

A Benevolent Community:
Information Exchange Among University Staff

A Dissertation

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ABSTRACT

Universities face increasing demands for the use of data to inform decision-making; with increasing amounts of data collected, the access and exchange of information continues to become more difficult in organizations. This study examines the roles of social capital and brokerage in the exchange of institutional information among administrative staff in a public university. The analysis is based on data from a survey completed by over 400 participants and eight interviews completed by administrative staff at a public research-intensive university. Findings suggest that several measures of social capital are associated with the perceptions of quality of information accessed, while information accessed through social networks is perceived to have lower quality, on average, than information accessed through information technology systems. Findings also suggest that, although information brokers within universities are willing to respond and are supportive of information requests from colleagues, constraints of time and resources make it difficult for them to provide the information requested.

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CHAPTER 1: INTRODUCTION

Colleges and universities are facing unprecedented pressure concerning the availability, understanding, and application of information about all aspects of institutions, including data about students, faculty, and staff. The application of this information has stretched across the university, from faculty productivity to student trends; no aspect of higher education is exempt from the demand for transparency and better decision-making through information availability (Ewell, 2010; Flaherty, 2016). Faculty and staff spend increasing amounts of their time on collecting and providing information, time taken away from their primary daily tasks (Muller, 2018). As university personnel seek to use information as evidence to inform decision-making, additional stresses are placed on them to produce, locate, and analyze data to support their recommendations and decisions (Taysum, 2010). Like corporations and other organizations, universities are focusing on a variety of strategies to facilitate information exchange that are inherently structural and technology-focused without considering the social strategies of information transfer to understand how information flows through organizations.

The field of human-information interaction brings together theories of information behavior (how people connect with information) as well as theories of social networks (how social ties enable information flow across an organization). Theories of human-information interaction are related to approaches of human-computer interaction that aim to explore how the individual interacts with the interface of a specific system

(Fidel, 2012). By shifting the focus away from the computer interface, human-information interaction investigates the importance of people exploring how information is found, understood, and shared in a variety of contexts (Fidel, 2012; Fidel, Pejtersen, Cleal, & Bruce, 2004). Little research examined the information flow within the context of higher education, whether through information behavior or social network theories. We do not fully understand how people interact with the information or with each other, particularly with administrative staff, to inform decisions.

This analysis begins with theoretical perspectives that influence and fit within the area of human-information interaction. One perspective, from the study of social network theory, focuses on how nodes of an organization are connected to facilitate the flow of information across an organization through clusters of people (Prell, 2012). The second perspective, information behavior, informs the design of information systems to facilitate information gathering, as well as social strategies used for information search. The third perspective, social capital, is a result of the connections that individuals have through their social network; these embedded resources are beneficial to the individual in a variety of situations including information search (Lin, 2001a). The three perspectives share threads of social behavior, with theories and concepts that cross boundaries between disciplines, but the information-behavior approach, due to rapid technological advancement, has an inherent technology bias as the solution. Information-behavior research is frequently framed around the idea that organizing data, increasing ease of access, and governance facilitate democratized data. Also, the increasing demands for information are compounded by “the growing opportunities to collect data, and the

declining cost of doing so” (Muller, 2018, p. 47). Alternatively, social network theory focuses on the people as the transfer mechanism. The human-centered approach sees the connections and gaps within the organization as the way that information is ultimately shared and understood for use (Valente, 2010). Bringing these areas of research together through the theory of social capital focuses on gains through social networks during the information-search process.

With the speed of technological change, the language around data and information practices are changing rapidly. Differences among common terms are important to clarify for application in interdisciplinary fields that cross technology, psychology, and organizational management. Within this discussion, data and information have different meanings. Data are raw or simple facts collected from a variety of places (Christozov & Toleva-Stoimenova, 2014). For an organization, these can be facts about the organization itself, the people within it, its constituents, and other organizations. In comparison, information is the conversion of data into usable parts (Christozov & Toleva-Stoimenova, 2014). Just as data are translated into information, the translated information is foundational to the formation of knowledge in any context (Christozov & Toleva-Stoimenova, 2014). These definitions create a hierarchy of the terms, with transformation of data resulting in information. The appropriate focal point for research is where information becomes a resource useful to decision-makers, because an individual cannot rely on raw data to identify patterns and draw conclusions, but the information has also not yet become knowledge that can be shared.

Background

Extensive analysis of the age of technology reflects on the rapid increase of computing power, connectedness, and access to information (Muller, 2018). Research in the fields of library science and information science has focused on impacts on individuals who are trying to find information (Fisher, Erdelez, & McKechnie, 2009). The overwhelmed user has led to development of information-literacy programs, and a focus of information professionals on how to help people get through the large amounts of information now available at their fingertips, which is no longer structured or curated into books or physical resource materials (Wright, 2014). Rapid changes in technology removed barriers between people and the information they seek such as digitization of out-of-print books or first-hand accounts of experiences from people living around the world. Growing amounts of information have quickly overcome the ability of humans to process it, changing the conversation away from strict access to the data, to understanding the information to answer a question or provide a new direction never before considered (Fisher et al., 2009). These changes in technology have promised a new future of the “democratization of data,” an ideal world of open access regardless of skill, to further equality of opportunity (Gagliardi & Turk, 2017). Typical discussions of the democratization of data make an assumption, however, how it can be accomplished: building an information technology system will solve all of the problems of information search. Unfortunately, a perfect information system does not exist, resulting in continued investigation of the human-interaction aspect of information behavior (Fidel, 2012).

As technological changes allowed for more data to be collected, processed, and analyzed for a variety of purposes, an expectation followed that all of the data would be put to use in organizational decision-making. In the field of education, this shift can be seen across school systems regarding outcomes assessment, testing, and teaching practices, and has been escalated through legislation (Simmons, 2012). Expectations are likewise growing in higher education around questions of student success, graduation rates, and the everyday activities of admission and registration (Gagliardi & Turk, 2017). Administrative staff across all levels of the university organization are being asked to use data to inform the decisions that they make each day. Universities also face comparisons to the companies with which their students interact and which are monitoring and influencing their behavior while making more personalized recommendations in all types of activities in their lives.

The influences of rapid technological change, increased expectations of data-informed decision-making, and the increasing connectedness of social networks have resulted in a higher education landscape drastically different than it was ten years ago. For many years, universities relied on individuals dedicated to the understanding and dissemination of institutional information in offices of institutional research (Terenzini, 1993). Today, the demand for information has outpaced the capacity of these offices, while simultaneous pushes for democratization of data through broader availability has changed the approach and use of information technology systems (Gagliardi & Turk, 2017). Individuals with social capital can get to the information they need even if they do not have the technical expertise necessary to keep up with changing information

technology systems. Those with access to and understanding of the information have enormous amounts of power in how questions are answered within a data-informed climate (Batallas & Yassine, 2006). The combination of the tendency to rely on others and the ease of access to other people brings up questions about the impact of social networks and the resulting social capital on an individual's search for information.

Problem Statement

Responses to the pressure for data-informed decision-making vary by organizational context and culture. Universities tend to take a structural position in responding to the need, creating complex technological solutions (such as information systems) and organizational groups (such as institutional research and communities of practice) with the goal of facilitating access. The problem with this response is the reliance of people on other people across the organization as avenues for information access. Enormous amounts of money are spent on information technology systems with the goal of democratizing access to information, yet this approach has not resulted in broad adoption and utilization across institutions, especially for administration (Gagliardi & Turk, 2017).

Information is frequently equated with power; those with access to institutional information have both the power to answer their own questions and control how information flows across an organization (Batallas & Yassine, 2006). If universities continue to ignore the impact of lack of information access in certain parts of the university, the divide will continue to grow so that those with technological expertise or

connections to key information brokers will determine what questions can be asked and how the answers are formed. Opening access to information systems will not solve the problem; just as information is power, time is precious to the administrative staff gathering the information they need to make decisions every day.

In order to support the growing need of administrative staff to access information for their work, research needs to be done on the social networks that they rely on and the social capital that they gain through these relationships that are beneficial to their information search. This research is necessary for several reasons. First, studying the exchange of information through social networks can identify the characteristics that impact an individual's access to social capital within the organization. Second, investigating the characteristics and experience of information brokers can guide institutional administrators to develop programs that increase opportunities for administrative staff to navigate networks and facilitate information exchange instead of narrowing information access to a limited few.

Research Question

The primary research question of this study is: *What roles do social capital and brokerage play in the exchange of institutional information among administrative staff in public universities?* In studying the role of social capital, it is necessary to consider multiple aspects of the social networks that might impact access to information, including network breadth, network position, and relationship ties. In addition, individual characteristics need to be considered, including information on demographics,

background, and organizational position. Due to the professional impact that social capital provides to individuals within organizations (Erickson, 2001), those with access to information have significant power (Ibarra, 1993). Social capital, which I examine in detail in the next chapter, is gained through a variety of connections. Information is an increasingly valuable asset in universities and is thus the particular focus (Gagliardi & Turk, 2017). There is extensive research on social capital, but very little is focused on the particular value of embedded information as social capital, especially within the university context. I examine specifically the influence of social capital on access to institutional information by staff in public universities. The study considers several social network factors to investigate the extent to which an individual's social networks impact access to institutional information.

Chapter 2 provides a review of the literature grounding the study in the areas of networks, information behavior, and social capital. Chapter 3 presents the conceptual framework of the study and the methods for the design and administration of the survey and interviews. Chapter 4 provides the findings of the analysis of data collected through the survey and interview. Chapter 5 discusses the findings, their implication, and directions for future research.

CHAPTER 2: REVIEW OF THE LITERATURE

This chapter reviews the relevant literature in the areas of the attributes, roles, and relationships of social networks; information behaviors of information exchange; and the access and use of social capital. Each of these areas are brought together to frame the research question.

Networks

Networks exist in all types of contexts between people, places, and things. Whether the connection is between computers to allow communication of information or between two people suffering from the same illness, networks create the connection. Due to the wide variety and uses, networks are discussed in a variety of fields, such as sociology and mathematics, to address many different kinds of interactions, relationships, and contacts (Watts, 2003). Due to the broad number of fields influencing the study of networks, the area of social networks has incorporated research and theories from multiple perspectives, including importing theories from areas such as mathematics, developing theories such as structural holes, and using social network as a lens for critique of other theories (Kilduff & Tsai, 2003).

Although there is an underlying concept of systems that are connected in networks to facilitate information flow, it is the connection of people that is the most important for this area of research. Lieberman (2013) argues that the desire to form social networks exists from birth, but it is not an inherently easy task for people to build and

maintain their social networks. By investigating the relationship that people form with each other, we can better understand the ties formed over time. The key distinction between social networks and other types of networks are the communities that are formed through the connections, which do not exist in non-social networks, connecting them to others that share their interest or affiliations (Newman & Park, 2003). When studying networks, there is an underlying structure to the networks that exist, and it is valuable to investigate those structures. Taking a structural approach does not mean that it is fixed or unchanging (Watts, 2003). Instead, a structural approach considers not only how the nodes of a network connect, but also the way they are organized within a specific context (Watts, 2003).

Network Analysis

Network analysis is applied to a wide range of research questions that aim to understand the role and impact of networks on human behavior. Research focusing on the nodes of the network is grounded in the convergence of mathematics and sociology constructs of networks, while the focus on relationships between nodes stems more from sociology and other social science disciplines (Carolan, 2014). Network analysis has grown in use and applicability across a large number of subjects, with the increased computing power now available to researchers and the ability to quantify and evaluate all of the connections between nodes (Valente, 2010).

Social-network research identifies social units as the basis of interactions within a system. These individuals within a social network are frequently referred to as actors, an

individual that is part of a larger system, who can have many roles and attributes within the network (Carolan, 2014). Actors can be grouped in a variety of ways within any network; studies in higher education tend to group actors into two groups of interest: faculty and students. Studies on faculty frequently group by research discipline or by communities of practice (Buckley, 2012; Ng & Pemberton, 2013). In contrast, student-based studies are framed around student learning within specific disciplines, such as doctoral education students (Murakami-Ramvalho, Militello, & Piert, 2013). The individual actors, as well as their relationships with others in the network, are the foundation for studying and understanding social networks.

The research completed has shown the power of social networks in a variety of organizational behavior. These social networks play a particular role in the transfer of resources across an organization that results in gain of individual and organizational power (Ibarra, 1993). In order to understand the transfer of resources, the interactions (relationships) between the actors must be studied. The study of the relationships has typically been within sociology to understand behavior that occurs and is influenced by the relationship (Carolan, 2014). Social-network research investigates on one hand the network structure and related social structures, while also looking at the facilitation of something happening (Watts, 2003). In some cases the network is a clearly defined group, such as community of practice, which is a common way to study people grouped in more formal structures of common interests or categories (Jawitz, 2007; Nixon & Brown, 2013). In other contexts, the boundary is less clear.

The study of relationships in a network can be done at a variety of levels. Researchers tend to take a macro- or micro-level approach. Studying the macro-level seeks to document the entire network, looking to link all individuals in the network in all of the ways they are connected to each other (Carolan, 2014). In contrast to entire-network analysis, aimed to document and study the whole network, a local-network approach takes an egocentric (individual) approach to data collection (Carolan, 2014). The individual approach does not link respondents to each other, but instead relies on individuals interpretations to measure social networks (Valente, 2010). Focusing on individuals considers the actions and the impact of an individual on the network, whether how they bridge networks or operate within dense networks (Kilduff & Tsai, 2003). The value of taking an individual approach is to get beyond the connection of nodes in the network and focus on the relationships and experiences that result from the connections. Individuals are influenced by their past experience; Kilduff and Tsai (2003) show that experience “may facilitate or hinder adaption of a new set of network patterns” (p.105). Using an individual approach, there are many measures for evaluation, but there are several in particular that have been shown to be important in the organizational context of social networks: aspects of an individual’s network breadth of network extensity, network range, and upper reach, measure how the individual connects to other individuals inside and across networks that exist in the organization, and brokerage, the role they play in facilitating transfer of resources in the network.

