly defined rewards all contribute to low role ambiguity (Kahn et al., 1964). However, such formalization clearly leaves little room for the exploration and experimentation with job tasks implicit in autonomy. Morgenson, Delaney-Klinger, and Hemingway (2005) provided evidence that autonomy increased role breadth, leading to greater performance. Due to the range of results from prior research no justifiable prediction as to the direction of the effect of role ambiguity on the effectiveness of individual autonomy to create organizational knowledge could be established. However, the literature review does give significant prior evidence to anticipate that role ambiguity will at least have an effect on the relationship between individual autonomy and organizational knowledge.

Hypothesis 3: Role ambiguity, as a moderating variable, will have an effect on the relationship between individual autonomy and organizational knowledge formation.

H4: Freedom of Expression. Freedom of expression is a behavior in which individuals share openly and honestly their personal beliefs with others. This behavior may be very difficult for individuals within work groups to exhibit because of fear. Others may not share or understand their personal beliefs, especially if they are contrary to organizational or social norms (Von Krogh, 1998). Freedom of expression within a work group consists of two influential components: leniency in judgment and courage (Zarraga & Garcia-Falcon, 2003).

Leniency in judgment is a climate of mercy that enables employees to make mistakes and experiment with new ideas and concepts without the worry that there may be severe repercussions for their deviations from the norm or status quo (Von Krogh, 1998). This term derives its meaning from the same concept as leniency of the court, in which an individual is found guilty of a crime but the court is lenient in sentencing due to the circumstances of the individual or the crime. The court shows mercy on the individual even though they could have punished them to the full letter of the law due to their guilty status.

Courage is defined as a willingness of a team member to provide their opinion or feedback to the work group in spite of the fear associated with exposing personal beliefs (Von Krogh, 1998) that might be criticized by individuals within the group. However, to foster freedom of expression within a group, all members must work towards an environment in which fears of ridicule due to expressing new ideas or thoughts are minimized by mutual respect within the group (Von Krogh, 1998).

According to Von Krogh (1998), freedom of expression and its components are a behaviors associated with high care. High care is associated with other behaviors as well

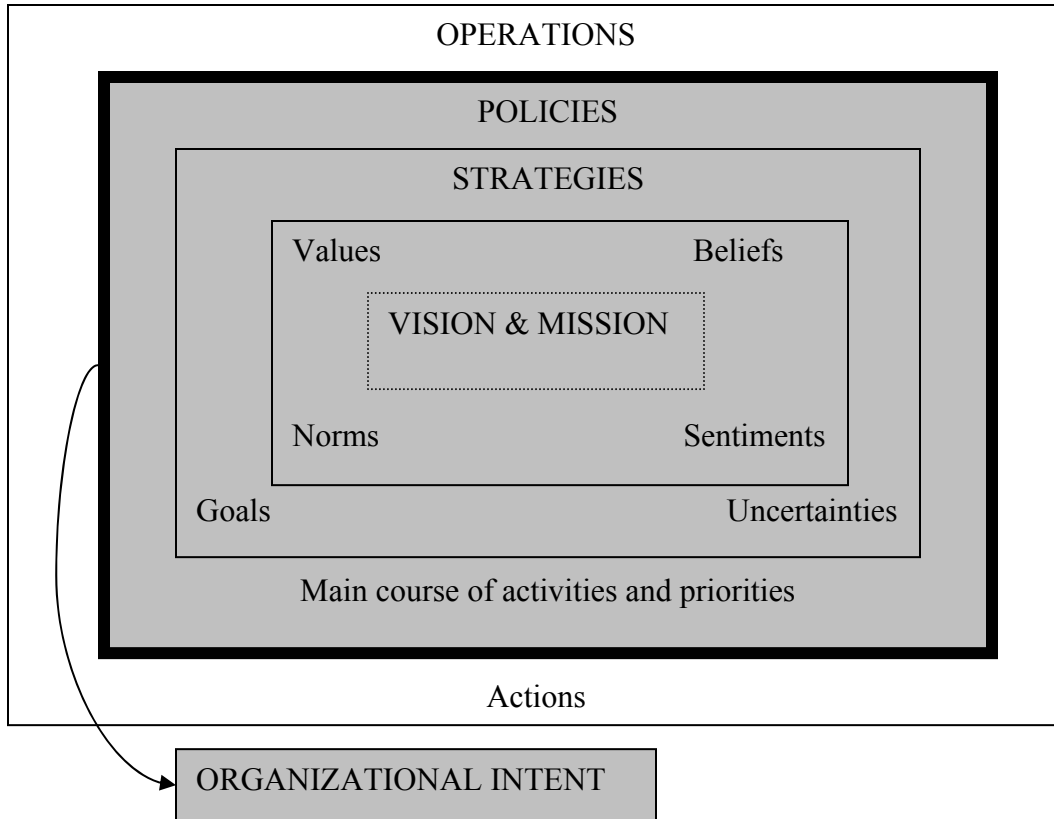
such as mutual help (which will be discussed shortly), access to help, and active empathy. All of these behaviors are dependant on the communication of expectations of group members and a clear understanding of other member's intentions, knowledge and needs, which creates a group climate founded on trust. In such a group environment, members can overcome their fears about openly sharing their personal beliefs. If group members allow others in the group to experiment with new ideas and do not harshly criticize a member who tries an idea and fails (leniency of judgment; Von Krogh, 1998), then an environment might be established that will allow individuals to exhibit courage in voicing their opinions or trying new approaches to problem solving.

Eys and Carron (2001) proposed that role ambiguity is a multi-dimensional construct composed of four areas: scope of responsibility, role behavior, role evaluation, and role consequences. Although this study measures role ambiguity as a uni-dimensional construct, it is important to understand the components of role ambiguity, which include the evaluation of role senders and consequences (both verbal and non-verbal), as illustrated by the role episode model (Kahn et al., 1964). When an individual is uncertain about how others will evaluate her / his contribution to the group or the consequences of poor input, she / he is less likely to engage the group openly. If the environment is one that is open to discussion and sharing, but it is only communicated to member in nonverbal ways (through direct interaction, or body language), the individual experiencing role ambiguity may not pursue clarification or open dialogue due to fear of the consequences. The higher the level of ambiguity, lack of information about evaluation or consequences of poor group contribution, the greater the fear, anxiety and distortion of reality the role incumbent will exhibit (Rizzo et al., 1970). Open dialogue with group members is based on trust that allows an individual to openly

share their ideas with others in the face of potential criticism (Von Krogh, 1998). Role ambiguity has been found to have a positive correlation with increasing hostility with others, resentment, and lack of trust (Breif & Aldag, 1976). Previous findings regarding role ambiguity and freedom of expression lead to the fourth hypothesis of this study.

Hypothesis 4: Role ambiguity, as a moderating variable, will weaken the effectiveness of freedom of expression to formulate organizational knowledge in work groups.

H5: Organizational Intent. Organizational intent is derived from the organization's vision and mission. An organization's vision is the picture of what it is hoped the organization will look like at the peak of its success in the future. Mission deals with the guiding principles needed to get to that peak (Eigeles, 2003). Organizational intent also embodies the organization's strategies, values, norms, beliefs, policies and procedures. The components of organizational intent are best summarized by Figure 3. The inner boxes represent the components of organizational intent and the outer (operations) represents the daily operations of an organization which are governed and directed by the design of the inner components.



Note: Modified from Eigeles (2003, p. 218)

Figure 3 Organizational Intent

When organizational intent is clearly present within an organization, it can lead to organizational cohesion, coherence of purpose and belief (Cairns, Burt, & Beech, 2001), and shared vision (Denton, 1997; Eigeles, 2003; Senge, 1990; 1994). These provide the basis on which employees assess and value information as it is received and created.

Without a clear understanding of an organization's intention it is impossible for an individual to judge the value of new information as it relates to the potential opportunities within the organization (Nonaka & Takeuchi, 1995; Nonaka, Toyama, & Konno, 2001). Clarity of intent, through the understanding of the norms, skills, and routines within an organization, thus provides the system of values that employees need to determine the

type of knowledge that is important for the organization to create and retain (Leonard-Barton, 1995; Nonaka, 1988). Zarraga and Garcia-Falcon (2003) found a positive relationship between the level of clarity of organizational intent and the formation of organizational knowledge as an output of work groups.

Organizational intent is comprised of a number of organizational components such as vision, mission, strategies and policies. Zarraga and Garcia-Falcon (2003) concluded that the greater the clarity of organizational intent possessed by members of the group or organization, the greater the positive influence on the formation of organizational knowledge within the group. This conclusion assumes that individuals fully understand their role in the organization as a whole and therefore, more information about where the organization is going allows them to align personal role activities with organizational strategies to move in the same direction (Thompson, 1998).