Social-Network Breadth

Social-network breadth is the extent to which an actor is connected to other actors within a defined network (Carolan, 2014). There are many measures of breadth, including the number and types of connections through network extensity, range, and upper reach (Valente, 2010). The size of a network is the number of people that an actor is connected to within a network; although a simple measure in counting the number of people connected, size is a critical aspect of a network when mapping an entire network (Valente, 2010). Within a network, regardless of the size, is the density of the individual's network, or the interconnectedness of members (Huysman, 2004). Network size and density are difficult to evaluate without taking an entire-network evaluation approach, and even then it can be difficult to ensure the entire size or density of the network is identified, particularly when using questionnaires and interviews (Johnson, 2003), in contrast to cataloging email communication (Rowe, Creamer, Hershkop, & Stolfo, 2007).

When taking an individual approach to social networks, extensity is a measurement used to examine the extent to which people within a specific context are accessed (Van Der Gaag, Snijders, & Flap, 2008). In contrast to extensity is upper reach, introduced by Lin (2001b), which gathers the extent to which an individual has relationships up the organizational hierarchy. Hsung & Lin (2008) found high correlation of access to positions and opportunities: "those who can access a greater variety of occupational groups have more opportunities to access the highest positions" (p.236). Upper reach is shown to have an impact not only in the context of the organization, but

the power it wields in who has success in the organization. For example, a Hsung and Lin (2008) study found male personnel managers had greater access to scarce resources through their upper reach than female managers did. Due to the structure, some organizations, and as a result the networks within them, create a culture of access to people across the organizational structure. Kilduff and Tsai (2003) found that “in high-reach networks (compared to low-reach ones), norms and values may diffuse rapidly to many people with low distortion, ensuring more conformism” (p.32). Studies like these have shown the extent to which various individual characteristics as well as organizational characteristics impact the upper reach of employees or group members. Social-network analysis utilizes various measures of network breadth in a variety of contexts. The specific measures of network extensity and upper reach will be discussed in a later section on the application of social networks in social-capital research.

Social-Network Role

In contrast to aspects of network breadth, the role an individual plays in relation to others in the network can be used to gauge impact. Measures of centrality and brokerage gauge the extent to which an individual is situated at hubs of the network. Watts (2003) explains that “a person’s social role therefore depends not only on the groups to which he or she belongs but also on his or her positions within those groups” (p.48). The importance of the position and role a person plays in a network can aid in understanding how information is transferred between people within the group as well as how information is transferred to other groups in need of information (Burt, 2007).

Understanding the role of brokerage frequently includes discussion of centrality, the extent to which an individual is a hub of connections in a network. Members of the network in the center inherently have more value due to their access; people quickly learn who has such access and thus more power outside of typical organizational hierarchies (Valente, 2010). Centrality measures are completed in similar ways to network size, by quantifying the number of connections that an individual has and mapping them within the context of the entire network (Valente, 2010) although it is not well-defined beyond the concept (Borgatti & Everett, 2006). Instead, it should be considered an aspect of the role the individual is playing within the position of the network and the influence that they have.

Centrality is frequently talked about in the number of connections in relationship to others in the network, but Freeman (1978) first framed the concept of centrality around degree, closeness, and betweenness, which includes the mapping of the entire network to evaluate individual in the context of the network they are a part of. Since then, a variety of definitions and measures of centrality have been developed. Borgatti (2005) argues that a structural approach is necessary, creating a dynamic model based on the network flow process (how often does it flow through them, how long does it take to get to them), later adapted to medial vs. radial measures (Borgatti & Everett, 2006). Although it would be easy to assume that centrality means the individual that is the most informed, Borgatti (2005) explains that “the rank ordering of who receives information earliest on average will not correspond to the ordering provided by the closeness centrality measure” (p.60).

Instead, it is the extent to which information flows through and the extent to which a network is focused on a select few members for connection (Kilduff & Tsai, 2003).

Research shows the importance of centrality measures when evaluating things that move through a network, whether ideas, information, or knowledge. Mapping information flow across a network requires evaluation of individual nodes in the network and the route information takes across the network. This information flow is very powerful, and holding a central network position provides power to the individuals that hold it, including impacts on organizational innovation, particularly administrative innovation (Ibarra, 1993). Centrality is limited in value for information transfer; it is the combination of centrality with the relationships maintained and brokerage role played by the individual that is valuable.

Relationships in Social Networks

The relationships in social networks are more important than the number of connections in many situations. In social-network research, a tie is a connection between two nodes, or people in a network. Ties can be evaluated in a variety of ways, but are frequently split between strong and weak ties, so measures of the closeness of connections are most frequently evaluated in the context of the strength of ties. Granovetter (1973) presented the concept that there is different value in the types of ties that an individual has within a network, and it should be considered differently than the number of people they are connected to. Different tie strengths are shown to impact different types of interactions; whereas strong ties are more likely to impact behavior,

weak ties are more likely to impact information exchange (Valente, 2010). Weak ties bridge between networks; those individuals with weak ties provide a valuable service of connecting otherwise disconnected groups of individuals within an organization (Borgatti & Cross, 2003). Weak ties also allow for an organization to work cohesively even when organizational structures are fragmented (Kilduff & Tsai, 2003). Within organizations, the flow of information is shown to be affected by many factors, including physical proximity, relative organizational position, and the strength of ties (Cross & Borgatti, 2004).

Ties are formed both purposely and non-purposely, depending on the context and type of interaction, which must include the question of whether there is the availability or possibility of interaction to form a tie (Small, 2009). Similar to other areas of social-network analysis, the job search is a common context for studying the importance of strength of ties. The study by Morlicchio (2005) analyzes the importance of networks in searching for a job, through strong and weak ties, but identifies the social isolation of communities with low employment, and the disadvantages individuals start with in terms of access to resources to start. There are two components to ties in networks, both the access to the potential ties as well as the creation and maintenance of the tie. After the initial access, “making ties depends on how actors interact with others: how long they interact, how frequently, how intensely, and while performing what activity” (Small, 2009, p. 14).

Different types of ties have roles within the organizational context, in a similar way that an individual is dependent on their social network for success. The importance

of weak ties in organizations is the contrast to strong ties, when “people tend to cluster in homogeneous groups of like-minded employees” (Kilduff & Tsai, 2003, p. 54). Within organizations in particular, it is the weak tie that provides access to other networks that may otherwise not be accessible. The close relationships are frequently not the way that individuals gain access to other networks – they are the acquaintances and others that can give information or an opening to something new (Watts, 2003). In fact, “the significance of weak ties goes beyond the transmission of important information between densely-structured cliques” (Kilduff & Tsai, 2003, p. 56). When taken into consideration in the context of organizational innovation, the comparison of strength of ties and tacit vs. explicit knowledge sharing was examined, showing that the type of knowledge shared is correlated with the type of tie (Byosiere, Luethge, Vas, & Salmador, 2010). In addition, Byosiere et al. (2010) found the importance of not just strength of ties and type of knowledge shared, but also the source was important in particular in tacit knowledge sharing for the diffusion of information during organizational innovation and change.

Beyond the strength of ties in a network, the underlying influence of trust must always be considered. Trust goes both ways in information flow: trust of the quality of information received (Cross & Borgatti, 2004) and trust that the information provided will be used appropriately (Guido, Rountree, Greene, Gerlak, & Trotman, 2016). In addition to being an acquaintance to someone, whether a strong or weak tie, “it is generally accepted that mutual trust positively influences the possibility of knowledge transfer” (Huysman, 2004, p. 201). The assumption of trust then raises the question of power in the relationship. Specifically, how does power and vulnerability influence the

interaction and interact with the trust in different contexts, and how can it be accounted for (Kovalainen, 2005).

In addition to the existence of weak ties in the organizational context, the connection between them and the structural aspects of the social network are used extensively in research. Burt (2001) argues at length about the importance of structural holes, or the places where there is a gap between networks. The position an individual holds in the network can also create a competitive advantage by crossing the structural holes between networks (Enns, Malinick, & Matthews, 2008). Just like a competitive advantage of bridging the gap, there is also the importance of a network or even physical community or group that does not have the individual that bridges the structural hole. An individual in an organization or community that does bridge the gap is “providing a valuable source of social capital through potential contacts to people with information and social resources not otherwise available in their community” (Enns et al., 2008, p. 259). Similar to the importance of strong ties, or bonding within a network, is the act of bridging, the cross between groups that have different types of information and resources in them (Villalonga-Olives & Kawachi, 2015). Regardless of whether the tie is strong or weak, beyond the existence of the tie is the importance of the action that happens as a result, particularly in the action of brokerage, whether information, resources, or access to others.

Social Networks Within Organizations

Due to the structural nature of organizations, particularly workplaces, the hierarchical structure is frequently focused on the most. These formal structures influence the formation (or lack of formation) of informal networks by the people that are part of it. There are many different ways that informal networks form. For instance, “organizations with highly centralized informal networks may tend to be more mechanistic in their functioning, whereas organizations with multiple centers may be more organic” (Kilduff & Tsai, 2003, p. 32). It’s important to consider that organizations are constantly evolving, in their business, structure, and the people that participate in them, thus it is important to consider the limits of a structuralist approach (Kilduff & Tsai, 2003). Like companies and similarly-structured organizations, social movements share similar characteristics, with the necessity of collective goals, individual responsibilities, and transmission of information and knowledge across individuals involved in the social network (Diani, 2003).

In the context of information transfer, both the organizational structure as well as the informal networks must be considered. Research in the organizational context asks the question of how organizational structures can balance the social structures for optimal transfer of information and knowledge (Kilduff & Tsai, 2003). Although information is at the core of the transfer, research on this transfer is particularly seen within research of knowledge management for organizations and how knowledge is accumulated, transferred, and maintained within organizations (Kilduff & Tsai, 2003). Organizations have many different characteristics that influence the context of interaction for

individuals, including institutional practices, complexity, and central focus, but a key aspect of normative behaviors is the extent of competitiveness versus cooperation of the actors within it (Small, 2009).

Within organizations, there will always be brokers, regardless of whether they exist in a more centralized function or distributed in different parts of the organization. Consideration must include “the characteristics of the flow process affect which nodes will receive flows (quickly, frequently, and certainly) and which are in a position to control flow” (Borgatti, 2005, p. 69). The control of information by the brokers within an organization can be based on many different considerations, including through alliances (Diani, 2003).

Information Behavior

To be valuable, data collected must not only be transformed into usable information, but also must be accessible by people. Information behavior, which is primarily treated as an individualistic activity through cognitive processing and behavioral actions, can be seen through the lens of systems or social interaction. Within the field of information-behavior research is the study of information-search behavior, which particularly influences the design and implementation of information systems. Research on information-search behavior looks for patterns in individual experiences searching for similar information within a specific context. The amount of information available is increasing at a staggering rate, making it more difficult for people to decipher, comprehend, and understand it while navigating systems (Silver, 2012).

Information-behavior and social network theories treat the process of information consumption through similar paths: creation, storage, search, retrieval, and transfer or use (Fidel, 2012; Grover, Greer, Achleitner, & Visnak, 2015). For the scope of this paper, I focus on the search and transfer of information, although the stages are all happening simultaneously within an organization through ongoing cycles. Due to the similar patterns, researchers tend to focus on users at either end of the process, frequently with the assumption of a system completing the technological transaction in between. There is a strong movement toward a human focus and away from the technological interface, but the research still tends to focus on the individual user interacting with the information system, or interacting with another individual acting as the information broker, rather than broader social search-behavior patterns of information transfer (Nichols & Twidale, 2011). Research within the field of higher education focuses on specific aspects of the information search process, such as uncertainty (Chowdhury, Gibb, & Landoni, 2014).

Information-Search Behavior

Information-search behaviors and social networks influence the way people access the information within any structure, but organizations tend to first approach the issue through information technology systems (Gagliardi & Turk, 2017). Through information-systems design and the resulting data and information-management strategies, organizations attempt to make information available to users in ways that will enable and encourage use. With increasing amounts of information being collected and being used to inform decisions, organizations turn to governance as the bridge between

technology and people. There is an assumption that providing information technologies will by default improve access by removing barriers such as time, physical interaction, and retrievability (van den Hooff, de Ridder, & Aukema, 2004). Goals are then perpetuated that open access automatically allows people get to the information they need, which continue to drive the implementation of information-technology systems, (Syrjkanen & Kuutti, 2004), and that removing the barriers will democratize the information for everyone. There is an expectation that information technology will not only increase the efficiencies for the individuals, but will also shift understanding to a more collective approach with information understood in the same ways (van den Hooff et al., 2004). Although well-intentioned, these types of approaches ignore the other aspects of information transfer that occur in organizations.

Huysman (2004) identifies several traps that organizations concentrate on when facing knowledge-sharing initiatives: the role of IT in the facilitating the process, imposing managerial needs, and individual learning as the purpose. The separation between the information-technology units and the broader social networks frequently resulted in lower adoption, due to an assumption that the technology will “fix” the gap between individuals and the information they need (Huysman, 2004). The result is the establishment of data-governance programs to ensure a variety of issues including data quality, availability, and usability (Khatri & Brown, 2010), but even governance programs tend not to address the extent to which individuals go to other people for information.

Utilizing Networks for Information Search

In contrast to the information-search behaviors used with information systems, social network theory provides the human-centered approach in human-information interaction. The social-network approach investigates the relationships of groups of people, whether formal or informal, to understand a variety of actions and results at the individual and collective level (Cronin, 2010; Lin, 2001b). Within organizations, the theoretical perspective is combined with organizational theory and human capital to understand the benefits and relationships of people within a structural organization, frequently through a knowledge-management lens (Graham, 2008). The difficulty of a social-network perspective in information-behavior studies is due to the many different paths that users take to gather the information they need (Johnson, 2004).