Senge (1990) thinks of an organization as an ocean liner and the leader as the designer. The leader (designer) ensures that the ocean liner has all the abilities and equipment it needs to be the fastest from point A to B, the most agile and structurally strong, has the largest capacity and can make the trip from London to New York. The vessel was designed perfectly for its purpose and mission. Everyone aboard the liner is perfectly clear on its attributes, purpose and mission. As it sets out from the London harbor, the engine room brings the liner up to full speed, well on its way, cruising towards their destination. At the half way point an iceberg is spotted, dead ahead, and all eyes turn to the helmsman. What does he/she do? He knows the mission of the big vessel. He knows the strategy to move more people faster than any other. He/She even knows the vision of entering the New York harbor in record time. But he/she does not know what

will happen if he/she turns the wheel of the big boat. If he/she turns the wheel to the right, will it turn the liner right or left or not move at all? He/She does not know if he/she should call for help to turn the wheel or if he/she should do it himself/herself. The helmsman has perfect clarity of the organizational intent but is uncertain about his/her role and the consequences of his actions on the organization as a whole. The helmsman is experiencing role ambiguity and as a consequence he/she freezes, takes no action and then leaves the control deck; as in many organizations, there is a wreck.

Senge (1990) stresses the importance of having a clear understanding of current reality as well as clear vision for the future. Cairns, Burt, and Beech (2001) suggest that cohesion is the unity of all members knowledge and understanding regarding organizational intent. In a case where a member of the organization is experiencing role ambiguity, they would not have a complete understanding of the organization or the shared knowledge of role senders of the organization. Researchers have agreed that a greater understanding of an organization's intent and shared vision are critical components of organizational cohesion which leads to the most effective and efficient use of organizational resources and better performance (Cairns, Burt, & Beech, 2001; Denton, 1997; Eigeles, 2003; Senge, 1990; 1994) but only when individuals understand their roles in the organization and can align individual goals with organizational goals.

Hypothesis 5: Role ambiguity, as a moderating variable, will weaken the effectiveness of clarity of organizational intent to formulate organizational knowledge in work groups.

H6: Organizational Memory. Most definitions of memory target individuals as the primary holders of a memory. However, organizational theorists have challenged this idea and have proposed that organizations have specific functions that operate in such a way that they parallel the activities and processes of human memory (Argyris & Schon 1978; Kiesler & Sproull, 1982; Loftus & Loftus, 1976; O'Reilly, 1983; Sandelands & Stablein, 1987; Sims & Gioia, 1986). Most researchers would agree that organizational memory consists of mental and structural artifacts found within an organizational environment for the purpose of acquiring, using, storing and dispersing information to the organizational members for decision-making purposes (Cohen & Levinthal, 1990, 1994; Cyert & March, 1963; Daft & Weick, 1984; Graud & Nayyar, 1994; Huber 1991). Mental artifacts include data, information, knowledge (Walsh & Ungson, 1991; Weick, 2000), shared beliefs, norms, values, models, perspectives, (Day & Nedungadi, 1994; Deshpande, Farley, & Webster, 1993; Deshpande & Webster, 1989; Lyles & Schwenk, 1992; Nelson & Winters, 1982) as well as myths, legends, and stories (Martin, 1982). Structural artifacts include roles, architectures, and operating procedures (Winters, 1987; Walsh & Ungson, 1991; Weick, 2000), as well as informal routines and interactions (Orr, 1990; Seeley-Brown, 1993). Organizational memory also serves as a basis of knowledge by which to understand new information that is presented to an organization. The more information that is stored and readily accessible to members of the organization, the greater will be the organization's absorptive capacity (Cohen & Levinthal, 1990).

Absorptive capacity captures the facility of an organizational unit to understand vicarious learning from other units or organizations by providing a base of contextual experience. The existence and use of organizational memory by an organization and its

members has a positive effect on the formation of organizational knowledge within groups and amongst individuals (Zarraga & Garcia-Falcon, 2003) as well as a positive effect on organizational performance (Moorman & Miner, 1997). Even though organizational memory has been found to have a positive influence on organizational decision making, there are mixed findings as to the use or disbursement of organizational memory and its effects on knowledge creation. Some find the overlap of information and knowledge to be a catalyst for new knowledge creation (Nonaka & Takeuchi, 1995) whereas others view heterogeneity of knowledge as an environment rich for innovation and creativity (Burgelman, 1983; March, 1991; Quinn, 1986).

Organizational memory has its roots in the area of social and behavioral science as the concept of collective memory and was discussed as early as Halbwachs (1926). Organizational memory is a branch of more contemporary collective memory studies (Connerton, 1989; Middleton & Edwards, 1990). Contemporary collective memory studies give rise to all sorts of different terminologies for group memory including: social memory (Fentress & Wickham, 1994; Valinerser & Veer, 2000); popular memory (Rosensweig & Thelen, 1998); cultural memory (Bal, Crewe, & Spitzer, 1999); institutional memory (Nilakanta, Miller, & Zhu, 2006); and the terminology utilized by this study, organizational memory, framed and focused as described by Walsh and Ungson (1991).

Organizational memory focuses on the storage of past events that can be brought to bear on current decision processes (Walsh & Ungson, 1991). The knowledge that is stored in organizational memory is the aggregated interpretations of organizational members as to the stimuli and organizational response to a past event. The aggregated interpretation of stimuli and response to current events is organizational knowledge and is affected by the

understanding of the organizational members as to their contribution and outcomes of the decision process. Individuals are very important in the process, not only because they are a mechanism of retaining knowledge (Walsh, 1988; Walsh, Henderson, & Deighton, 1988), but because they largely determine what knowledge will be deposited into storage mechanisms and what knowledge will be retrieved from those mechanisms. Walsh and Ungson (1991) posed that organizations with long tenure and low turnover will have a higher capacity to acquire, retain and retrieve decision making knowledge than will organizations without these attributes in their members.

Several studies have established a positive relationship between increasing levels of role ambiguity and intentions to leave, or turnover (Brief & Aldag, 1976; Lyons, 1971). Other studies have examined the loss of organizational memory as individuals leave the organization (Kransdorff & Williams, 2000; Rusaw, 2005), which in the last decade has become an increasingly greater concern as the USA's overall employee turnover rates hit 23.4 % from September 2005 to August 2006 (Corporate N, *US labor department, 2006, 2000*). Based on that rate an organization would turn over their entire work force in slightly over four years. In the literature that links role ambiguity and organizational memory, the focus has been on the consequences of role ambiguity which lead to dissatisfaction, withdrawal, intention to leave, leaving the organization, and the loss of organizational memory. These consequences have an effect on an individual's ability to access organizational memory to solve current problems (Walsh & Ungson, 1991).

Schemata have been found to speed up problem solving (Taylor, Crocker, & D'Agostino, 1978). Anderson and Pichert (1978) and Cantor and Mischel (1977) proposed that our schemata relating to a current problem can facilitate the retrieval of organizational

memory. Relevant information from past experiences may be utilized to fill in gaps in the current schema. However, an individual experiencing role ambiguity will not have the information necessary to formulate an accurate picture of their current problem. Without a clear understanding of the current problem the process of retrieving pertinent past information stored in organizational memory is hindered. Role ambiguity affects an individual's ability to properly plan or connect their activities to desired job outcomes (Kahn et. al, 1964) and without a clear understanding of the current job to be done, the process of accessing past relevant information from organizational memory is impaired.

Hypothesis 6: Role ambiguity, as a moderating variable, weakens the effectiveness of organizational memory to formulate organizational knowledge in work groups.

H7: Lateral Communication. Lateral communication within an organization refers to the way in which individuals, teams and other sub-units make connections with one another to facilitate the transfer and exploitation of knowledge. The ability of individuals and teams within an organization to identify who knows what and who is capable of providing help is important in the process of exploiting knowledge (Cohen & Levinthal, 1990; Nonaka et al., 2001; Von Hippel, 1988). Grant (1997) and Spender (1996) both suggest that a traditional hierarchical structure fails to effectively transfer knowledge between sub-units of an organization. As a result, organizations are moving to structural forms that facilitate employee participation and empower them to take action. Hedlund (1994) suggests an N-Form organizational structure that is flat in design and facilitates communication horizontally rather than relying primarily on vertical communication paths as does a traditional structure.

Lateral communication has been shown to have a significant effect on the level of knowledge shared between organization sub-units when trust between sub-units exists (Tsai & Ghoshal, 1998).