Within social research, the focus is on the individual acting within a group or how the group acts together. The research most applicable to organizational information use pertains to the translation of information-search behavior to groups of people, whether grouped by gender, profession, or organization (Hupfer, Detlor, Toms, & Trifts, 2009). Research looks for patterns of behavior and activities to understand how to develop systems to facilitate better information gathering. The information search does not happen within a vacuum in an organization. Although research focuses on behaviors, it can also look at the power and benefit one derives from being part of a group. Lehmann and Heagy (2008) found that participation in groups increased the ability to locate the information being searched for.

Using social networks for information search is not a linear process, just like

searching for information using systems. By nature, an individual seeking information does not know the destination; multiple nodes may be utilized to get the information being sought. Johnson (2003) found that people used their social networks to search for information regardless of the characteristics of their network, whereas it did impact if they chose to go to an organization for information. When viewing the measures of the social network and success, there are also concerns of how the relationships relate to the information search process, due to the complexity and non-linear form it takes. For example, many measures of centrality assume that the origin of the request knows how to reach a target (Borgatti, 2005).

Social network theory influences information-behavior research in a variety of ways, including information access. Although less frequent, social network theory is used to study the transfer of information across communities, groups, and organizations (Prell, 2012). The majority of research on information transfer within an organization through social networks focuses on the benefit to the individual, whether through tangible benefits such as promotion (Sparrowe, Liden, Wayen, & Kraimer, 2001) to access and social capital (Lin, 2001b). Social network theory provides a framework to understand several key aspects of information flow between individuals in an organization.

Understanding the organization of social networks, how information is transferred within them, and the resulting social capital gained through the transfer, whether through informal or formal information brokers, provides a framework to study the ways that information is treated as a resource that is protected, shared, and used across higher education organizations. The flow of information through an organization represents

many different transfers of information including systems, individuals, and groups.

The Network Role of Information Brokerage

Information flows naturally through an organization's social structure, whether traveling within clusters of people or across clusters through different types of ties (Granovetter, 1973). At the center of this flow of information are the people serving as information brokers to facilitate information transfer. Information brokerage is the presentation of information in consumable ways, through a person acting as an information broker. Being an information broker is the act of serving as an intermediary between people and information or between groups of people that share different types of information (Burt, 2005). Although Small (2009) separates between actor- and institution-driven brokerage, the extent to which an individual connects to other individuals and institutions connecting an individual to another network, the focus for information transfer will be between individuals. The transfer is a decision that represents a pattern of both the network and the related decisions (Kilduff & Tsai, 2003).

Information brokers can be in formal roles within the organization, such as those in institutional research within higher education (Terenzini, 1993), or in informal roles due to experience and knowledge (Hardy, 1982). Burt (2005) shows how people serving as information brokers benefit in organizational success in a variety of ways due to their increased access to and understanding of information. The relationship between the information seeker and the individual providing the information, discussed previously in the context of brokerage in social networks, is particularly important for the process of

information transfer. Borgatti & Cross (2004) research showed how specific attributes of the relationship between the seeker and provider are developed over time. Information is transferred (diffused) through copying, not moving (the person with the information does not lose it in the exchange (Borgatti, 2005). The information is not lost in the exchange; brokers can perform the same function for multiple people in the same network. The transfer may happen again and again, so “individuals know of their potential exchange partners’ habits and behaviors in large part because they see these themselves, or because their partners inform them in one- on-one conversations” (Smith, 2005, p. 17). “Trustees are much less likely to have other sources to confirm or deny trustees’ presentation of self and thus are less likely” (Smith, 2005, p. 17). The exchange also allows for seekers to receive better information; with the broker’s knowledge “information provided to a user is deeply contextualized and stands within a frame of reference” (Noble, 2018, p. 149). Brokers also provide the controlling aspect of gatekeeping. “Who has access to provide information in the network certainly impacts whether information can be found and surfaced to anyone looking for it.” (Noble, 2018, p. 141).

Individuals across the organization benefit from this organization- and relationship-based transfer of information. Those with more non-redundant connections are more successful (Burt, 2005). The social capital gained by brokers recognizes the benefit of connections between nodes within the organization (Burt, 2005). These connections can be seen through the context of network closures or structural holes (Burt, 2001). Effective brokers are resource rich, have diverse organizational network connections, and transfer resources for the benefit of multiple groups (Small, 2009).

Diani (2003) identified “both organizational resources and the capacity to cover a variety of issues as significant predictors of brokerage roles” (p.115).

Brokers are not necessarily situated in a specific part of an organization or network, and they do not each serve the role in the same way. Brokers can operate in many different ways, from serving as bridges, creating an “outpost” in different communities to relay information back, and connecting between people and technology (Huysman, 2004). Although the responsibilities may suggest a formal, central role in an organization, these key people, brokering an activity, are not necessarily coordinated (Watts, 2003). Diani (2003) argues that brokerage is tied to connectedness, but is more related to organizational traits than social capital, going on to argue that “...brokers’ most crucial property lies in their capacity to connect actors who are not communicating because of some specific political or social barrier” (p.107).

The key role of a broker is the facilitation of resources in some way. Although extensive research focuses on the transfer of knowledge, there is a foundational aspect of the transfer of information that needs to be considered on its own. The sharing of information or knowledge is dependent on a relationship in which both individuals participate. The seeker of the information is dependent on the information broker to provide it to them. Inherent in that transaction is the fact that “getting information from someone requires his or her cooperation, which at some level is a function of the kind of relationship one has with that person” (Cross & Borgatti, 2004, p. 138). There is a bias toward an assumption of willingness to share knowledge, but taking a more individual approach can identify more of the process of both how it happens and how it continues to

be enabled outside of a collectivist mindset (van den Hooff et al., 2004). The transaction is also more time-consuming for the broker than it is for the seeker. Although some argue that information transfer establishes an expectation of reciprocation (van den Hooff et al., 2004), information brokers frequently serve in a one-way relationship with individuals regularly returning to them to information, consuming their time. When information seekers are asked about the brokers they depend on, seekers frequently compare information providers between those willing to engage in the question, and those that actively defend through a variety of strategies to decrease their time taken for the question. (Cross & Borgatti, 2004). The component of time for brokers is increasingly important as the demand for information from more people also increases. Part of the difficulty of this transfer of information is that "...a critical behavioral difference between effective and ineffective knowledge exchanges lay with a source's willingness to engage in problem solving in the interaction" (Cross & Borgatti, 2004, pp. 147–148).

The action of brokerage is highly dependent on the relationship of the two people involved in the transfer. Small (2009) identifies key social interactions that influence the relationship and thus the brokerage: whether it is frequent or infrequent, focused or unfocused, competitive or noncompetitive, and cooperative or uncooperative – is likely to affect the quality of the ensuing relations" (p.17). In the case of job seekers, similar criteria of previous interactions influence the interaction. For example, "they either knew of job seekers' past behaviors and actions because they had observed these firsthand, or, in cases where contacts had little information to go on, they would engage job seekers in lengthy conversations in order to gather bits of information they believed would provide

a more accurate picture of their job seekers' character" (Smith, 2005, p. 38). Cross and Borgatti (2003) also attempt to address this in their study, where they identify that the willingness to help depends on a variety of factors, particularly qualities and capital of the seeker.

Information Access and Higher Education

The push for data collection, translation into information, and utilization in decision-making as impacted higher education just like other organizations. Concerns continue to be raised that "there is an often unexamined faith that amassing data and sharing it widely within the organization will result in improvements of some sort – even if much information has to be denuded of nuance and context to turn it into easily transferred 'data'" (Muller, 2018, p. 47). To date, this concern has been pushed aside as external agency requirements and internal mandates have continued to increase the demand for information to influence decision-making.

To study the current information climate within higher education aspects of information behavior and social networks must be considered. Higher education is uniquely positioned for the discussion due to structural changes and efforts over time to address access to information within universities. Frequently the answer is to look to formalized structures to create information brokers that have power by controlling the flow of information between groups, thus impacting who has access to specific information (Burt, 2005).

Beginning in the 1960s, universities looked to the model of information brokers to bridge the gap between information management and use. Institutional research offices served as experts that could translate university data into information that would be useful to the broader community and respond to specific needs. Institutional research was defined differently within organizations and across the literature. Terenzini (1993) acknowledges that definitions ranged from analysis of institutional functioning to support of planning and decision-making within the organization, to address the difficulty in the evolutionary nature of the needs and thus the function of institutional research. Terenzini (1993) returns to the concept of organizational intelligence by Wilensky (1967) to define the kinds of intelligence needed for successful institutional research: technical/analytical intelligence, issues intelligence, and contextual intelligence. Regardless of the skills required, organized institutional research serves “a critical intermediary function that links educational, managerial, and information functions of higher education institutions and systems” (Peterson, 1985, p. 5).

From the early inception of institutional research, the concept evolved across organizations and over time. The reasons and results of the adaptations are seen differently across the literature. For some, the historical shifting of focus of these offices reflects the larger organizational systemic changes from establishment to consolidation to fragmentation, showing the tendency towards adapting to organizational change more than informing it (Hearn & Corcoran, 1988; Peterson, 1985; Taylor, Hanlon, & Yorke, 2013). The fragmentation away from a single, centralized office for institutional research can be seen in a variety of university contexts. Hearn and Corcoran (1988) identify two

conditions: information legitimacy (when legitimacy is questioned more non-central units take on the role) and limited attention (when there are limited central resources that do not meet the perceived need). The information legitimacy argument stems from the construct that information is a resource that can be capitalized (Hearn & Corcoran, 1988; Lin, 2001b). The shift also creates social capital across the organization rather than centralized with individuals in a single, centralized office serving as the information brokers.

The proliferation that Hearn and Corcoran (1988) predict in their case study analysis of the University of Minnesota shows the impact particularly of information legitimacy to drive proliferation of institutional research functions, pointing to six forces impacting the direction: external environment, individual personalities, management styles, power arrangements, microcomputing capabilities, and structural/procedural arrangements (Hearn & Corcoran, 1988). Others identified the shifts in focus of the offices as integral to understanding. Case studies support this evolution. DePaul University shifted from a focus on data in the early 1980s, to issue-driven analysis focus in the late 1980s, to a framework-guided synthesis focus in the 1990s (Chan, 1993). Specific examples include Indiana University's initiative in 1997 to increase college graduate rates (Hossler, Kuh, & Olsen, 2001). Whether through specific initiatives or long-term changes in practice, the role and impact of institutional research functions are clear (Chan, 1993; Hearn & Corcoran, 1988; Hossler et al., 2001). The proliferation occurred over a long period. Technology increased access to data, so the limited time of a

small group of people to answer questions conflicted with data accessibility to validate or investigate questions across the organizations.

By the late 1990s, clear separation began to occur based on the type of organization. Not surprisingly, research shows that large universities are more likely to have dedicated staff focusing on research and planning situated within the Provost's office, whereas smaller universities had little to no staff, reporting to a Vice President with more reporting responsibilities (Delaney, 1997). Over time these differences also shifted. Research by Morest and Jenkins (2007) shows only three percent of community colleges do not have institutional research offices. A vast majority of the colleges in the study still use institutional research primarily for compliance reporting rather than embedding it in the planning and decision-making processes (Morest & Jenkins, 2007). Even with a shift toward more compliance and regulatory roles, institutional research offices continue to play a role in information transfer, although more toward external nodes of the university network.

Institutional researchers are seen as the bridge among a variety of functions within the university, and thus better suited to understand, explain, and better utilize the data available (Schmidtlein, 1985; Teodorescu, 2006). Schmidtlein (1985) argues that, because of information as a resource, institutional researchers are better equipped to negotiate the resources and implications, which raises the question of the placement of such knowledge within a structured organization. The approach of using information brokers is based in the premise that a more democratic, open access to information resources has a negative impact. Instead of providing ways for individuals across the

organization to connect with information, this structuralist approach focuses on the trust and value necessary for institutional research functions to be successful as they continue to be the brokers and in many ways gatekeepers of the information resources (Schmidtlein, 1985). Teodorescu (2006) takes this one step further, arguing that institutional researchers are the buyers and sellers of information and knowledge as well as being brokers within the organization. Taking a more network approach to the role of institutional research, Teodorescu (2006) sees the need to align the institutional research approach with institutional needs, but also to foster the formal and informal networks that allow and encourage information and knowledge flow across the organization.

Regardless of the exact composition or design of institutional research offices, the approach of institutional researchers serving as information brokers maintains limited data expertise across the organization and does not consider information needs of the broader university community. In fact, Hearn and Corcoran (1988) provide a stark statement and prediction of the impact in value and social capital provided by information-rich environments: “In such a context, the most efficient allocation of resources may be that provided by a system in which all parties to the struggle have equitable access to the fundamental weapon of fair discourse (and fair markets), namely, information on the subject at hand” (p. 648). With the development and broader accessibility of data came a shift toward exactly that, with more open information systems to the university community. Focus on the development and accessibility of these systems brings the question of information interaction to the forefront for the

broader community, which is how new structural solutions, as well as technical solutions continue to appear in higher education.

Social Capital

The concept of capital “represents investment and possession of resources of value in a given society” (Lin & Erickson, 2008, p. 3), which has been translated into many different theories of different types of capital. Capital theories stretch back to Karl Marx’s classical theory of capital as value captured in production in the labor force and exploited by those in power (Lin & Erickson, 2008). The Marxist approach to capital encompasses both the commodity and the process of acquisition, although only applied to the capitalists rather than laborers to continue consolidation of power (Lin, 2001b). Neocapitalist theories of human, cultural, and social capital use the same concept of capital, but shift focus all of the individuals participating (Small, 2009). Lin (2001a) sees these as different from classical theory of capital due to the “potential investment and capture of surplus value by laborers or masses (p. 6). The potential investment can come in a variety of ways and is no longer tied to a specific commodity (Lin, 2001b).

By shifting the focus of capital to all of the individuals rather than only those in power, neocapitalist theories split in the types and concepts of capital. Human capital focuses on the skills and knowledge that are leveraged for personal gain (Coleman, 1988). Human capital is frequently used in studies of workers and how their individual gains can be utilized. In contrast to human capital, cultural capital shifts away from the individual knowledge and skills, and toward the investment in behaviors, practices, and

routines of a specific group. Bourdieu argued the effect of these norms was the control of groups that could be attained by elites through adherence of the norms (Lin & Erickson, 2008). Later studies broaden this definition to the gains of knowing and participating in cultural norms.

Although human capital, focusing on the individual knowledge and skills, and cultural capital, focusing on the collective norms, address the choice and action between individuals in a network, neither focuses on the relationship between the actors (Lin, 2001b). The relationship between the individuals contains not the human capital that an individual possesses, but what is gained via the social network (Lin, 2001b). Social capital is not individually-owned, but is rather jointly-owned through the relationship (van den Hooff et al., 2004). By focusing on the relationships between the individuals, social capital can have benefits both to the individual as well as the collective group (Lin & Erickson, 2008). Social capital sits between other forms of capital, representing the relationship and resources between the individuals within an existing network. As Coleman (1988) explains, social capital “is not lodged either in the actors themselves or in the physical implements of production” (p. 98). Social capital thus places action within a specific context, such as an organization, and focuses on the resources accessed through relationships. Social capital represents a feature of the social structure, an ecologic characteristic whether we look at it from the individual (ego-centered) or collective (socio-centered) point of view (Carrillo Álvarez & Riera Romani, 2017, p. 58). Although social capital is seen in the relationships, the value is in the embedded resources of the network that an individual is accessing through the relationship (Lin, 2001a).

Social Capital

Social capital became broadly popular in the context of civic engagement and community relationships due to Putnam's (1995) argument of the declining social capital in the United States. He identifies three key factors: mobility, demographic changes, and technology as the reasons for declines in social connectedness and civic engagement (Putnam, 1995). Putnam's view of social capital, although focused on the connections between individuals, is grounded in the community norms, especially trust and reciprocity (Fried, 2002). As a result, a large body of literature places social capital in the context of community and civic engagement. Criticisms of Putnam's construct of social capital includes concerns of lack of focus on equality, shifts in broader structures, and contextual information (Fried, 2002). Alex-Assensoh (2002) argues that the focus on individual inclination to evaluate social capital ignores the important contextual factors that influence participation and civic engagement, showing the difference in political participation by those living in different socio-economic neighborhoods. When using social capital as the framework for investigating the success of individuals, the influence of the relationship becomes the primary focus. As Lin (2001b) explains the theory of social capital, it is "...a theory eliciting the central theme that capital is captured in social relations and that its capture evokes structural constraints and opportunities as well as actions and choices on the part of the actors" (p. 3).

In contrast to a view of social capital as purely social connectedness, Coleman (1988) argues for social capital as a tool to analyze action within systems. Coleman (1988) defines social capital as "the value of [the] aspects of social structure to actors as

resources that can use to achieve their interests” (p. 101) with the value dependent on the social organization. Using an organizational context for evaluating social capital, there are many different resources that are utilized by people. Examples of resources include information and expected norms, which can be accessed through others in the network (Coleman, 1988). As a result, there can be consequences and two types of social capital: the benefit for the individual as well as the organization or collective group (Lin, 2001b). Individuals use social capital for their personal gain particularly in job-related activities, such as employment searches (Smith, 2005), employee referrals (Fernandez & Castilla, 2001), and job performance (Burt, 2007). There is an inherent assumption that social capital is both an individual and a collective good, providing benefits at multiple levels (Lin, 2001b). The result of the impacts to both the individual and the organization (or collective entity) is a choice in focus in research. One set of research focuses on the greater good, or how social capital built within the organization provides collective benefits. In contrast, another set of research focuses on personal gain. Personal gain can be seen in research in personal lives as well as professional contexts. In fact, Lin (2001b) states that “the reciprocal relationship between the persistence of a community and its conferral of status on individual actors possessing valuable resources has important consequences for collective action” (p. 31).

A more recent interpretation of social capital is the definition of “resources embedded in a social structure that are accessed and/or mobilized in purposive actions” (Lin, 2001b, p. 29). Lin’s (2001b) approach identifies four reasons for why embedded resources impact outcomes: information, influence, credentials, and reinforcements.

Social-capital theory is inherently dependent on a system or network that the activities are happening within. The context can be ambiguous, such as a network of friends, or more defined, such as an organization that an individual works in. As discussed earlier in this chapter, closed networks provide opportunities for bridges across the structural holes, creating more opportunity for social capital for a smaller number of people that serve as bridges (Burt, 2001). The embedded resources enhance outcomes because of the facilitation of information, the influence of ties, social credentials, and the reinforcement of identity (Lin, 2001b).

Lin's (Lin, 2001a) model of social-capital theory identifies three concepts influencing social capital: structural position, network location, and purpose of action. The three concepts each impact the social capital accessible by an individual within the network (Lin, 2001a). Structural position is a key characteristic when evaluating closed networks with organizational hierarchies. An individual's structural position in the organization naturally gives them different amounts of access, power, and influence. A social structure is a set of positions organized hierarchically by authority, share rules, and have occupants that act on those rules/procedures (Lin, 2001b). Social structures have an enormous amount of influence on the participants in the structure, and social networks exist in the same context, creating a parallel structure that allows individuals to accomplish activities outside strict organizational hierarchies. As Lin (2001b) explains, "agreement through persuasion rather than authority or coercion dictates the actors' participation and interaction, and defines the boundary and locations (positions) of participants' (nodes)" (p. 38). This participation crosses clearly identified boundaries as

viewed on organizational documents like organizational charts but can be seen in network position.

Network position, discussed earlier in terms of network role, can be gained through a variety of ways. An individual can gain network position over time, through the accumulation of social capital. According to Burt (2001) those individuals that connect different networks serve as brokers, and have much more social capital than their counterparts that only have connections within the smaller closed networks. Individuals participate simultaneously in multiple networks; “since individual actors may be embedded in hierarchical structures and other networks, they bring to bear resources embedded in the positions of these hierarchies as well” (Lin, 2001b, p. 38). The people that serve as an information broker due to their network position control the information flowing between networks, and serve as gatekeepers to the type of information that is shared (Lu, 2007), and there can also be an inherent gain of network position in the organizational role that an individual holds. Although personal resources are gained through education and experience, but also position because they are attached to the position that an individual holds whereas social resources are social capital are the resources accessible through the connection and are not in the possession of the individual (Kovalainen, 2005; Lin, 2001b).

Accessing Social Capital

A key component of social capital is the access an individual has to the embedded resources in their social network. Lin (2001b) identifies three factors for accessing social

capital: position in the hierarchy, nature of the tie, and location of the ties in the network. The three factors of social capital bring together the key aspects of an individual's social network for success. The access is not the only thing that is important in this context: "...social capital may be defined operationally as the resources embedded in social networks accessed and used by actors for actions" (Lin, 2001b, p. 25). Flap and Boxman (2001) argue that there are elements: number available to help, extent to which they will help, and accessible resources.

The position an individual holds in the organizational hierarchy has an influence on their access to social capital. There is an assumption that the higher in the structure the greater access one has; various types of resources all relate to position in the structure (Lin, 2001b). Further, there is an assumption that the higher an individual is in the organization the broader their network is partly due to responsibilities of coordination of activities but also various professional expectations (Fu, Hsung, & Lee, 2014). As a result, due to the inequality in who holds positions, there is a clear "inequality of social capital offers fewer opportunities for women and minorities to mobilize better social resources to attain and promote careers" (Lin, 2001b, p. 95). Research has also confirmed that "as long as the structure is hierarchical, access to and use of better social capital are expected to facilitate socioeconomic returns under any structural variations" (Lin, 2001b, p. 168).

The existence and absence of ties that can reflect the structure of both the social networks and the organization (Kilduff & Tsai, 2003). When considering the nature of the tie in the access to social capital, Lin (2001b) separates the outcome on the type of tie

between the individuals, arguing that strong ties are best for expressive actions, while weak ties are better for instrumental actions. Regardless of the nature of the tie, both people involved is important: “it is the product of availability of social resources and the propensity by alters to offer such resources for help” (Lin, 2001b, p. 22). Structural position also helps in access to social ties in the hierarchy (Lin, 2001b).

Using Social Capital

Access to social capital, although useful to identify, is only part of the consideration of the impact of social capital; the rest is using the social capital for a specific purpose. One proposition of social capital is that “the success of action is positively associated with social capital” (Lin, 2001b, p. 61). The positive association means that the access itself, although valuable, must be used for a specific, purposive, action. Lin (2001b) differentiates between instrumental action (used to obtain resources) and expressive action (used to maintain resources). Of particular interest is the instrumental action, because it is the acquisition of resources, that is valuable in the use of information with organizations for decision making.

An important question of the utilization of social capital is the usability of the different types of network connections. Although a significant amount of research has been done on evaluating the access to different network nodes, the hypothesis persists of whether denser or sparser networks more useful for information flow (Lin, 2001b). There is additional concern of the accessibility of network when the information is needed (Fu et al., 2014).

Social Capital in Context

The literature on the contextual aspects of social capital include influences of time, action, and place. In the consideration of time, it has been largely ignored of how social capital is accumulated over time within an organizational or employment context (Kovalainen, 2005). Fu, Hsung and Lee (2014) investigated how social capital changes over the time that an individual holds a specific job within an organization, comparing the extensity of their networks prior taking the position and once in the position for a period of time. The Fu et al. (2014) study compares workplaces in China, Tawian, and the United States, finding that social capital was gained more through external networks than organizational networks in the United States, in comparison to China and Taiwan, whereas job tenure, rank, and innovation were identified as good indicators of social capital utilization. More longitudinal studies are necessary to truly understand the impact of time has, particularly in a work career or living within a community has on social capital.

Considering the impact of the place typically takes the form of either a community or an organization in social capital research. Research of social capital is placed into a context for evaluation, usually around the types of interactions. Physical location can also be important such as research of social capital in different types of communities such as economically depressed rural communities (Enns et al., 2008) to comparing companies in different countries (Fu et al., 2014). The physical location is particularly salient in studies focusing on the inequality of access to social capital and the extent to which people are connected across stratified hierarchies and the “cultural and

political rules governing how networks may be used to access resources” (Lin & Erickson, 2008, p. 5). Within the explicit context of a place can influence the expectations and obligations people have to the social network, motivating specific actions (Small, 2009).

Within organizations, the passing of information and ideas including other sorts of interactions facilitate additional contacts and increased social capital (Fu et al., 2014). For individuals within an organization, social capital has been shown to be a powerful source of occupational advantage, thus is imperative people gain it (Lin & Erickson, 2008). Individuals may see in specific organizations that there are occupational returns: access to social networks and the social capital associated result in job seekers occupational prestige (higher levels of class, income) (Lin & Erickson, 2008). One approach is to consider work conditions, including industry sector, firm size, years in position, rank in the hierarchy, and innovation in the workplace as well as patterns of contacts to compare within the workplace and in everyday life (Fu et al., 2014).

In contrast to the experience within organization, there are influences the organization exerts on individuals for the development of social capital. For example, the size of the organization can impact development of social capital, while larger organizations provide greater opportunities to connect with others across organizational hierarchies partly due to the structural differentiation (Fu et al., 2014). Beyond size, it is the culture of the organization that has the largest impact. Organizations impose certain culture and norms on the individuals that operate within them, directly impacting the social capital that they obtain through the individual relationships, such as the obligations

of formal relationships (student to professor), the accessibility that the organization provides to other networks for an individual (prestigious universities) (Small, 2009). Through the cultural influence of organizations, the availability and access to resources can be reinforced through the overall culture, influencing the social capital that an individual is able to access (Small, 2009)

There is a reason that so much of the social capital research focuses on the workplace. Social capital is impacted by the stratification of the system, and the access that an individual has; outside of education, work is the second clear system that places boundaries of social capital access (Lin & Erickson, 2008). Due to the fact that “people’s social capital depends fundamentally on the organizations in which they participate routinely, and that, through multiple mechanisms, organizations can create and reproduce network advantages in ways their members may not expect or even have to work for” (Small, 2009, p. 5).

When it comes to specific activities, social capital is considered the utilization for action. The two most common discussions of social capital and action are around the job search and health care decisions. At an individual level, social capital and health is studied in the distribution and access to relevant health information, support structures whereas at a meso-level, such as neighborhood or institution, looks at the diffusion of health information, health-related norms, and access to resources (Carrillo Álvarez & Riera Román, 2017). Related is the research on the child care centers, of the relationship not only between mothers and the impact on their social capital, but also the relationship between mothers and the organization and the extent of the impact of the organization

they are a part of (Small, 2009). These studies tend to focus at the individual-level on the experience of how they utilize their network to get information or answers. In contrast, job searches is some of the most common research done on social capital, including the flow of job information in an informal way and the impact of social networks on receiving routine job information, positively associated with labor market success (Lin & Ao, 2008). Studies have found that the informal flow of job information through social networks and impacts job mobility and success in job searches, and partially affects social capital (Lin & Ao, 2008). Both of these are examples of the connection of social capital and instrumental action – commonly viewed in looking for jobs (Lin, 2001b).

Information Flow and Social Capital

The facilitation of information transfer requires an investment in relationships to be accomplished outside of information technologies. By studying social capital from an individual perspective within a broader structural context, the influence of social network connections on the ability to be successful in information searches can be investigated. Social capital is the connection between people, facilitating something to happen that may otherwise not happen (Coleman, 1988), in this case information access and transfer. As information access becomes more of a valuable resource within organizations, the knowledge required for successful access and applications becomes a valuable resource. The "...value assignment of a resource is dictated in part by its scarcity relative to the demand or expectations for it" (Lin, 2001b, p. 30). The concept of social capital shifts the focus of capital away from the roots of human capital and towards a concept of capital as

the value of facilitating information transfer (Johnson, 2009). Research continues to show that people depend on others for information in a variety of context, relying on specific people that they find trustworthy to provide them with information (Coleman, 1988). This dependence means that the value of social capital will continue to grow with more information being made available, regardless of the technology advances being made. In fact, “personal networks that facilitate effective information acquisition constitute an important form of social capital and contribute to the performance of those engaged in knowledge-intensive work” (Cross & Borgatti, 2004, p. 136).