Previous literature has established that organizations have system boundaries in which information, knowledge and resources are transferred across subsystems such as marketing, manufacturing, and research or between organizational project teams (Ford & Randolph, 1992; Katz & Kahn, 1978; Miller & Rice, 1967). Within these boundaries are the specific roles which individual occupy. The literature has extensively looked at individuals occupying the roles that facilitate the movement of information, knowledge and resources across the boundary lines. In the literature these roles are called boundary spanning roles and the individuals called boundary spanners. But the benefits that organizations derive from boundary spanners come at a cost to the individuals themselves as numerous studies have revealed that the role is associated with higher levels of role conflict and role ambiguity (Blau & Scott, 1962; Crozler, 1964; Kahn et al., 1964). As a consequence, these incumbents often exhibit the negative behaviors associated with role stress: dissatisfaction, frustration, lack of organizational commitment (Kahn et al., 1964), and a propensity to leave the organization (Breif & Aldag, 1976). Grant (1997) touches on the importance of people who hold these roles as they are often the experts who provide and interpret external information to the group through the use of lateral communication and common language. Role clarity becomes increasingly important for strategic roles within a work group as they are a key component to the efficiency level of the group. In the case of boundary spanners they bring valuable information to the group from sources outside of the group. If an individual is not clear about his or her role as a boundary spanner within the group they will be less effective

at bringing information to the group. Hence, the group will become increasingly discouraged as their expectations are not met and the cycle of the episode model of Kahn et al. (1964) continues to create an atmosphere of stress.

Hypothesis 7: Role ambiguity, as a moderating variable, will weaken the effectiveness of lateral communication to formulate organizational knowledge in work groups.

H8: Mutual Help. Mutual help encompasses the actions taken by members of the team to identify where help is needed, to provide the appropriate help required, and the willingness to receive help when it is needed (Von Krogh, 1998). According to Von Krogh (1998), mutual help is a component of care or high care. Mutual help is a specific behavior associated with mutual trust and cooperation between individuals. Without trust or a willingness to cooperate in good faith and respect, the ability to mutually help one another is lost. Very little has been done to empirically test mutual help and knowledge management, but recently researchers have begun to explore the atmosphere in which teams or work group operate to unlock some of the secrets of the creative process of organizational knowledge formation (Nonaka, Von Krogh, & Voelpel, 2006; Zarraga & Bonache, 2005). One of the greatest hindrances to mutual help is individual non contributors in the group. An attitude of non participation begins to spread as contributors in the group begin to experience a cost of contributing. They are giving up power, position, and privilege as they give up their knowledge base to others in the group without receiving anything in return (Zarraga & Bonache, 2005). This barrier to collaboration is known as the free-rider effect in which an individual benefits from the

group but makes no contribution of his own (Lazear, 1998). Non contributing or social loafing can be associated with a lack of information to evaluate role performance (role ambiguity), which leads to a tendencies to withdraw from the group activities, and to hostility amongst group members (Harkins & Szymanski, 1989; Karau & Williams, 1993; Van den Beukel & Molleman, 2002). Group environments that facilitate the process of knowledge sharing and collaboration go beyond member obligation to share information and communicate openly. They bring a deeper element of member connection and commitment which has been labeled by researchers in different ways; high care (Von Krogh, 1998), shared organizational content (Nonaka & Konno, 1998), and high involvement (Lawler, 1992). A true collaborative environment in which trust is a dominate attribute and individuals freely provide input without consideration of self interest is based on a clear understanding of member roles, how their contributions affect group output, and a clear sense of how members will be evaluated and rewards will be fairly distributed to the group members as a result of positive group output.

Hypothesis 8: Role ambiguity, as a moderating variable, will weaken the effectiveness of mutual help to formulate organizational knowledge in work groups.

Summary

Zarraga and Garcia-Falcon (2003) established eight factors that contributed to the formation of organizational knowledge within work groups. These eight relationships are presented in Figure 4. Each of the eight factors is associated with the interaction of individual members of the group, for the purpose of creating, transferring and integrating

individual knowledge to create organizational knowledge. It has been established by past researchers such as Kahn et al. (1964) and Rizzo et al. (1970) that if certain information is not provided to an individual, regarding his role in an organization, he experiences role ambiguity. The greater the role ambiguity the greater the anxiety, stress and negative outcomes experienced by the role incumbent. A review of the literature as presented in this study has lead to the development of eight hypotheses which suggest that role ambiguity will have a weakening effect on the effectiveness of seven of the factors to create organizational knowledge. For the predictor variable, individual autonomy, the direction of the effect is not predicted but it is still felt that role ambiguity will have an effect on the relationship. The weakening effect of role ambiguity on the relationships between the factors and organizational knowledge are represented in Figure 4 by negative signs.

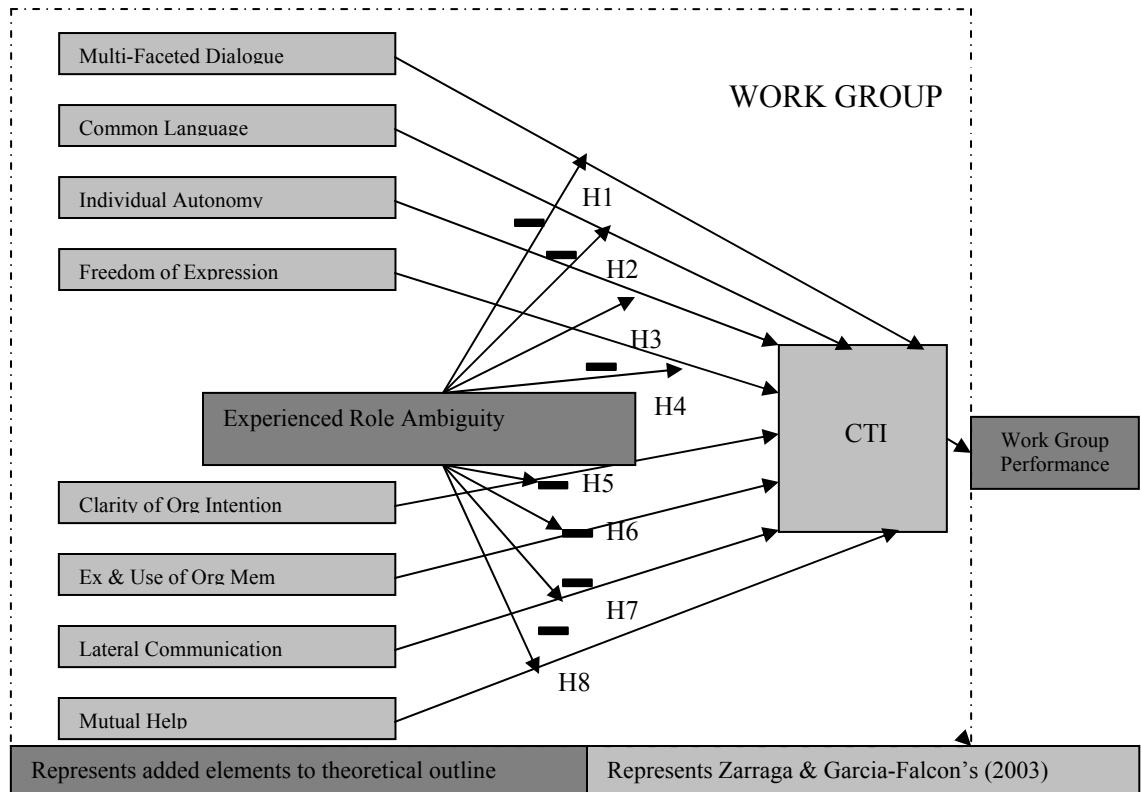


Figure 4 Eight Factors, Organizational Knowledge and Role Ambiguity

Chapter III

III. *Methodology*

Introduction

The purpose of this research is to explore the moderating effect of role ambiguity on the relationship between eight factors associated with knowledge management and the formation of organizational knowledge in work groups (Zarraga & Garcia- Falcon, 2003). Role ambiguity is a psychological state experienced by an individual due to a lack of adequate information. Exploring the impact of role ambiguity in this context addresses the questions of “when” or “for whom” each of the eight factors hypothesized above is expected to vary in its effectiveness to create organizational knowledge. Role ambiguity is not expected to directly affect group outcomes but rather weaken the ability of individual behaviors to effectively combine into group behaviours favorable to knowledge outcomes. This study thus hypothesizes role ambiguity as a moderating variable to previously established relationships. This chapter will discuss research design including the identification of the predictor, outcome and moderating variables, data collection instruments including their development and reliability and validity, and lastly will outline the tools and method of data analysis.

Research design

This study combines knowledge management theory, group dynamics theory and role dynamics theory, a combination which is currently absent in the literature. This connection will increase management’s ability to create and manage work groups more

effectively by exposing potential barriers to the creation, transfer and integration of knowledge amongst group members.

The research is a cross-sectional study that uses the survey method to obtain research data. The data consist of two major sets of information supplemented by two minor sets of information. The two major sets of information are the measurement items relating to the eight factors associated with knowledge management and organizational knowledge developed by Zarraga and Garcia-Falcon (2003) and the measurement items developed by Rizzo et al. (1970) to determine the level of role ambiguity experienced by a role incumbent. The two minor sets of information are associated with participant demographics and group performance. The demographic information will cover gender, age, tenure in work group, level of experience, and education. The study surveys individuals with respect to their interactions and outcomes in work group settings but does not use intact groups or group-level measurements. All measurements and analyses are at the individual level.