Understanding the interaction of people within an organization to gather and construct meaningful information is valuable in answering vital questions of how information flows through an organization. Not only does it answer how people get to information, it also reveals the power structure within the organization of how information is transferred or held within specific parts of the organization through gatekeeping strategies (Barzilai-Nahon, 2009). Information is costly to acquire from others due to the time and attention it requires for the access and transfer (Coleman, 1988). The power is evident in the decision of who you go to seek information is a perception that they have more expertise than you (Cross & Borgatti, 2004)

There is an inherent gain for those within an organization who have access to information. They have advantages in both knowledge and applicability that are not available to those without it. The theory of social capital aims to identify and quantify how that benefit is gained throughout the complex social network that exist within an organization (Lin, 2001b). The resources that are social capital represent the advantage

individuals gain within an organization, but they also represent the opportunity of bridging the network clusters that naturally exist (Burt, 1997, 2001). Unfortunately, with the recent influx of technological advances, more emphasis has been placed on the technology as the solution rather than the social capital necessary to access it in meaningful ways (Cronin, 2010). The power of the broker is very important for information flow. Those with social capital to bridge structural holes create a tie to resources otherwise not available, “therefore represent conduits for information to flow between communities” (Enns et al., 2008, p. 259).

Research on social capital in an information context aims to identify and quantify the individual gain through a variety of indicators such as pay and performance (Burt, 2005; Galunic, Ertug, & Gargiulo, 2012; Gargiulo, Ertug, & Galunic, 2009). Any member of the organization can have social capital, but those members who act as information brokers have significantly more social capital due to the role that they play (Burt, 1997, 2005). Each aspect of a social network influences the treatment of information, but research focuses heavily on the tangible benefits of the information structure to the person, such as promotion, rather than the power of the information itself (Burt, 1997).

Studies of social capital tend to emphasize the cognitive gains of the individual through the social networks within broader sociological communities. Researchers assume information as a resource and study the intersection of social capital and information search in limited ways. Johnson (2003), through the context of urban Mongolians, sought to investigate how social capital, measured through successful and

useful information searches are directly correlated to social capital, measured through network reach and diversity. Cronin (2010) used case study analysis to study the introduction of an electronic information repository for a private company and to analyze both the contribution of information and the retrieval of information over a six-year period. Results showed initial flow of data from a small number of staff members, and then broader connections made by connecting smaller networks as the use of the system grew (Cronin, 2010).

Measuring Social Capital

Approaches to studying social capital span a variety of research methods. Early research on social capital primarily used qualitative research methods to evaluate social capital through interviews and observational techniques. Social capital measurement can be split into two areas: structural (observable behaviors) and cognitive (collective norms and trust) characteristics (Villalonga-Olives & Kawachi, 2015). Measuring social capital today is done through techniques of social network analysis to measure a variety of network characteristics. Common approaches use one of three types of generator approaches: name, resource, and position generators. The generator takes a structural approach to social capital, focusing on the characteristics of the networks an individual is a part of to create relationships (Carrillo Álvarez & Riera Romaní, 2017).

The different types of generator approaches ask respondents to identify members of their network through a different lens. The name generator approach asks respondents to identify by name individuals in their network and to describe characteristics of them

and their interactions. Cross & Borgatti (2004) utilized interviews in a consulting company following a name generator approach to identify the network of projects they had worked on, and who they identified as most important in the project in providing information to them.

In contrast to the name generator approach, the resource generator asks respondents to identify the resources they obtain from members of their network. The resource generator is more complex “because it requires that the researcher defines the list of relevant resources beforehand” (Carrillo Álvarez & Riera Romani, 2017, p. 60). By identifying the list of resources that individual respond to more precise information of context-driven networks can be obtained than the dependence on specific names. In this way, resource generators “can be more precise than position generators with regard to health outcomes, since they measure access to specific resources that are relevant to the outcome” (Carrillo Álvarez & Riera Romani, 2017, p. 60). The approach also “focuses on ‘actions’ instead of relying on one’s subjective evaluations about ties or relationships” (Fu et al., 2014, p. 104).

The position generator approach is the most common approach in current research of social capital. The position generator asks for information about people that are in specific role rather than specific information about named individuals (Lin & Erickson, 2008). The position generator relies on the prestige of occupations, which are ranked for the respondent to identify if they know someone in the particular position (Lin & Erickson, 2008). The position generator also addresses the difference between reputation gained over time based on the individual regardless of position, and the status bestowed

due to the position held by an individual (Smith, 2005). By asking individuals if they know anyone in the particular occupation rather than naming people broader understanding of the network can be achieved and is not influenced by a willingness by the participant to provide specific names. To get a fuller picture, the researcher can ask about positions, not just broader occupations (Lin & Erickson, 2008). Placing questions in an organizational context measures access to positions rather than people (Lin, 2001b).

There are a variety of measures that can be obtained through the position generator. One common use of the position generator is to evaluate measures of network breadth including diversity, extensity, and upper reach (Carolan, 2014). Erickson (2003) posits that the useful measure from position generator is network diversity because it is able to effectively evaluate if there are any connections to different positions or occupations. In addition to diversity, position generators can measure the highest status accessible and the range of statuses accessed (Lin, 2001b). The measure of upper reach is frequently studied because “available social resources are inferred by the prestige or class location of the occupations” with an assumption of better resources are associated with more prestige (Lin & Ao, 2008, p. 45). Others try to correlate the prestige by evaluating positions access and participation in social activities (Enns et al., 2008). The combination of multiple measures provides a picture of the effect of social capital (Van Der Gaag et al., 2008, p. 44).

There are several challenges of the position generator and limitations of evaluation. In the most common approach, aspects of prestige, time, and network can pose specific difficulties. First, the prestige scores assigned in the common model may

not be relevant to the context of the research and are based at a national level rather than a specific local context. Second, if a time frame is not provided, which the generator does not typically require, the respondents can have different views of the time included. Van Der Gaag et al (2008) argue “it would be fruitful to phrase the leading question within a more specific time frame or criterion if we are interested in unique subsets of networks or special areas” (p.57). In a similar concern to time, the relationship also cannot be identified since it does not provide guidance of the interaction of the contact (Van Der Gaag et al., 2008). Due to this accepting of anyone known within the specific position, the position generator also has a natural tendency to default to the closest contact in the position listed, skewing toward the strongest ties (Van Der Gaag et al., 2008). Finally, the size of the network cannot be identified because access to the position is considered the value rather than the number of individuals at each level of the organization.

CHAPTER 3: CONCEPTUAL FRAMEWORK AND METHODOLOGY

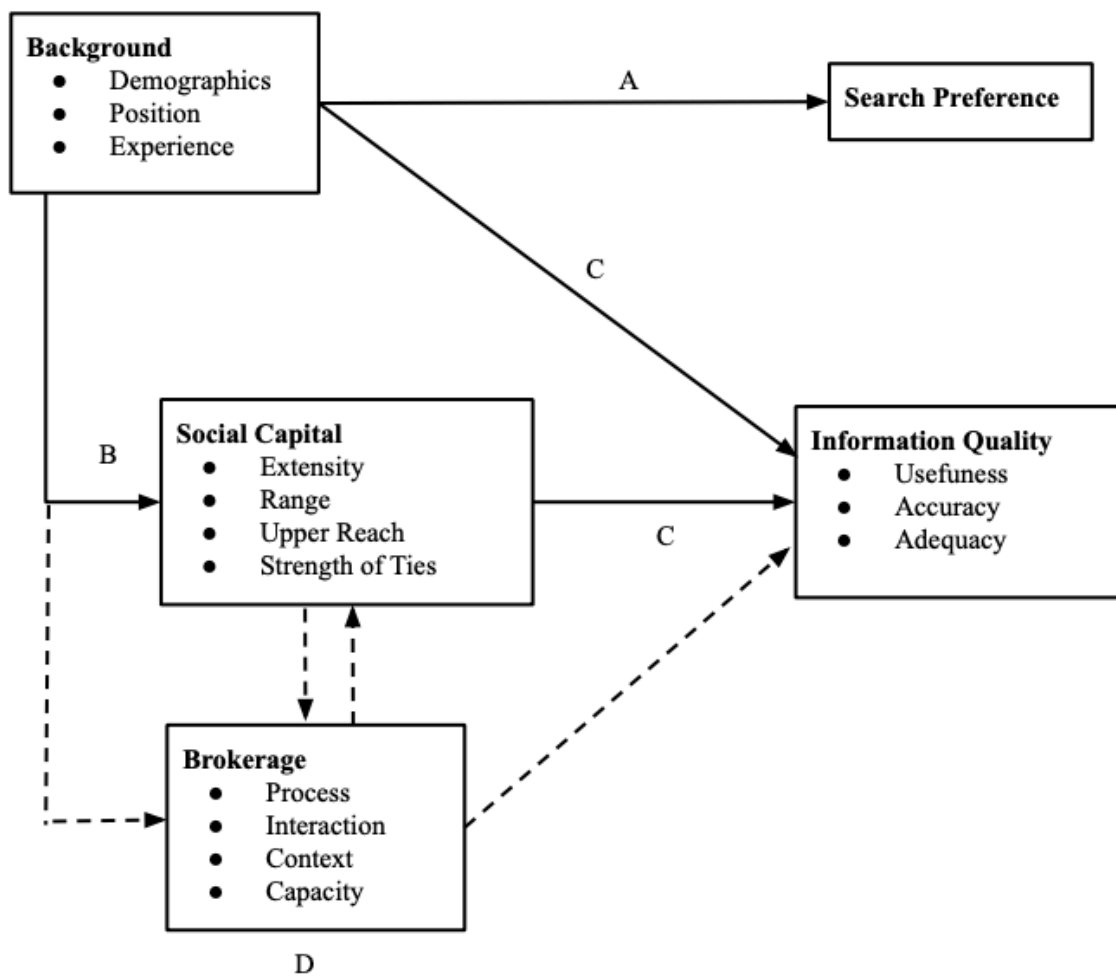
In this chapter, I provide an overview of the methodology used to investigate the relationship between administrative staff's social capital and brokerage and their perceptions of the quality of information resources obtained within higher education organizations. The research question for this study is: *What roles do social capital and brokerage play in the exchange of institutional information among administrative staff in public universities?* This chapter begins by contextualizing the research question around four concepts for the study: search preference, social capital, information quality, and brokerage. It then presents an overview of participants and instruments. The analytical approach and measurements are discussed in the context of each of these four parts.

Conceptual Framework

The conceptual framework for this study shows the way that I approached the research question: *What roles do social capital and brokerage play in the exchange of institutional information among administrative staff in public universities?* The conceptual framework divides the approaches used to address the two parts of the research question: first, exploration of the role of social capital, and, second, analysis of the role of brokerage in information exchange. The exploration of the role of social capital is divided into three parts for analysis: Part A is the analysis of the role of an individual's background in search preference; Part B is the analysis of an individual's background in relation to social capital; and Part C is the analysis of an individual's

background and social capital in relation to information quality. The interview-based analysis of the role of brokerage in information exchange is identified here as Part D. All parts of the study are depicted in the conceptual framework in Figure 1.

Figure 1. Conceptual Framework



Part A. Relationship Between Search Preference and Background

Part A of the study is analysis of the role of an individual's background in relation to information-search preference. Due to the high value of information resources within higher education (Muller, 2018), people use every avenue they can to access the information they need for the operational and strategic decisions they make every day (Taysum, 2010). This study examines how an individual searches for institutional information, either by going directly to an information technology system or by utilizing their social network. This choice is framed as an individual's search preference. Preference for an information technology system is defined as the likelihood of an individual going to an information technology system (e.g. a data warehouse, reporting system) to access institutional information. Preference for utilizing a social network is defined as the likelihood of an individual going to another person to access institutional information. An individual may be likely to utilize none, one, or both of these two search approaches when searching for institutional information.

An individual's background may influence information search in many different contexts. Background is conceptualized here in three categories that potentially influence the search preference of an individual: demographics, position, and experience. A person's demographic characteristics can influence the search process (Sanchiz, Chevalier, & Amadiou, 2017; Urquhart & Yeoman, 2010). I chose to investigate the influences of age, gender, ethnicity, and highest earned degree on search preference. In addition, position and experience within an organization can influence access to information for a variety of reasons, such as managers choices for information sources

(Mackenzie, 2005). I identified three aspects to investigate: their employment position at the university, the number of years they have worked at the university, and the number of positions they have held at the university.

Part B. Relationship Between Social Capital and Background

Part B of the study is analysis of the role of an individual's background in relation to their social capital. It investigates the extent to which characteristics of demographics, position, and experience are related to the social capital that an individual possesses. For this study, information resources embedded in the social structure are the focus of social capital (Lin, 2001a). Lin (2001b) defines social capital as "resources embedded in a social structure that are accessed and/or mobilized in purposive actions" (p.29). For this study, the focus is specifically on the information resources embedded in the social structure (Lin, 2001a).

For aspects of social capital, network extensity, range, upper reach, and strength of ties are investigated in relationship to the background characteristics of demographics, position, and experience. Social capital, the resources built into the social structures (Lin, 2001a), has been shown to be important in many different activities; the value of social capital gained through an individual's network can influence many aspects of activities. For example, social capital has been shown to influence an individual's work experience from initial job searching activities (Smith, 2005) to changes within an individual's current position (Fu et al., 2014). Within the context of information search, the importance of social capital can be seen in personal searches for information such as

medical information (Song & Change, 2012), information gathering in the management of businesses (Schoenacher, 2008), and information gathering within the workplace in the context of knowledge sharing (Widén-Wulff et al., 2008). Within organizations, information is a valuable resource; those who have access to information have social capital that can be used for their own benefit or for institutional benefit (Fu et al., 2014).