Data Collection Procedures

The target population for this study included organizations in North America that utilized work groups in their daily operating activities. This study used the definition posed by Claus Langfred in which he defines a work group as “a social unit (as perceived by themselves and by others), with a common goal or directive, that exists within a larger organizational system” (2000, p. 567). A work group could therefore be formal or informal, with varying degrees of rigidity in its boundaries, such as a committee, department, task force, or work unit. Participants were expected to self identify if they fit

the criteria of a work group member before completing the questionnaire (see Appendix A). The data collection was not limited to a particular company, industry or segment of the market place; all different sizes and type of organizations were potentially involved. Employees at different levels of organizations were equally targeted. Data was collected using two convenient samples. Emails were sent to two distinct groups of potential participants requesting their participation in an online survey, using the survey tool survey monkey. The first convenient sample source was an e-mail list with which the researcher was associated that contained 512 random individuals whose only connection was the e-mail list. The individual that developed and updates the list agreed to send an email on the researchers' behalf requesting participation in the online survey. The email contained the link to the survey monkey web site and the survey. The second convenient sample source comprised individuals known to the researcher that might wish to participate in the project. In this case emails were sent directly from the researcher to the potential participants. The emails contained the link to the survey. An addition request to pass on the survey link to other potential participants that fit the participant criteria was included in the emails sent by the researcher. Approximately 700 participants were contacted by way of email. 171 individual self identified as working in groups and participated in filling out the online survey. That response constitutes a 24.4% response rate but does not account for individuals which responded by not filling out the survey due to the fact they did not meet the criteria of working in groups.

All questions were presented in the same wording and visual presentation, regardless of the delivery medium. Past research by Dillman (1999) suggests that mixed modes of delivery may contribute to inconsistent conclusions due to the potential

differences associated with social desirability, acquaintance, question order effect, and primary/ recency effect.

Predictor Variables

The eight predictor variables of interest to this project were established by Zarraga and Garcia-Falcon (2003): Multi-Faceted Dialogue, Common Language, Individual Autonomy, Freedom of Expression, Clarity of Organizational Intent, Use and Existence of Organizational Memory, Lateral Communication, and Mutual Help. As discussed in more detail below, Zarraga and Garcia-Falcon (2003) designed a 29 item scale for these eight factors.

Outcome Variable

The outcome variable, organizational knowledge (CTI) was also established by Zarraga and Garcia-Falcon (2003) in which they developed a five item scale to measure the construct. Both predictor and outcome variables have since been used in Zarraga and Bonache (2005).

Moderating Variable

The moderating variable, role ambiguity, was first explored by Kahn, Wolfe, Quinn, Snoek, & Rosenthal (1964) with their work on role dynamics. Rizzo, House, and Lirtzman (1970) established a measurement scale for the variable that is discussed in more detail below.

Knowledge Management Instrument

Celia Zarraga initially developed and tested a measurement instrument for the eight factors associated with knowledge management and organizational knowledge in 2001 and later published a paper using these materials in 2003 with her dissertation supervisor Juan Manuel Garcia-Falcon. E-mail contact was made with Celia Zarraga and with her permission, a copy of her doctoral dissertation, including the measurement tool and reliability and validity tests, was obtained. The relevant portion of the measurement instrument includes 34 questions. Each question utilized a seven-point Likert scale ranging from 1 (low level of agreement) to 7 (high level of agreement) (see Appendix B). The questionnaire was provided in a word document in Spanish. The original questionnaire was translated using online language tools to roughly translate the document. The rough translation was then examined by a language expert fluent in Spanish. This refined questionnaire was compared against the literature to establish the relevance of the finished translation to each concept. For the five items measuring creation, transfer and integration of organizational knowledge (CTI), Cronbach's (1951) alpha indicated a reliability score of 0.70 in measuring the phenomenon being examined (Zarraga & Garcia-Falcon, 2003). Table 1 shows the reliability analysis for each of the eight factors used in the previous study. In addition, Pearson's coefficient of correlation was calculated between each of the variables. Zarraga has gone on to use the scale for several articles for publication since its development in 2001. Very few measurement instruments are available in the area of knowledge management to empirically test knowledge creation, transfer, integration or storage.

Table 1 Analysis of reliability of the scales used to measure the factors favoring the CTI of knowledge in work teams

<u>Factor</u>	<u>Cronbach's Alpha</u>
Multi-faceted dialogue in work teams	0.721
Common language in the company	0.743
Individual autonomy	0.735
Freedom of expression in the work team	0.841
Clarity of organizational Intent in the company	0.802
Existence and use of organizational memory in the company	0.758
Lateral communication within the company	0.718
Mutual help in the work team	0.769

Table from Zarraga and Garcia-Falcon (2003, p. 90)

Role Ambiguity Instrument

This study used questions from the role ambiguity scale developed by Rizzo et al. (1970). The original study in which the scale was developed presented 15 items to measure role ambiguity. Of the original 15 items, two were duplicate questions which resulted in 14 items. Of the 14 items, six had very low load values on the ambiguity construct. Rizzo et al. (1970) thus used the eight remaining item when considering the role ambiguity effect in their study. This study utilized the eight items from the original scale that were considered by Rizzo et al. (1970). This number of items was also more appropriate for the desired length of the survey. The original seven-point scale ranged from very false to very true but was modified to provide consistency throughout the survey. The scale used ranged from 1 (low level of agreement) to 7 (high level of agreement).

The scale developed by Rizzo et al. (1970) in its original form or a slight modification has been utilized by the majority of research in the area of role conflict and ambiguity for more than three decades. However the scale has been criticized in the literature as having only one-dimensional qualities which is a drawback as many researchers have proposed role ambiguity as a multi-dimensional construct (Eys & Carron, 2001; Rhoads, Singh, & Goodell, 1994). However, numerous other studies have examined the validity and reliability of the scale in measuring role ambiguity from a broader perspective (Breugh & Colihan, 1994; Comer, 1994; Smith, Tisak, & Schnieder, 1993). The scale measures the magnitude of role ambiguity but does not provide details as to the underlying attributes of role ambiguity which may be more descriptive. Past research has produced alpha scores of .68 to .87 which have been accepted as adequate for measuring the overall level of role ambiguity present in a particular organizational role (Shepard & Fine, 1994). For the purpose of this study, Rizzo et al.'s (1970) role ambiguity scale was thus deemed appropriate to detect the presence and amplitude of role ambiguity as a moderating variable.

Performance

Two questions made up the performance section of the questionnaire. The questions ask for an individual's perception of their team's performance in comparison to other teams in the company and to other teams they have been involved with. These questions were utilized in the study by Zarraga and Garcia-Falcon (2003).

Data Analysis Procedures

In this research project the data were analyzed using hierarchical multiple regression techniques to determine the relationships among variables. This method of analysis is recommended to retain the continuous nature of the variables and has shown to result in fewer type I and type II errors for detecting moderator effects versus choosing cut off points for continuous data (Bissonnette, Ickes, Bernstein, & Knowles, 1990; Mason, Tu, & Cause, 1996; Stone-Romero & Anderson, 1994). This research has hypothesized that role ambiguity is a moderator of the relationships between the eight factors and organizational knowledge. Hierarchical multiple regression analysis was thus used to analyze the moderating effects of role ambiguity on the eight relationships involved in creating organizational knowledge.

Chapter IV

IV. Analysis and Presentation of Findings

Introduction

The study was designed to replicate the findings of Zarraga and Garcia-Falcon (2003) and to test the moderating effect of role ambiguity on the previously established relationships between eight factors and organizational knowledge in work groups. A sample of individuals who self identified themselves as working in groups, from at least nine different sectors of the North American economy were collected. A total of 700 invitations were sent by email to potential participants. A total of 171 participants responded to the invitation and filled out the online survey. This reflects a total survey response rate of 171/700, or 24.4%. Of the 171 responses received only 162 were used in the analysis as one was incomplete and eight were received after the deadline date. SPSS and Microsoft Excel software were used as the main statistical analysis tools.

This chapter presents the results of the statistical analysis performed on the variables described in the previous chapters. Demographic characteristics of the respondents are presented first, followed by the reliability estimates. Then the results of the main effects and moderating effects of the variables associated with the research hypotheses.

Demographic Characteristics

This section profiles participants that responded to the invitation to fill out the online survey designed for this study. The population in this study included those individuals working in groups in an organization in North America. The respondents

were asked to self identify if they participated in a work group. A work group was described as a formal or informal group comprised of themselves and at least one other individual working towards a common goal within a larger organization. Table 2 shows the distribution of respondents by age and gender.

Table 2 Ages of Respondents by Gender

		GENDER		Total
		Male	Female	
AGE	25 and under	2	4	6
	25 to 35 years	16	23	39
	35 to 50 years	28	39	67
	50 and over	32	18	50
	Total	78	84	162

There is almost equal gender representation with 78 men (48.1%) and 84 women (51.9%) in the sample. There was good representation among all age groups except for 25 and under which should have been expected as most individuals do not fully enter the fulltime work force until mid to late twenties or upon the completion of post secondary education. The most frequently occurring age group (41.3%) is the 35-50 age range. The 50 and over age group was represented 30.9 %, 24.1% were between the age of 25 and 35 and only 3.7 % of the respondents were under 25 years old.