There are many aspects of social capital. This study focuses on aspects of network extensity, range, upper reach, and strength of ties, which are considered in research on accessibility of network resources and are viewed from an individual perspective (Carolan, 2014; Lin, 2001b). Using a positional approach, *network extensity* is the extent to which an individual's network connections cross institutional boundaries using a count of the positions with which an individual interacts in the search process. In contrast to network extensity, *network range* is the distance between the highest and lowest connections an individual makes in the organizational hierarchy (Burt, 2007). Adapting a positional approach, the range of access is based on the positions within the hierarchy with which an individual interacts rather than specific people (Carolan, 2014). Range is particularly important in the collection of social capital for individual gain within an organization and is shown to ease knowledge transfer (Reagans & Mcevily, 2003).

Similar to range, *upper reach* is the highest position in the network to which an individual has access when sharing information (Hatala, 2009; Lin, Fu, & Hsung, 2001). Upper reach is identified as the level of the person with the highest position in the organizational hierarchy with whom the individual interacts during information exchange. Network range, extensity, and upper reach provide a clearer picture of an

individual's network and how individuals form social capital through different connections outside of their position in the structural organizational hierarchy that might otherwise determine access.

In addition to the connections to positions an individual has in an organization, the strength of those relationships is also important. *Strength of ties* is based on the frequency of interactions between individuals in the network. A long-standing core concept in social capital, the strength of weak ties, addresses the extent to which various networks within an organization are connected through individuals, creating bridges, and facilitating information transfer across groups (Granovetter, 1973). In contrast, strong ties are more influential in group dynamics and influence (Carolan, 2014; Valente, 2010). Tie strength is the focus of a lot of organizational research due to relationships that can cross organizational boundaries that might otherwise determine information exchange (Gargiulo et al., 2009). The same background variables utilized in Part A of the study are also utilized in Part B.

Part C. Relationships Among Social Capital, Background, and Information Quality

Part C of the study is analysis of the role of an individual's social capital and background in relation to information quality. The quality of information gained through access is critical; access to information is not sufficient for a search to be considered successful due to uncertainty inherent in information search (Chowdhury et al., 2014). Increasing requirements for data-informed decision-making within higher education

mean that access to data or information is a necessary, but not a final step; information that is perceived by individuals to have met their needs is necessary (Johnson, 2007).

The quality of information retrieved through information technology systems or through social networks is the dependent variable for the study. For the purpose of this study, information quality is conceptualized in three aspects: the usefulness of the information, the accuracy of the information, and the adequacy of the information. *Usefulness of information* is the extent to which the individual accessing the information finds it useful for their purposes. *Accuracy* is the extent to which the individual sees the information as being factually correct. Finally, *adequacy* is the extent to which the individual finds the information sufficient or adequate for their needs. The study examines information quality because of the importance not only of being able to retrieve information, but also of ensuring that it meets the needs of the person looking for it (Johnson, 2007).

The components of information quality are adapted from Johnson's (2007) work on studying the quality of information when individuals utilize networks in a social setting. In Johnson's (2007) work, participants were asked about search success in terms of usefulness and satisfaction. Participants were first asked about the usefulness of the information they obtained, then asked whether they found the information they needed, and if found, the extent to which it helped or met their satisfaction (Johnson, 2007). The concept of success was divided for the purpose of the study into concepts of usefulness, accuracy, and adequacy.

The same background variables utilized in Parts A and B of the study are also used in Part C as control variables.

Part D. Brokerage

The final part of the study, Part D, focuses on the role of information brokerage in access to institutional information, including concepts of process, interaction, context, and capacity. The people who are in network positions who serve in brokering roles make decisions on who receives information and to what extent information is provided (Haythornthwaite, 1996). Extensive research examines the role of information brokers, whether through formal positions in the organization (Teodorescu, 2006) or informal roles (Gargiulo et al., 2009). The analysis begins by examining the role of brokerage. Investigating the brokering of information, Guido et al. (2016) identify three important influences: interaction, context, and capacity. Expanding on the concept of strength of ties, interactions build trust and influence decisions of brokering, specifically, how the interactions between seeker and broker impact the decision to provide information and the perceived value of the information (Guido et al., 2016). In contrast to the relationship, the context of the seeker and their particular information need and the capacity available to provide brokerage, both address the concerns of the resources it takes to serve in a brokerage role (Guido et al., 2016).

From an individual (ego-centric) perspective, brokerage is frequently conceptualized in terms of the people to whom information brokers are connected, specifically when providing information (Carolan, 2014). Although it is helpful to

document the people to whom information brokers are connected, the response of information brokers to requests is also vital since they are the gatekeepers who are facilitating information transfer to others in the organization. Brokerage is a form of information gatekeeping, determining who is successful in getting the information they need between disconnected groups (Quintane & Carnabuci, 2016).

The ability of a person to find information using a social network is dependent on the information broker, who has the knowledge and skills to facilitate the exchange (Christozov & Toleva-Stoimenova, 2014). The dependence of information seekers on information brokers is partly why relationships and social capital gained through relationships are important (Johnson, 2004). Information brokerage takes place between familiar and unfamiliar contacts (Quintane & Carnabuci, 2016); the social capital of connections means that those with a connection to information brokers have access that others do not. Characteristics of information brokers, such as their limited time to answer requests, address a key aspect of the information flow within an organization (Guido et al., 2016).

This study expands on Guido et al. (2016) by investigating process, interaction, context, and capacity to respond during information brokerage. Studying the interactions of information brokerage in exchanges of climate information, Guido et al. (2016) identify three characteristics that influence information brokerage: interaction, context, and capacity. For the purpose of their study, they defined context as contextual knowledge needed regarding the “supply and demand sides of information” (Guido et al., 2016, p. 295). For the purpose of this study, the concept of *context* has been expanded

beyond contextual knowledge; contextual concepts such as persuasion, urgency, and complexity of requests are included. *Interactions* are defined as the relationship between the brokers and the users (Guido et al., 2016); for the purpose of this study the interaction includes who makes the requests for information, reasons for requests, and influences on how and why information is provided. Guido et al. (2016) define *capacity* as the availability of the information broker, specifically their time. As with any activity within the workplace, the capacity of the individual providing the services, such as their time, can provide further insight into the success of the interaction. In addition, *process* is considered as the actions that take place during the brokerage.

There are potential relationships between information brokerage and an individual's background, social capital, and information quality. Brokerage may be related to these other factors, but such relationships are beyond the scope of this study.

Methods

This study was undertaken with a sequential mixed-methods design. An explanatory sequential design (Creswell, 2015) was first used to gather survey data and then to conduct follow-up interviews. The quantitative survey produced data regarding an individual's social capital (network extensity, range, upper reach, and strength of ties) and background characteristics. Quantitative survey data identified social networks being used to access and provide information but did not address the personal experiences that individuals have when navigating the process of providing information to other people.

The qualitative interview data provide details of the experiences of those serving as information brokers within the organization and more contextual information than the quantitative survey can provide (Creswell, 2015) about information brokers' experiences of process, interaction, capacity, and context.

Setting

The large, public university chosen for this study is the University of Minnesota, a land-grant institution founded in 1851. The University of Minnesota has five campuses across the state of Minnesota: Crookston, Duluth, Morris, Rochester, and Twin Cities. The University of Minnesota has over 26,000 employees ("University of Minnesota: Employee headcount," 2021). With such a large number of employees in the organizational hierarchy, networks and information brokers could be studied and compared, but due to large differences in campus sizes and structures, the study was limited to the Twin Cities campus, which has approximately 24,000 employees ("University of Minnesota: Employee headcount," 2021).

The University of Minnesota has a long history of approaching data collection and access as an important resource for institutional staff. The University of Minnesota's focus on the importance of data access includes building a data warehouse and a reporting system in the early 1990s, and establishing a system-wide Enterprise Data Management and Reporting strategy in 2012. The University of Minnesota has developed a variety of tools and resources to support university staff and faculty. The University of Minnesota, Twin Cities campus, has sixteen different colleges and a central

administration that collaborate on institutional information needs. Selecting a site with diverse programs is important for understanding information exchange across the institution, between central administrative units and academic units including colleges and academic centers.

Previous studies have demonstrated the impact of networks on access to information, primarily in the private sector (Gargiulo et al., 2009) and healthcare (Song & Change, 2012). Studies within the context of higher education have focused primarily on networks of faculty (Wakefield & Dismore, 2015) and students (Arthur, 2016), rather than administrative staff. These studies have focused on a variety of network characteristics, including network size (Galunic et al., 2012) and network role in the form of network nodes (Batallas & Yassine, 2006). Analyses of social capital center primarily on organizations outside of higher education such as investment banking (Galunic et al., 2012). In order to explore social capital within the higher education setting, I surveyed and interviewed staff who are involved in exchanging institutional information. Due to the wide range of institutional data collected within universities, institutional information is a common need across positions and structural boundaries.

Universities require a balance of data access and privacy. Unlike corporations, universities have specific legislation about the privacy of data. Student data, in particular, are regulated through the Federal Educational Rights and Privacy Act (FERPA). Enacted in 1974, FERPA regulations are designed to protect personally-identifiable student data, and they apply to any university that receives federal funds (Daggett, 1997). Student records covered by FERPA include all aspects of personally identifiable data as well as

academic records, such as grades and degree progress (Daggett, 1997). Universities are required to make clear to students what public information can be shared, such as academic major and degrees earned, and to allow students to suppress information if they do not want it shared (“Student records privacy,” 2021). Universities thus create specific requirements for access to student information within the institution. The University of Minnesota stipulates that student information is available to advisors, instructors, and data managers with a demonstrated need to know the information (“Student records privacy,” 2021). The balance of access and privacy is continually evaluated as more information is used in informed decision-making processes.

Public universities perform an additional balancing act for information access: they are required to follow open-records laws. In Minnesota, public universities are required to follow the Minnesota Government Data Practices Act. Established in 1993, it regulates public access to government data (Westin, 1996). According to the legislation, data are divided into public, private, and confidential types; summary data are treated separately (Westin, 1996). Combining the regulations of Minnesota Government Data Practices Act with FERPA reinforces the privacy of individual student data, but private data at the summary level (not individually identifiable) are provided when requested. The balance of access to information at a public institution requires information brokers to interpret information and make it available to a wider range of people than would have information access at private institutions.

Participants

The survey protocol was designed to collect information about social networks and background characteristics of staff within the university. Participants identified for the study were university staff who work with institutional data. These individuals include staff members who have participated in data-related activities or use the current information systems directly to access institutional data.

The interview protocol was designed to examine information brokerage that takes place within the institution. This step required additional contextual information that the survey did not provide. Interviews were conducted with university staff identified as information brokers. Selection and recruitment of participants are discussed below.

Institutional Review Board Approval

The research study was designed as a sequential mixed-methods study, with a survey followed by in-person interviews. After receiving approval of the research proposal from my dissertation committee, I submitted a research protocol proposal to the Institutional Review Board (IRB) at the University of Minnesota for approval on May 27, 2019. On June 6, 2019, the study was given “Exempt From Review” status by the IRB, which means the study did not meet the definition of human subjects research. Confirmation of the decision is presented in Appendix A. Due to this decision, consent materials were not required, but were provided to participants as a courtesy. No participants were contacted for the survey or interviews before the study proposal was reviewed by the Institutional Review Board.

Development of the Survey Protocol

The quantitative data for the study were collected through a survey including measures of background, search preference, social capital, and information quality. The survey protocol is presented in Appendix B.

Part A: Relationship between search preference and background. Part A of the study investigates the relationship between the search preference of individuals searching for institutional information and the background characteristics of individuals, including demographic, position, and work-experience characteristics.

In order to frame the context of the survey, respondents were first asked, “For the purpose of this survey, institutional information is defined as the detailed and summary data the university gathers about its people, research, money, and facilities. This information can take the form of data tables, summarized visualizations, and presentations, for example. What type of institutional information do you use most frequently?” Response options were: Facilities, Finance, Human Resources, Research, and Student. All subsequent questions of the survey were framed in reference to the respondent’s choice of the institutional information they used most frequently.

Search preference. Search preference refers to different approaches individuals use in the search for information. Information-behavior research shows that individuals utilize many different approaches when searching for information (Taysum, 2010). Within organizational settings, many resources are dedicated to building and supporting information systems to encourage individuals to use information technology systems to gather information (Byrd & Turner, 2000). In contrast, outside of formal networks, such

as communities of practice, for individuals to share information and knowledge (Davenport & Hall, 2002), less research has been conducted evaluating the information networks that individuals utilize information in higher-education settings. In order to investigate the role of social networks in access to information, the role of information technology systems was also considered.

Respondents were asked to indicate the likelihood that they would use an information technology system and the likelihood that they would contact another person for information. Questions were dynamically created based on the respondent's answer about information type (e.g. Facilities, Research). The first question was: "How likely are you to access [Research] information using an information technology system? (e.g. PeopleSoft, Data Warehouse, UM Reports, UM Analytics)". [Research] will be used throughout as a generic indicator for the information type that a respondent chose. The examples provided are information technology systems used to store and run reports at the University of Minnesota. The second question was: "How likely are you to contact another person for [Research] information?" Response options for both questions were 4=Very Likely, 3=Likely, 2=Unlikely, 1=Very Unlikely, and 0=Not at all. The questions survey participants were asked to measure search preference are provided in Table 1.

Table 1: *Measures of Search Preference*

Components of Search Preference	Measures
Preference for Information Technology Systems	How likely are you to access [Research*] information using an information technology system?
Preference for Social Networks	How likely are you to contact another person for [Research] information?

* Research is used as an example; see page 69 of the responses options of information type.

Search preference transformations. In order to analyze search preference, individuals were placed into categories based on their likelihood to utilize information technology systems and/or social networks to search for institutional information, creating a “Likely Approach” variable. I grouped individuals by their search preference:

1. High in information technology systems search preference
2. High in social network search preference
3. High in both information technology systems and social network search preference
4. Low in information technology systems and social network search preference

Individuals who responded with “Very Likely” or “Likely” preference were coded as “High”, while individuals that responded with “Unlikely” or “Very Unlikely” were coded as “Low”. For example, if a respondent “Very Likely” to the question of their likelihood to utilize information technology systems and “Likely” to the question of their likelihood to utilize social networks, they were coded as High in both information technology systems and social network search preference.

Background. The background of an individual searching for information in an organizational context can influence their search preference. Influence of background characteristics occur in many ways, such as age affecting utilization of search engines (Sanchiz et al., 2017). Influences also occur based on experience with an organizations’ information technology systems (Skyrius, 2005). I chose to investigate three components of background characteristics: demographics of age, gender, ethnicity, and highest degree

earned, position at the university, and experience of the number of years worked at the university, and the number of positions held at the university.

Demographic variables were measured through the following questions:

- “What is your age?” Response options were 1=Under 29, 2=30-39, 3=40-49, 4=50-59, 5=60 and Over, and 6=Prefer not to Respond.
- “What is your gender?” Response options were 1=Male, 2=Female, 3=Not Listed, and 4=Prefer not to Respond.
- “What is your race/ethnicity?” Response options were 1=American Indian or Alaska Native, 2=Asian, 3=Black or African American, 4=Native Hawaiian or Pacific Islander, 5=White, 6=Not Listed, 7=Prefer not to Respond.
- “What is your highest degree earned?” Response options were 1=High school diploma, 2=2 year degree, 3=4 year degree, 4=Master’s degree, Professional degree or equivalent, and 5=Doctorate.

Demographic variables regarding education have been shown to influence information behavior (Chowdhury et al., 2014; Song & Change, 2012). Investigating the potential influence of demographic variables in the search process is valuable in considering the different experiences individuals may have as well as controlling for those differences when investigating the role of social capital.

Respondents were asked questions about their position and work experience at the university. First, respondents were given a list of position categories, a simplified version of positions listed within the following job families at the University of Minnesota: academic, administration, campus operations, finance, human resources, information

technology, research, and student services (Appendix C). I excluded positions that were out of scope for the study (e.g. athletics) and positions only on a campus other than the Twin Cities campus. Using a position generator approach, the list is designed to investigate the relationship and interactions that an individual has with people across the organizational structure (Lin et al., 2001). Respondents were asked: “What category best fits your position?”

In addition, two questions about work history were included:

- “How long have you worked at the university?” Response options were 1=Less than 1 year, 2=1-2 years, 3=3-5 years, 4=6-10 years, 5=5-15 years, 6=16-25 years, and 7=More than 25 years.
- “How many positions have you had at the university?” Response options were 1=1, 2=2-3, 3=4-5, 4=6 or More.

Both of these characteristics may influence an individual’s search preference and social capital (Fu et al., 2014; Galunic et al., 2012). The measures of the background variable are provided in Table 2.

Table 2: *Measures of Background*

Components of Background	Measures
Demographics	What is your age? What is your gender? What is your race/ethnicity? What is your highest degree earned?
Position	What category best fits your position?
Experience	How long have you worked at the university? How many positions have you had at the university?

Background transformations. First, I re-coded demographic variables. Several of the demographic questions included answer options that very few or no individuals chose, so options were compressed into more meaningful categories for analysis. Such changes were made to the variables of age, race/ethnicity, degree earned, and years worked. For example, the age categories of “Under 29”, “30-39”, and “40-49” were collapsed into a single value. I also created a new demographic variable for position group, collapsing the 23 different positions into two categories for analysis: “Staff,” “Director and Above”.

Part B: Relationship between social capital and background. Part B of the study investigates the relationship between an individual’s social capital and background characteristics. Items on which measures of social capital are based appear in the section of the survey related to exchanging institutional information. Respondents were asked to indicate the number of times they exchanged (received or provided) institutional information with individuals within the organization in a typical month. Questions in the section refer to exchanging information (providing and receiving) with people in academic administrative positions. A total of eleven academic positions and eight central administration positions are listed. Respondents were asked to enter the number of times they exchanged (provided or received) information in a typical month with anyone in each position.

Social network analysis. In order to collect social capital data in the university context, I used an individual level of social network analysis, adapting the position- and resource-generator approaches. Social network analysis is frequently used to measure

social capital (Lee, 2014; Lin, 2001b). There are multiple types of social-network analysis that could be applied, but an individual-level (egocentric) analysis focuses on the experiences of individuals within the network rather than seeking to document an entire network (Carolan, 2014). Using an individual approach places the emphasis on the individual experience and relations rather than on the entire network (Carolan, 2014).

A different approach to network data collection, the position generator is a tool that collects data on an individual's connections among a list of occupations (Lin, 2001b) or, as adapted in this case, positions within a university. The position-generator approach, while placing the emphasis on the individual experiences, gives a hierarchical context to the network individuals use to access information and gain social capital, due to positions' different levels of prestige of occupations (Lin, 2001a). The position generator asks respondents to indicate whether or not they interact with anyone in specific positions (Lin, 2001a). In contrast to the name-generator approach, the position generator utilizes a specified list of occupations rather than relying on respondents' willingness to share specific details of individual contacts (Carolan, 2014). The position generator has been used in a variety of studies and is seen as a valid measurement tool for social capital (Hällsten, Edling, & Rydgren, 2015; Lin et al., 2001; Verhaeghe & Li, 2017). The context for the positions listed varies depending on the question being asked, from occupations in a community to positions within an organization (Carolan, 2014).

Like a position generator, a resource generator specifies the resource provided by an individual, including skills, knowledge, and activities (Carolan, 2014). This approach is used primarily in social science research to analyze access to social capital (Van Der

Gaag & Snijders, 2005). This study utilizes a combination of the principles behind the position-generator and resource-generator approaches. First, a list of occupations was identified from the list of University of Minnesota job families, provided in Appendix C. The following job families were used: academic, administration, campus operations, finance, human resources, information technology, research, and student services. Unlike typical position generators that use an arbitrary list of occupations within the community (Lin et al., 2001), this list of positions has clear organizational boundaries and levels of prestige through the organizational hierarchy. The list of positions was then divided into administrative and academic categories.

Second, instead of asking only whether or not an individual has contact with someone in a position, the survey asked respondents to identify the resource-sharing activity (either receiving or providing information) involved in the exchange. Combining the approaches identifies two important characteristics of the relationship: the prestige of the people with whom the respondent interacts, and the resource shared with those people (information provided or received).

Social capital. Four survey questions asked respondents about the act of providing or receiving information from individuals in positions and provided a space for them to provide the number of interactions. Respondents were first asked about providing information to two groups of positions: “How many times in a typical month do you PROVIDE information to an academic staff member in this role? (complete all that apply)” and “How many times in a typical month do you PROVIDE information to a central administration staff member in this role? (complete all that apply)”. Second,

respondents were asked about receiving information from two groups of positions: “How many times in a typical month do you RECEIVE information from an academic staff member in this role? (complete all that apply)” and “How many times in a typical month do you RECEIVE information from a central administration staff member in this role? (complete all that apply)”. The answers to these four questions were used to calculate the measures of social capital. The questions and positions, as well as two example participant responses are provided in Table 3.

Table 3: *Example Participant Responses of Information Exchange*

	Participant 1	Participant 2
<i>How many times in a typical month do you PROVIDE information to an academic staff member in this role? (complete all that apply)</i>		
Departmental Staff	3	1
Departmental Chair	0	15
Collegiate Staff	5	5
Faculty	0	10
Academic Director	0	15
Assistant/Associate Dean	0	15
Dean	0	20
Provost Staff	0	0
Assistant/Associate/Vice Provost	0	2
Provost	0	2
President	0	2
<i>How many times in a typical month do you PROVIDE information to a central administration staff member in this role? (complete all that apply)</i>		
[Research*] Services Staff	0	1
Information Technology Staff	10	1
Institutional Research Staff	0	1
[Research*] Services Director	0	1
Information Technology Director	0	1
Institutional Research Director	0	1
Assistant/Associate Vice President	0	5
Vice President	0	2

* Research is used as an example; see page 69 of the responses options of information type.

Table 3: *Example Participant Responses of Information Exchange, continued*

	Participant 1	Participant 2
<i>How many times in a typical month do you RECEIVE information from an academic staff member in this role? (complete all that apply)</i>		
Departmental Staff	0	1
Departmental Chair	0	5
Collegiate Staff	0	0
Faculty	0	2
Academic Director	0	2
Assistant/Associate Dean	0	0
Dean	0	5
Provost Staff	0	0
Assistant/Associate/Vice Provost	0	0
Provost	0	1
President	0	0
<i>How many times in a typical month do you RECEIVE information from a central administration staff member in this role? (complete all that apply)</i>		
[Research*] Services Staff	1	0
Information Technology Staff	10	0
Institutional Research Staff	5	0
[Research*] Services Director	0	1
Information Technology Director	0	1
Institutional Research Director	0	0
Assistant/Associate Vice President	0	3
Vice President	0	1

* Research is used as an example; see page 69 of the responses options of information type.

Social capital calculations. In order to calculate the social capital measures of network extensity, range, upper reach, strength of ties. I completed several steps to prepare the data to complete calculations for measures of social capital.

Strength of ties calculation. First, strength of ties was calculated as a sum of interactions (providing or receiving information) the respondent indicated with each position. The answers provided by each respondent for providing and receiving information by position were added together to create new variables of the total number of interactions with the position, titled the name of each position. This resulted in the creation of nineteen new variables (e.g. Departmental Staff, Collegiate Staff, Department Chair). For example, from Table 3, for Departmental Staff, Participant 1 responded 3 as the number of times information provided to Departmental Staff and 0 as the number of times information was received from Departmental Staff, which results in Departmental Staff=3. Participant 2 responded 1 as the number of times information provided to Department Staff and 1 as the number of times information was received from Department Staff, which results in a new variable of Departmental Staff =2.

Utilizing the nineteen position variables, I grouped the positions into position categories, combining the administrative and academic hierarchies to create a single order of levels based on typical reporting structures within the university, and added the interactions of all positions within the category together to create a new variable for total interactions with the position category. For example, from Table 3, Participant 1 responded the following for the number of times providing information to staff: Department Staff=3, Collegiate Staff=5, [Research] Services Staff=0, Information

Technology Staff=10, and Institutional Research Staff=0. Participant 1 provided the following responses for the number of times receiving information from staff: Department Staff=0, Collegiate Staff=0, [Research] Services Staff=1, Information Technology Staff=10, and Institutional Research Staff=5. The sum of all interactions (providing and receiving) information from the staff categories created the value of Staff Interaction=34. Participant 2 responded the following for the number of times providing information to staff: Departmental Staff=1, Collegiate Staff=5, [Research] Services Staff=1, Information Technology Staff=1, and Institutional Research Staff=1. Participant 2 provided the following responses for the number of times receiving information from staff: Departmental Staff=1, Collegiate Staff=0, [Research] Services Staff=1, Information Technology Staff=0, and Institutional Research Staff=0. The sum of all interactions (providing and receiving) information from the staff categories created the value of Staff Interaction=10. The same calculation was done for each position category shown in Table 4.

Table 4: *Position Categories*

Position Category	Administrative Hierarchy	Academic Hierarchy
1=President		<ul style="list-style-type: none"> • President
2=VP/Provost	<ul style="list-style-type: none"> • Vice President 	<ul style="list-style-type: none"> • Provost
3=AVP/Dean	<ul style="list-style-type: none"> • Assistant/Associate Vice President 	<ul style="list-style-type: none"> • Assistant/Associate Vice Provost • Dean
4=Director	<ul style="list-style-type: none"> • Institutional Research Director • [Research*] Services Director • Information Technology Director 	<ul style="list-style-type: none"> • Assistant/Associate Dean • Academic Director • Faculty • Departmental Chair • Provost Staff
5=Staff	<ul style="list-style-type: none"> • Institutional Research Staff • [Research*] Services Staff • Information Technology Staff 	<ul style="list-style-type: none"> • Collegiate Staff • Departmental Staff

* Research is used as an example; see page 69 of the responses options of information type.

Based on the five position category variables created, I created indicator variables to reflect reach (whether there was interaction with the position category), with 0=no interaction with any position within the position category and 1=at least one interaction with any position within the position category. For example, from Table 3, Participant 1 has the value of Staff Reach=1, and 0 for all other position categories. For Participant 2, the values are: Staff=1, Director=1, AVP/Dean=1, Vice President/Provost=1, President=1.

Extensivity calculation. Network extensivity is the number of positions in which there was one or more interaction (providing or receiving information). In order to calculate extensivity, I used the data from the position variables, adding together the number of position variables that an individual had interaction with. The range of values is zero to nineteen. For example, from Table 3, Participant 1's extensivity is 5, with interactions with: Departmental Staff, Collegiate Staff, [Research*] Services Staff, Information Technology Staff, and Institutional Research Staff. Participant 2's extensivity is 18, with interactions with all positions except Provost Staff.

Range calculation. In order to calculate network range, I used the position category variables, counting the number of position categories that an individual had at least one interaction (providing or receiving information) with. The range of values is zero to five. For example, from Table 3, Participant 1's range is 1, with interaction with only Staff. Participant 2's range is 5, with interactions with all position categories.

Upper reach calculation. In order to calculate upper reach, I assigned a numeric value of 0 to 5 based on the highest level of the organization with which an individual

had interaction. If an individual interacted with the President, the top of the organizational reporting structure, they were given a value of 1, with the value of 5 representing interacting with the lowest group in the organizational reporting structure, “Staff”. A value of zero was given if the individual indicated no interaction with anyone in the organizational hierarchy. For example, from Table 3, Participant 1’s upper reach is 5 with interaction with staff, and Participant 2’s upper reach is 1, with interaction with the President.