The respondents were distributed across at least nine different sectors of the economy and represented both short and long term tenure with their respective groups. Table 3 shows the distribution of respondents by group tenure and industry.

Table 3 Tenure of Respondents by Industry

		GROUP TENURE			Total
		< 1 year	1 to 3 years	> 3 years	
INDUSTRY	Accounting	2	3	4	9
	Finance	0	2	4	6
	Agriculture	7	4	23	34
	Publishing	0	0	2	2
	Services	4	8	9	21
	Retail	0	3	1	4
	Clergy	1	0	7	8
	Education	5	5	10	20
	Other	17	21	20	58
	Total	36	46	80	162

Table 3 lists the industries in which the respondents are involved in. The most frequently occurring category was Other (35.8%). Based on the dominant industry associated with the area in which the majority of the study was conducted, Oil and Gas would be the most likely industry to comprise this category. Sectors such as agriculture (21%), education (12.3%), and services such as fire fighters, nurses, police, etc. (13%) comprised the majority of respondents. Smaller representation occurred in the areas of retail (2.5%), accounting (5.6%), financial (3.7%), publishing (1.2%), and clergy (4.9%). The amount of time with which an individual has been involved in their current group is known as group tenure and there was good representation across the categories of tenure.

Reliability and Descriptive Statistics

The reliability of the research instrument is concerned with its internal consistency. Cronbach’s alpha measures how well a set of scales measures a single uni-dimensional latent construct (Cortina, 1993). Values above 0.7 are acceptable indicators

of internal consistency as suggested by (Ribere, 2001 and Santos, 1999). Table 4 presents the Cronbach's Alpha for the variable associated with this study.

Table 4 Reliability of Constructs

V	CRONBACH'S ALPHA
Organizational Knowledge (CTI)	0.701
Multi-Faceted Dialogue	0.780
Common Language	0.684
Individual Autonomy	0.608
Freedom of Expression	0.839
Clarity of Organizational Intent	0.799
Existence and Use of Organizational Memory	0.340
Lateral Communication	0.469
Mutual Help	0.757
Role Ambiguity	0.808

The items used to measure the factors associated with knowledge management utilized the scale developed by Zarraga and Garcia-Falcon (2003). Their scale was developed and tested in Spain utilizing a sample collected from 12 Spanish Organizations. All items were translated using the same process as described in the previous chapter. Seven of the nine constructs tested for reliability held similar results to the original study. However, two of the items (organizational memory and lateral communication) were significantly lower in their reliability score and failed to score the minimum required for a construct to be considered reliable. Due to the low reliability scores the variables organizational memory and lateral communication, they will not be considered in the remaining analysis and subsequent chapter regarding discussion and conclusions. Knowledge management is a relatively new field of research which has only been around since the mid 1990's and very few scales have been developed to empirically test knowledge management constructs. The scales that have been developed

have yet to undergo test and retest to ensure the reliability and generalizability. This study has provided a retest of the constructs across cultural boundaries and some items seem to withstand the test whereas others, such as the two previously mentioned, seem to have lost some reliability. The fact that the original test was developed in Spain may indicate that the loss of reliability could be a consequence of translation, respondent's interpretation of the question, or contextual meaning. The role ambiguity scale has been tested and retested over and over in the literature since its development in 1970 and this study reconfirmed its reliability.

Table 5 presents the descriptive statistics for the ten variables; eight knowledge management factors, the dependant variable organizational knowledge (CTI), and role ambiguity. (See Appendix B for questionnaire item ↔ variable links.)

Table 5 Descriptive Statistics all Variables

V	N	M	SD	Variance
Organizational Knowledge (CTI)	162	25.400	4.585	21.024
Multi-Faceted Dialogue	162	20.550	4.545	20.659
Common Language	162	24.200	4.847	23.489
Individual Autonomy	162	28.770	3.571	12.752
Freedom of Expression	162	19.700	5.179	26.821
Clarity of Organizational Intent	162	19.310	4.868	23.695
Mutual Help	162	11.540	1.985	3.940
Role Ambiguity	162	23.780	7.712	59.475

Note: Variable were derived using a simple summative approach described William Zikmund "BUSINESS RESEARCH METHODS" (2003, p.480)

All variable frequencies were graphed using a histogram overlaid with a normal curve to visually check for skewedness. In addition a P-P plot of frequency was graphed. All variables appear to be normally distributed and thus do not violate the normal distribution assumption associated with multiple regression analysis techniques.

Table 6 Correlations Among all Variables

V	1	2	3	4	5	6	7	8
1. Common Language	-							
2. Multi-Faceted Dialogue	0.659*	-						
3. Clarity of Organizational Intent	0.439*	0.520*	-					
4. Individual Autonomy	0.213*	0.451*	0.480*	-				
5. Mutual Help	0.395*	0.550*	0.326*	0.392*	-			
6. Freedom of Expression	0.655*	0.649*	0.454*	0.322*	0.607*	-		
7. Organizational Knowledge (CTI)	0.490*	0.716*	0.553*	0.536*	0.548*	0.632*	-	
8. Role Ambiguity	0.485*	-0.543*	-0.647*	-0.566*	-0.282*	-0.457*	-0.516*	-

* P<.01

Table 6 summarizes the correlations between independent variables, dependent variable, and moderating variable and there significance. The correlation Matrix indicates a low risk of multicollinearity as the coefficients are all less than 0.75 (Usually considered as the critical point). Multicollinearity is often a concern with attitudinal scales which utilize the same data collection methods.

Hypothesis Testing: Multiple Regression and Hierarchical Multiple Regression

To confirm the relationships associated with the eight factors and Organizational knowledge first established by Zarraga and Garcia-Falcon (2003), a multiple regression analysis was performed using SPSS software. All independent variables were loaded in one block and CTI - the dependant variable was loaded. Table 7 indicates the results of that multiple regression test.

Table 7 Multiple Regression for Predictor variables and Outcome Variable (CTI)

V	Organizational Knowledge (CTI)
1. Common Language	0.043
2. Multi-Faceted Dialogue	0.344*
3. Clarity of Organizational Intent	0.077
4. Individual Autonomy	0.203**
5. Mutual Help	0.258***
6. Freedom of Expression	0.184*
F	34.449*
R squared	0.643
Adjusted R squared	0.624

Note. Data reported are Unstandardized β coefficients

* $P < .01$, ** $P < .05$, *** $P < .10$

In Table 7, the adjusted R^2 reveals that the independent variables account for 62.4 percent of the variation in the dependant variable CTI. The significant F also reveals that the model as a whole is significant ($\alpha = .05$). Table 8 contains the coefficients for each of the independent variable when all other variable are held at zero. From Table 8, the significant values reveal that multi-faceted dialogue, individual autonomy, and freedom of expression are significantly and positively related to organizational knowledge (CTI) at an $\alpha = .05$. Mutual help was significant and positively related to organizational knowledge (CTI) at an $\alpha = .10$. The other four variables: common language, clarity of organizational intent, existence and use of organizational knowledge, and lateral communication were not significantly related to organizational knowledge. This study thus substantiated half of the findings of the earlier work of Zarraga and Garcia-Falcon (2003) but failed to confirm all of the relationships found in the first study.

To test the six hypotheses concerning the moderating effect of role ambiguity Hierarchical Multiple Regression was used. In this analysis the independent variables, as well as the potential moderating variable are loaded in the first stage along with the dependant variable CTI. The second stage of the regression analysis involved the loading of the interactive variable which are a product of each individual independent variable and the moderator variable. These six interactive variables are loaded in the second stage. Table 8 presents the results of the Hierarchical moderated multiple regression analysis.

Table 8 Results of a Hierarchical Moderated Multiple Regression Analysis Predicting Organizational Knowledge (CTI)

V	Main Effects	Moderated Effects
	Model 1	Model 2
1. Common Language	-0.043	0.096
2. Multi-Faceted Dialogue	0.344*	0.26
3. Clarity of Organizational Intent	0.076	-0.018
4. Individual Autonomy	0.203**	0.946*
5. Mutual Help	0.259***	0.681
6. Freedom of Expression	0.184*	-0.112
7. Role Ambiguity	-0.001	0.627**
8. Role Ambiguity X Common Language		-0.007
9. Role Ambiguity X Multi-Faceted Dialogue		0.005
10. Role Ambiguity X Clarity of Organizational Intent		0.002
11. Role Ambiguity X Individual Autonomy		-0.028*
13. Role Ambiguity X Mutual Help		-0.017
14. Role Ambiguity X Freedom of Expression		0.011
F change	30.422*	1.561
R squared	0.643	0.672
Adjusted R squared	0.622	0.633

Note. Data reported are Unstandardized β coefficients
 *P<.01, **P<.05, ***P<.10

The results in Table 8 show the R² change of 0.028 (F=1.561, α =0.141) is not significant. Therefore, role ambiguity does not moderate the relationships between the independent variables and organizational knowledge (CTI). However, if we look at the

coefficient of the interaction term for role ambiguity X individual autonomy in Table 8, it is significant ($\alpha = .006$). But for all other interactive terms the coefficients are also not significant which would indicate that role ambiguity does not moderate the relationships and as such all hypotheses except for Hypothesis 3 are not supported. The moderating effect of role ambiguity on the relationship between individual autonomy and organizational knowledge may be due to random error as indicated by the non-significant F test or the low statistical power due to the number of variables and sample size.

To further look at hypothesis 3, a Hierarchical Multiple Regression analysis was used to test the moderating effect of role ambiguity on the relationship between individual autonomy and organizational knowledge (CTI). In the first stage of the analysis the dependant variable (CTI), independent variable (individual autonomy) and moderator (role ambiguity) were loaded. In the second stage, the interaction term created by multiplying the variables individual autonomy and role ambiguity together was loaded. Table 9 presents the results of the analysis.

Table 9 Results of a Hierarchical Moderated Regression Analysis Predicting Organizational Knowledge (CTI)

V	Main Effects	Moderated Effects
	Model 1	Model 2
5. Individual Autonomy	0.460*	1.075*
9. Role Ambiguity	-0.186*	0.465**
14. Role Ambiguity X Individual Autonomy		-0.023*
F change	43.51*	8.148*
R squared	0.354	0.385
Adjusted R squared	0.346	0.374

Note. Data reported are Unstandardized β coefficients
 *P<.01, **P<.05

The results of Table 9 show that the R² change of .032 (F=8.148, $\alpha = .005$) is significant. Therefore, role ambiguity does moderate the relationship between individual

autonomy and organizational knowledge (CTI). The Coefficient of the interaction term in Table 9 ($\beta = -.023$) is also significant and indicates that the relationship is negative. This indicates that higher levels of role ambiguity reduce the effectiveness of individual autonomy to influence the formation of organizational knowledge (CTI). This analysis provides support for hypothesis 3.

Exploratory Analysis

From the initial analysis of the relationship between the six factors and organizational knowledge (CTI) and the moderating variable (role ambiguity) the results of the correlation coefficients revealed strong relationships between the six factors and role ambiguity which would suggest a possible main effect or direct relationship rather than a moderated relationship. Role ambiguity is defined by Kahn et al. (1964) as a lack of information to adequately perform the duties of one's assigned role. In the Role episode model (see figure 1, p. 13) box III indicates that experienced role ambiguity is the result of an incumbents evaluation of a role senders feedback or actions associated with their interactions with one another, as such an incumbents level of role ambiguity is dependant on the variables associated with group member interactions. Therefore, a Multiple Regression analysis was performed using the six independent variables and role ambiguity as the dependent variable to test for main effect or significant direct relationships. Table 10 present the results.

Table 10 Multiple Regression for Predictor Variables and Outcome Variable (Role Ambiguity)

V	Role Ambiguity (RA)
1. Common Language	-0.303**
2. Multi-Faceted Dialogue	-0.18
3. Clarity of Organizational Intent	-0.539*
4. Individual Autonomy	-0.701*
5. Mutual Help	0.555**
6. Freedom of Expression	-0.169
F	28.115*
R squared	0.643
Adjusted R squared	0.624

Note. Data reported are Unstandardized β coefficients
* P<.01, **P<.05, ***P<.10

In Table 10 the adjusted R² reveals that the independent variables account for 57.4 percent of the variation in the dependent variable (role ambiguity) and that the overall model is significant ($\alpha=0.000$, $p=.05$). Table 15 indicates that the coefficients for common language, clarity of organizational intent, individual autonomy, and mutual help are all significant. Common language, clarity of organizational intent and individual autonomy are negatively related to role ambiguity as predicted by hypotheses 2, 3, and 5. Mutual help is positively related to role ambiguity which supports prior research in the area of feedback seeking behavior. This research suggests that individuals will make an attempt to clarify their roles by asking for the help of others and only when they reach the point of frustration do they withdraw from the feedback seeking situation. The fact that over 50 percent of the respondents have been with their groups for less than three years may suggest either that they are still exhibiting feedback seeking behavior or that

uncertainty in work groups is happening at a greater frequency even in established groups (Kimberly & Quinn, 1984).

Conclusion

Overall, these findings reconfirm many of the relationships established by Zarraga and Garcia-Falcon (2003) and add to the generalizability and reliability of the portion of their previously developed scale relating to knowledge management factors. The findings also establish an important link between role dynamics and the need to clarify individual's roles as an important consideration in the group environment. The results established five significant relationships between role ambiguity and the factors contributing to knowledge management. These relationships demonstrate the complexity of knowledge management and the need for researchers in the area of knowledge management to continue to integrate the findings of other areas of study with new theory development. With the exception of individual autonomy (hypothesis 3) role ambiguity was not found to moderate the relationships of common language, multi-faceted dialogue, clarity of organizational intent, existence and use of organizational memory, lateral communication, mutual help, and freedom of expression with organizational knowledge (CTI). The findings did establish significant direct relationships between four of the eight factors and role ambiguity however, which suggests that role ambiguity does have an important role to play in interacting with the factors associated with knowledge management.

Chapter V

V. Discussion and Conclusions

This chapter opens with a discussion of research findings from which conclusions are drawn, followed by an examination of the limitations of the study and suggestions for future research. To conclude this chapter and the overall project, I draw conclusions and consider the implications of these findings for academics and managers of organizations.

Findings and Conclusions

The purpose of this study was to investigate the impact of role ambiguity (RA) as a moderator in the relationship between the eight factors that contribute to organization knowledge and formation of organizational knowledge (CTI). In the process of fulfilling that purpose the opportunity was also taken to retest the scale developed by Zarraga and Garcia–Falcon (2003) since there are very few measurement tools available to empirically test constructs associated with knowledge management. The literature in the area of knowledge management is dominated by theoretical modeling and theory development but limited testing. The study surveyed 171 individuals working within groups in organizations in North America to measure the moderating effect of role ambiguity on the relationship between eight factors (multi-faceted dialogue, common language, individual autonomy, freedom of expression, clarity of organizational intent, existence and use of organizational knowledge, mutual help, and lateral communication) and the formation of organizational knowledge. The results indicate that role ambiguity moderates only the relationship between individual autonomy and organizational

knowledge. However, the results also indicate that role ambiguity does play a significant part in the process of knowledge management. Role ambiguity was found to have a significant direct relationship with four of the eight factors associated with the knowledge management process, including individual autonomy. These are useful findings as empirically testing is only starting to scratch the surface of all of the complex relationships and factors that affect the creation, transfer, retention, and integration of knowledge utilized within organizational environments.

Multi-faceted dialogue. This study retested the reliability of the items developed by Zarraga and Garcia-Falcon (2003) and found that the reliability of the items used to measure multi-faceted dialogue were very similar across the two studies. The fact that these studies were implemented in different geographic and cultural settings therefore adds to the reliability and generalizability of the scale items. Multi-faceted dialogue was also found to be a significant factor in predicting the formation of organizational knowledge which is consistent with the previous findings. Hypothesis 1 predicted that role ambiguity would moderate the relationship between multi-faceted dialogue and the formation of organizational knowledge (CTI). The findings of this study did not support hypothesis 1 and no significant relationship was found to exist between role ambiguity and multi-faceted dialogue. Callister, Kramer, and Turban (1999) suggests that in situations of uncertainty, such as a new transfer or entry into a new organization, individuals will seek feedback from their peers regarding their behavior and actions as it pertains to the organization as a whole, rather than job performance issues or tasks. Individuals are more apt to seek feedback on performance issue from their supervisors. Peer feedback is solicited less frequently as tenure increases (Callister, Kramer, &

Turban, 1999). As discussed in previous chapters, the case for connecting role ambiguity and multi-faceted dialogue was based on the perceptions that differences in past experiences, training and education would be considered as barriers to clarifying an incumbent's role. However, as this study's results and the feedback literature suggest, individuals are often not concerned with their peer's differing backgrounds when considering their own role responsibilities within their work group, but are concerned with their peer's knowledge of the corporate environment and how to behave within it. This study would suggest that role clarity is an important consideration in work groups but may not impact the cognitive diversity elements which facilitate multi-faceted dialogue.

Common Language. This study retested the reliability of the items developed by Zarraga and Garcia-Falcon (2003) and found that the reliability of the items used to measure common language were relatively consistent across studies. In the original study the Cronbach's Alpha was .743 and under the current study it was found to be .684 which falls just short of the rule of thumb which states that the Alpha should be greater than .70 to be considered reliable. Common language was not found to be significant in predicting the formation of organizational knowledge (CTI) which is contrary to the findings of Zarraga and Garcia-Falcon (2003). Hypothesis 2 predicts that role ambiguity will moderate the relationship between common language and organizational knowledge. The results of this study do not support hypothesis 2, however a significant negative relationship was found between common language and role ambiguity. These findings do support the literature discussed in previous chapters regarding the relationship between role ambiguity and common language. The literature suggests that role ambiguity may be

an antecedent or consequence, rather than a moderator, of common language. Role clarity or the lack of role ambiguity facilitates communication and by making communication easier, its frequency increases. An increase in communication between individuals leads then to an increase in common understanding and an increase in common language. The study findings suggest that role clarity facilitates interaction between group members and is important to the development of common language within workgroups. Further research is required to better understand the relationship of these constructs.

Individual Autonomy. The results of this study support the work of Zarraga and Garcia-Falcon (2003) by retesting and reaffirming the relationship between individual autonomy and CTI. The findings also support hypothesis 3 which predicts a moderating effect of role ambiguity on the previously established relationship. Role ambiguity was found to hinder or have a negative effect on the relationship between individual autonomy and organizational knowledge (CTI). Thomas Davenport (2005) in his book “Thinking for a Living” suggests that management needs to take a hands-off approach to managing employees who work with knowledge. Davenport calls it the HSPALTA or “Hire Smart People And Leave Them Alone” approach to management. Davenport also suggests that this approach is expected by knowledge workers as they feel their level of education and experience should indicate that they know what they are doing and so are resistant to being told what to do. In this study, autonomy and role ambiguity are measures of the perception of the individuals. Knowledge workers attitude about being told what to do and their expectations of autonomy would suggest that there would be a high correlation between perceived autonomy and perceived role ambiguity which would support the negative relationship. If an individual perceives that they are being told what

to do through verbal or nonverbal interactions with others they assume that means that they do not know their role and as such others are telling them what to do. It seems more than reasonable that this would lower perceptions of individual autonomy. One purpose of business analysis and research is to improve performance and these findings create additional questions in this area. If the perception of role ambiguity and autonomy are highly correlated, is it possible that individuals only think they know their role because management has take a hands off approach and given them a high degree of autonomy? This might be the case despite a gap between perceived role clarity and objective role clarity as expressed by the expectations of the organization. This study touches on the idea of organizational intent and establishes that it has a significant relationship with role ambiguity that might be the connection between an organization's expectations of an individual's role and the individual's perception of role clarity. These questions should be explored in future research. The findings of this study reveal that individual autonomy and role ambiguity are significantly related and affect the process of organizational knowledge creation, transfer and integration.

Freedom of Expression. The findings of this study support the findings and reliability of the freedom of expression construct as developed by Zarraga and Garcia-Falcon (2003). The Cronbach's Alpha for items measuring freedom of expression was .841 in the original study and .839 for this study. This study also supports the earlier findings of Zarraga and Garcia-Falcon (2003) regarding the positive and significant relationship between freedom of expression and organizational knowledge (CTI). However, no significant relationship was found between freedom of expression and role ambiguity as a main effect or a moderating effect of the previously established

relationship. This study establishes that freedom of expression is an important factor in the creation, integration and transfer of knowledge within work groups and is a significant part of the dynamic environment in which work groups operate but the degree in which an individual understands his role in the group or the organization as a whole does not appear to either hinder or facilitate an individual's ability to openly express their opinions to their group members. More recent work by Zarraga and Bonache (2005) and Nonaka, Von Krogh, and Voelpel, (2006) has focused on the workgroup environment and the factors necessary to maximize knowledge sharing. Freedom of expression is one of those key factors which facilitate the process of knowledge sharing which is supported by the results of this study as well.

Organizational Intent. Organizational intent was not found to be a significant factor in predicting the transfer and integration of organizational knowledge (see Appendix C, Table 11 ($\beta=.002$, $\alpha=.970$)), but was a significant predictor of the formation of organizational knowledge, (see Appendix C, Table 11($\beta=.138$, $\alpha=.000$)). This result provides partial support for the findings of Zarraga and Garcia-Falcon (2003). These findings suggest that an individual looks to the organizational priorities and goals to filter information for the purpose of creating new knowledge for the organization.

Organizational intent does not hinder or facilitate the sharing of information amongst organizational group members as organizational intent was not significantly related to the transfer and integration of knowledge in work groups. The items measuring organizational intent were confirmed as reliable across studies, geographic locations and cultures. Role ambiguity was not found to be a moderator of the relationship between organizational intent and organizational knowledge as predicted by hypothesis 5, but a

significant negative relationship was found between organizational intent and role ambiguity which partially supports the literature as discussed in previous chapters. This study measured role ambiguity as a uni-dimensional construct which limited the extent to which conclusions could be derived from the findings. The findings do raise the question, for this researcher, as to whether organizational intent is an indication of the organization's expectations of a role incumbent and thus reflect more the dimension of objective versus subjective or perceived role ambiguity. Future studies should explore the relationship between organizational intent and role ambiguity as a multi-dimensional construct and tease apart objective and subjective ambiguity to better understand the role organizational intent plays in the knowledge management process.

Organizational Memory. The use and existence of organizational memory was one of two constructs in which the reliability of the measurement items were not consistent between studies. The original study had a Cronbach's Alpha of .758 whereas in this study the Cronbach's Alpha was .340 which is far below the acceptable .70 level and as such very little can be said with confidence about the construct relating to organizational memory. As described in previous sections all procedures for translating the measurement items were consistent across constructs and items. Therefore it is reasonable to assume that a cultural difference may have contributed to the variability in the reliability results. By repeated test and retest of the items used to measure this construct, a better understanding as to the variability can be established.

Lateral Communication. Lateral communication like organizational memory was found to be unreliable as established by the Cronbach's Alpha requirement for a construct to be .70 or greater. Lateral communication's Cronbach's Alpha was .469. Therefore, any

findings are suspect due to the low reliability rating and little conclusions can be derived.

Mutual Help. The reliability of the mutual help construct measurement items was consistent from the original study (.769) by Zarraga and Garcia-Falcon (2003) to this study (.757). The findings of this study indicate that at an $\alpha=.10$ there is a significant positive relationship between mutual help and organizational knowledge (CTI). The findings do not support hypothesis 8 regarding the moderating effect of role ambiguity on the relationship between mutual help and organizational knowledge. However, there is a significant positive relationship between mutual help and role ambiguity. This relationship concludes that as role ambiguity increases the behavior associated with mutual help increases. Bennett, Herold, and Ashford (1990) suggest that this process would occur at the early stages of transition or uncertainty situations but would decrease overtime. Tenure was not a significant factor in these findings. I would suggest that uncertainty situations are becoming the norm or happening with a greater frequency for even well established work groups. Environmental changes, staff turnover, customer demands, corporate restructuring are all example of events that might create a environment of uncertainty in a work group and may keep even a well established work group in a constant state of feedback seeking behaviors. One might even suggest from the work of Bennett, Herold, and Ashford (1990) that such uncertainty is at an organizational level as feedback and mutual help associated with group members is often focused on cultural or organizational norms rather than job specific tasks. Feedback relating to job specific tasks or performance is thus often directed at supervisors rather than group members. This study did not identify if direct supervisors were a part of the respondent's work group, however, so this supposition could not be tested. The findings do suggest

that work group members are aware of their need for clarity and a certain level of ambiguity may increase group cooperation and interaction.

Limitations

The study was limited in several ways. First, the measurement scales for each of the constructs being investigated were based on an individual's perception of each item measuring the constructs and not cross-verified with other more objective measures. This may lead to a common method variance or bias. Second, there is always a limitation in the nature of sampling. As Kerlinger and Lee (2000; p. 614) recognize, "any research that uses sampling is naturally subject to sampling error." Sampling error takes place due to the barriers that are present when trying to gain access to research participants (Braverman, 1996) and to make the sampling representative of the population which is being targeted for the study. This research looked at knowledge management activities associated with groups, and relied on individual respondents to self identify as fitting the criteria of a group member, however the convenience nature of the sample may have introduced some bias. Third, due to time constraints on the data collection period the number of respondents was limited to the scope and objectives of the present project and may be perceived as limited for use outside of the present study. Fourth, the measurement scale developed by Rizzo et al. (1970) approaches role ambiguity as a uni-dimensional construct, limiting the depth of descriptive analysis of the construct. Finally, the scale developed by Zarraga and Garcia-Falcon (2003) has not had substantial amounts of test and retest usage to confirm the validity and reliability of the scale. This is a condition of the current depth of study in the area of knowledge management which is a relatively new area and requires time to develop reliable

measurement tools. For this reason empirical testing in the area of knowledge management should be seen as somewhat exploratory.

Future Research

Some areas for future research were touched on briefly in the findings and conclusions sections, such as the need for future research regarding the impact of objective role ambiguity on the factors associated with knowledge management. Further studies linking knowledge management factors and the multi-dimensional aspects of role ambiguity may enhance our understanding of the specific areas of role clarity which play a part in the creation, transfer and integration of knowledge associated with the interaction of group members. Much more work is needed in the area of scale development to establish reliable measurement tools to empirically test the constructs presented by the theoretical work done in the area of knowledge management. As these measurement tools are established, tested and retested, additional studies can then utilize them to examine further crossover elements of different areas of study.

Implications for Organizations

Knowledge possessed by individuals within an organization is a key resource that organizations can utilize to obtain sustainable competitive advantage in a highly competitive global economy. All organizations, but particularly those that employ knowledge workers, should be made aware of the importance of clarity of organizational intent, as it provides an opportunity to give direction to knowledge workers without directly impacting their individual autonomy. This is a key insight to increasing knowledge worker productivity.

Thomas Davenport (2005) stresses the importance knowledge workers put on autonomy as an expectation of employment and the resistance to anything that affects that autonomy. Managers should also be aware that a certain amount of role ambiguity can actually help to develop group interdependence and mutual help. Organizational managers, supervisors and leaders need to understand that work groups are like a good soup, the right amount of a combination of ingredients can produce a perfect blend of flavors, but a little too much of any one ingredient can be disastrous. This study established that the factors that have contributed to the formation of organizational knowledge in this study and previous ones are also significantly related to role ambiguity. These findings suggest that a good starting point to the constructing or refocusing of work groups is to clarify individual roles within the organization and the work group before setting them free. This concept is a slight modification of Davenport's "HSPALTA." I propose the further step to "HSPCRALTA," i.e. Hire Smart People, Clarify Roles, And Leave Them Alone.

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APPENDICES

Appendix A Participant Letter University Of Lethbridge

Organizational knowledge in work groups: Factors contributing to its formation and the effects of role ambiguity

Dear Participant

I am a graduate student under the supervision of Professor John Usher in the faculty of management at the University of Lethbridge. Prior to returning to University to obtain my MSc. Management degree I worked for 15 years in the agricultural industry. I understand the pressures and stress that can be part of a competitive environment. This study is intended to examine role ambiguity as it relates to the factors that effect the movement and use of information within an organization and their effect on work groups.

I am requesting your participation, which will involve completing a questionnaire which consists of 49 statements to which you will have to respond as to your level of agreement. The questionnaire should not take more than 15 minutes to complete. Participants must be involved in a work group situation involving yourself and at least one other individual, working towards a common goal within a larger organization. This group can range from an informal work group to a highly organized self directed team. If you are involved in some way with a work group, your participation would be greatly appreciated. Your participation in this study is completely voluntary. If you choose not to participate or to withdraw from the study at any time you are free to do so with no consequences.

The data collected from the questionnaires will be kept confidential. Reports or published findings derived from the study will not contain individual information as the data will be aggregated per work team. All information collected will be stored on a portable DVD and will only be accessible to the primary researcher and the project committee if requested. This information will be disposed of in the proper manner at the end of the research and will be properly secured by the primary researcher until that time. This research is being conducted in accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans, and the University of Lethbridge Policies.

If you have any questions concerning the research study, please contact me at 403-603-3030, University of Lethbridge center for research at 403-329-2431, or my supervisor Dr. John Usher at 403-329-2759

The attached questionnaire will ask that you verify that you understand that by completing and returning the questionnaire you will be giving your consent to have your information utilized in the fore mentioned research project.

Sincerely,
STEWART WHILLANS

Level of Agreement

* 7. I have clear planned goals and objectives for my job.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 8. When I evaluate the actions taken by other members of the team, I take into account their personal as well as professional circumstances that may have caused them to act that way.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 9. My work group is creative.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 10. The atmosphere in my work group is one in which all members contributions are valued.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 11. I feel that I divide my time properly among my work tasks.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 12. Within my work group we obtain a level of efficiency superior to that which we would obtain if each member worked separately.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 13. Often, the bulk of the ideas that are brought to the group from various group members are related to other ideas that we had not thought of before.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 14. When a new member is added to the group that did not work for the company prior to joining us, there are no problems of understanding between the new member and the others in the group.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 15. I know what my responsibilities are.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 16. I know the organizational vision, direction and standards that have been set out by the company to guide my work performance.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 17. I know the areas and work that the organization is focused on and the projects underway in those areas.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 18. I feel that I am independent in my daily activities.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 19. I feel certain about the process that will be used when I am evaluated for a raise or promotion.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 20. I assume responsibility for my daily activities.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

- * 21. I attempt new ways to perform my tasks in the group, although at times they can result in errors.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

- * 22. I make an effort to continuously improve my contributions to the work group.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

- * 23. I have just the right amount of work to do.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

- * 24. I have easy access to information or knowledge that exists in my company whether about the present or the past, even if it is possessed by individuals outside of my immediate group.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

- * 25. I am accustomed to using information or knowledge that the company has but for which I have to search, since it is not immediately available to me.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

- * 26. I have learned new things as a result of my co-workers' contributions to the team despite them being unaware of their influence or contribution.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

- * 27. I know exactly what is expected of me.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 28. I have taken advantage of knowledge and experiences I have developed in my past (in this company or others) that I had almost forgotten.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 29. I have been assigned the responsibility for a specific task or part of a specific task within the work group.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 30. When I offer help to others, I trust that they will understand the help given and use the information provided in the best possible way.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 31. When other members of my group offer aid to me, I value the help that they can offer and trust that their intentions are sincere in offering the aid.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 32. Clear explanations are given to me as to what has to be done in my work group.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 33. I can express my personal successes openly within my work group without causing an uncomfortable situation for any member of the group.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 34. I can express my frustrations to my other group members and it will not result in problems within the group.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 35. I can express my opinion and not worry that it will create a problem within the group even though it might conflict with others in the group.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 36. I can ask and receive help from any or all members of my work group at any time.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 37. This organization has a structure based on work groups with very few hierarchical levels. That is to say there are few levels of supervision or authority within my work group.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 38. The organization looks to the employees within each work group to coordinate the jobs that need to be done.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

* 39. The organization, division, or business unit in which this work group is located promotes the communication and coordination of activities between different work groups

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

- * 40. The organization has outlined the goals and objectives of the company which are to be used to coordinate daily activities.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

- * 41. When a new Idea is presented, the company provides the criteria they feel are most important in order for my work group to accept or reject the idea.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

- * 42. My work group has had good ideas that have been implemented or used by the company.

1. 2. 3. 4. 5. 6. 7.
Low High

Level of Agreement

43. When I think about my work group, comparing our performance to other work groups in the company, I would describe my work group as ...

One of the worst Inferior to the average Above average Superior to average One of the best No ability to compare

comparison

44. When I think about the amount of direction given to work groups by my company, as compared to the other companies, I would describe my company as...

One of the worst Inferior to the average Above average Superior to average One of the best No ability to compare

comparison

- * 45. What is the number of years of experience that you have with this company.

Less than one year Between one and three years More than three years

Choices

* 46. What is the number of years of experience you have with your current work group.

Less than one year	Between one and three years	More than three years
-----------------------	--------------------------------	--------------------------

Choices

* 47. Your Age

Less than 25 years	Between 25 and 35 years	Between 35 and 45 years	More than 50 years
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Choices

48. Gender

Male	Female
------	--------

Choices

* 49. Industry

Accting	Financial	Agri	Publishing	Fire Fighter, Police, etc.)	Retail	Clergy	Edu	Other:
				Service industry (nurse,				

Choices

* 50. I understand that by submitting this completed questionnaire I am agreeing to participate in the survey.

yes	No
-----	----

Choices

Note: The following is a list of the constructs and the items which pertain to each:

- Common Language - Items 1, 2, 3, 5, 14
- Multi-Faceted Dialogue - Items 6, 8, 10, 12
- Individual Autonomy - Items 18, 20, 21, 22, 29
- Clarity of Organizational Intent - Items 16, 39, 40, 41
- Freedom of Expression - Items 33, 34, 35, 36
- Existence and Use of Organizational Memory - Items 17, 24, 25
- Lateral communication - Items 37, 38
- Mutual Help - Items 30, 31
- Organizational Knowledge (CTI) - Items 9, 13, 26, 28, 42
- Role Ambiguity- Items 4, 7, 11, 15, 19, 23, 27, 32

Appendix C Additional Multiple Regression Analysis

Table 11 Multiple Regression for Predictor Variables and Outcome

Variables	Organizational Knowledge (C)	Organizational Knowledge (TI)
1. Common Language X Multi-Faceted Dialogue	0.122*	0.023
2. Clarity of Organizational Intent	0.138*	0.002
3. Individual Autonomy	0.122*	0.217*
4. Mutual Help X Freedom of Expression	0.104**	0.233*

Note. Data reported are Unstandardized β coefficients * $P < .01$, ** $P < .05$, *** $P < .10$