Part C. Relationships among social capital, background, and information quality. Part C of the study investigates the relationship among information quality (measured as respondents’ perceptions of information quality), social capital, and background. Perception of information quality is comprised of three components: usefulness, accuracy, and adequacy. Respondent’s perceptions of information quality were gathered in the context of measures presented in Table 5.

Table 5: *Measures of Information Quality*

Components of Information Quality	Measure
Through Information Technology Systems	<p>Usefulness:</p> <ul style="list-style-type: none"> • In a typical month, how useful was the [Research*] information you retrieved from a system? <p>Accuracy:</p> <ul style="list-style-type: none"> • In a typical month, how confident are you in the accuracy of the [Research*] information you obtained from a system? <p>Adequacy:</p> <ul style="list-style-type: none"> • In a typical month, how adequate was the [Research*] information you obtained from a system?
Through Social Networks	<p>Usefulness:</p> <ul style="list-style-type: none"> • In a typical month, how useful was the [Research*] information you received from other people? <p>Accuracy:</p> <ul style="list-style-type: none"> • In a typical month, how confident are you in the accuracy of the [Research*] information you received from other people? <p>Adequacy:</p> <ul style="list-style-type: none"> • In a typical month, how adequate was the [Research*] information you received from other people?

* Research is used as an example; see page 69 of the responses options of information type.

The dependent variable of the study is information quality. The dependent variable was measured through six questions. Respondents were first asked about the quality of the information they gathered through information technology systems. The response option [Research] is used as a placeholder for the type of information the respondent usually exchanges.

- Usefulness was measured by asking, “In a typical month, how useful was the [Research] information you retrieved from a system?” Response choices were 4=Extremely Useful, 3=Very Useful, 2=Moderately Useful, 1=Slightly Useful, and 0=Not at all Useful.
- Accuracy was measured by asking, “In a typical month, how confident are you in the accuracy of the [Research] information you obtained from a system?” Response choices were 4=Extremely Accurate, 3=Very Accurate, 2=Moderately Accurate, 1=Somewhat Accurate, and 0=Not at all Accurate.
- Adequacy was measured by asking, “In a typical month, how adequate was the [Research] information you obtained from a system?” Response choices were 4=Extremely Adequate, 3=Somewhat Adequate, 2=Neither Adequate nor Inadequate, 1=Somewhat Inadequate, and 0=Extremely Inadequate.

Next, respondents were asked about the quality of the information they received from another person.

- First, participants were asked, “In a typical month, how useful was the [Research] information you received from other people?” Response choices were

4=Extremely Useful, 3=Very Useful, 2=Moderately Useful, 1=Slightly Useful, and 0=Not at all Useful.

- Second, participants were asked, “In a typical month, how accurate do you think the [Research] information was you received from other people?” Response choices were 4=Extremely Accurate, 3=Very Accurate, 2=Moderately Accurate, 1=Somewhat Accurate, and 0=Not at all Accurate.
- Finally, participants were asked, “In a typical month, how adequate was the [Research] information you received from other people?” Response choices were 4=Extremely Adequate, 3=Somewhat Adequate, 2=Neither Adequate nor Inadequate, 1=Somewhat Inadequate, and 0=Extremely Inadequate.

Separating the information quality through the two search preferences provides indication of the potential difference in perceived quality depending on the preference.

Asking participants to describe their perceptions of the information quality of the information they retrieve from information technology systems as well as the information they receive through social networks enables comparison of their background characteristics and social capital as influencing the quality of the information they are able to access. Due to the high value of information resources within an organization, it is important to consider whether there is any difference in the quality of information obtained through information technology systems and social networks.

Information quality calculations. Respondents provided responses to their perceptions of information quality they receive in two contexts: information technology tools, and social networks. The three components of perceptions of information quality

(usefulness, accuracy, and adequacy) were combined for information technology system responses and separately combined for social networks, resulting in two composite information quality scores. For example, if a respondent indicated that information from information technology systems were: 4=Extremely Useful, 4=Extremely Accurate, 1=Somewhat Inadequate, the composite information technology system score is 9. If the same respondent indicated that information they received through their social networks was 3=Very Useful, 4=Extremely Accurate, 3=Somewhat Adequate, the composite social network score is 10.

Pretesting of the survey. Pretesting of the survey was completed through cognitive interviews. Three individuals completed the survey to simulate the experience that respondents would have in the study. Individuals were selected to complete the pretesting based on their work at the university related to sharing institutional information. During the pretest, the principal investigator was present as individuals read each question and provided their thoughts verbally when answering. They explained how they interpreted the question and why they provided the answer, and they asked any questions they had about how to answer a question. Individuals also provided feedback on the online survey experience as they completed the survey.

Survey Data Collection

The quantitative data for the analysis in Parts A, B, and C of the study were collected through an online survey. The survey was distributed after approval of the

dissertation proposal by the dissertation committee and approval by the Institutional Review Board at the University of Minnesota.

Selection and recruitment of survey participants. The survey was created to address the first part of the study: the impact of background characteristics and social capital on search preference and perceptions of the quality of institutional information retrieved. Survey participants were identified through a data-community list, managed and maintained by the Enterprise Data Management and Reporting group within Institutional Analysis at the University of Minnesota. The list includes employees who have participated in data-related activities or use the current information technology systems directly. The list includes approximately 1,000 employees across the five campuses; individuals from campuses other than the Twin Cities were removed from the list, resulting in 727 employees. The list was compiled from a variety of groups, including individuals with access to information technology systems and individuals that participate in data-user activities, and so the list represents a broad range of university employees interacting with university data in a variety of ways. Using the maintained list ensured a selection of staff who interact with institutional data as part of their jobs. The list includes the names, institutional email addresses, job titles, and departments of those who work with university data, which is public information.

An email invitation to participate in the study, containing an individualized survey link, was sent to each of the 727 potential participants. After sending the initial invitation to participate on June 27, 2019, I sent three follow-up emails at weekly intervals to all non-respondents. Of the 727 of survey invitation sent, three were undeliverable due to

email addresses that were no longer active, which resulted in 724 survey invitations delivered.

Administration of the survey. The survey data were collected through a web-based survey, which allows a customized experience for each participant and individual follow-up. Web-based surveys provide a combination of ease of access, anonymity, and flexibility for completion (Dillman, Smyth, & Christian, 2014). The staff members selected for the survey are comfortable with online surveys due to their interaction with information technology systems. Finally, the online survey also provides the ability to build logic into the questions based on previous questions, decreasing cognitive requirements for completing the survey (Dillman et al., 2014). The built-in logic ensured that respondents were required to answer only follow-up questions related to their earlier responses.

I created the survey in and distributed it through Qualtrics. In addition to providing the needed logic-based question flow within the tool, Qualtrics also enabled distribution, tracking, and follow-up to non-respondents. Qualtrics enabled follow-up emails to only those who had not completed the survey. A targeted approach to follow-up emails is designed to improve response rates (Dillman et al., 2014). The survey was available from June 27, 2019 to August 1, 2019. According to the tracking available through Qualtrics, of the 724 staff members who received survey invitations, 479 started the survey, and 437 completed the survey. The survey had a response rate of 60 percent.

Survey Data Analysis

After the survey deadline passed, the survey data were downloaded into an Excel file. The file included the responses of the 479 individuals that started the survey. I took initial steps to de-identify the data by removing email address, survey start and finish information, and internet provider information. After initial response clean-up I completed data transformations. All data were first transformed from the textual survey to numerical values. The quantitative analysis of survey data included descriptive analyses, means testing, and crosstabulations. Analyses were done with Microsoft Excel and Statistical Package for the Social Sciences (SPSS).

Development of the Interview Protocol

The qualitative data for the study were collected through interviews. The interview protocol was designed to investigate process, interaction, context, and capacity of information brokerage.

Part D. Brokerage To explore process, interaction, context, and capacity of brokerage activities, data were collected through interviews. Interaction in information brokerage is reflected in the relationship between the individual requesting information and the information broker providing information, particularly trust (Guido et al., 2016). In development of the interview protocol, questions about interaction focus specifically on the individuals who make requests and the reasons they approach specific brokers, reasons for no longer providing information, and the additional value that brokers provide. Exploration of context extends to the interaction that can influence the response,

such as appeal, persuasion, urgency, and complexity. Finally, capacity is explored as the availability of the information broker to complete the requests (Guido et al., 2016). In addition to the aspects of brokerage identified by Guido et al. (2016), process was added as an additional aspect of brokerage for the purpose of the study to further investigate the activity that takes place during the interaction.

Brokerage Process. In order to ground the interview in the experience of information brokerage, the beginning of the interview focused on process to help them think further about their experiences. I first asked questions related to the process of providing information to individuals within the organization. Participants were first asked to provide an example of a recent experience: “Can you please give me an example of a recent request for information that came to you from someone here at the University? I’d like an example that is more or less typical of these requests.” As a participant provided an example, I asked follow-up prompts as needed, including the following: “Could you please tell me the story of this request? Who asked you for the information? What information were they asking for?”

I then asked participants to discuss further the process of sharing information: “I’d like to know more about how the process of responding to a request actually works. What is the process from the beginning to the end? I’m emphasizing the process itself here – how you actually respond. Please save comments about whether or not you respond to requests until later.” Focusing on the process helped to set the context of the transaction that takes place between the person asking for the information and the information broker. Taking a process approach facilitated investigation of the steps that take place

before separating out the different aspects that may influence or change that process.

Follow-up prompts included, “How do you typically provide the information?” and “Are there variations in how you present the information to them?”

Brokerage Interaction. The next set of questions relates to the interaction aspects of brokerage activities. Participants were asked to reflect on the people they interact with when providing information. First, I asked, “Who are the people you primarily get requests for information from?” Second, I asked, “Are there people that you do not, or no longer, give information to? Why?” Asking questions about interaction focuses on the person requesting the information. Studies show that the person making the request can influence a broker’s response (Guido et al., 2016). The requestor’s interaction is the first aspect of the exchange that can influence the outcome.

Next, I asked participants to think about why they are asked for information: “Why do you think people come to you to get information?” I followed up with an additional prompt: “Are there any other reasons why people come to you for information? (Please don’t be modest).” I encouraged the participants to think about how they see themselves as information brokers, but also to consider how they are perceived by others within the organization who reach out to them to request information. In addition to why people request information from information brokers, I asked, “What do you think people are hoping to get from you other than the information?” This question helped the participants consider further the perception that others have about their role in providing information. Research shows that the value that brokers provide frequently

goes beyond just the information resource being requested, such as connections across structural holes in the network (Quintane & Carnabuci, 2016).

Brokerage Context. The next set of questions relates to the context of brokerage activities. Participants were asked to share their experiences of how people approach them and appeal for information as well as what factors influence their response to a request for information. I first asked participants, “When people request information, how do they typically approach you?” This question gets at the context of the request. I then asked, “What’s usually the basis of their appeal for information? Are there other ways they appeal to you for the information?” I also asked, “What do they do to persuade you to provide information?” All three of these questions aim to show the persuasive aspects of requests for information, providing the context for the information exchange.

Next, I asked individuals about the contextual variables that could influence their response to the request. First, I asked, “What is it about a request that would make it more or less likely for you to respond?” The likelihood of an information broker responding is frequently studied, such as considering the likelihood based on the familiarity with contacts (Quintane & Carnabuci, 2016). After discussing the overall likelihood of response, I asked about specific factors that could influence the likelihood of response. I asked, “I’m interested in how certain factors might affect your response to a request. For example, how might the type of information being requested affect your response?” I also asked about other factors: “How about the position or role of the person requesting information? How about the urgency of the request? How about the complexity of the request?” All of these factors can play into the decision-making process that information

brokers go through when considering whether to provide information to the person making the request (Guido et al., 2016).

Brokerage Capacity. Finally, the last set of questions relates to the information broker's capacity to provide information. Participants were asked about the factors that influence their capacity to respond to requests. I asked participants about their own capacity: "I'm interested in how your capacity to respond influences your response to requests for information. If you have limited capacity (like time or workload), how does that affect your response?" In addition to the capacity of the information broker, this question addresses other capacity factors that might constrain a response.

Pretesting of the interview protocol. Pretesting of the interviews was completed through cognitive interviews with three individuals. I selected individuals in administrative and collegiate positions who exchange institutional information. I completed each interview in person at a location of their choice. As I administered the interview, I took notes of their answers to the questions as well as additional information they provided, including how they interpreted the question, why they provided their answer, and any other useful information. The feedback they provided resulted in adjustments to the language of questions as well as additional prompts.

Interview Data Collection

The qualitative data for analysis of brokerage were collected through interviews. The interviews were completed after approval of the dissertation proposal by the

dissertation committee and approval by the Institutional Review Board at the University of Minnesota.

Selection and recruitment of interview participants. Interview participants were selected based on their participation in activities in the university's data community. Participants were chosen purposely to reflect information brokers within central-administration units and collegiate units, with attention to equal representation of men and women.

I selected and contacted twelve participants via email to participate in the study. Participation was not contingent on or related to participation in the online survey. The potential interview participants represented central administration and collegiate units on the Twin Cities campus. Invitations were sent via email to identified participants in August and September 2019; timing of invitations was staggered due to the start of the fall semester. Participants were asked to take part in an interview to discuss their experiences in accessing and sharing University data and information. Three follow-up emails were sent to non-respondents in August and September, 2019. Of the participants contacted, eight agreed to participate in the study. All participants who agreed to participate were interviewed.

Conduct of the interviews. Interviews were completed between August 21, 2019 and October 2, 2019. All interviews were conducted in-person at a location chosen by the participant.

Prior to starting each interview, I provided the participant with a copy of the consent form. All participants completed the consent form. I took hand-written notes in

case any issues occurred with the audio recording and to verify the recordings if needed.

Analysis of Interview Data

The framework for the interview data analysis is reflected in Part D of the Conceptual Framework, shown in Figure 1. Qualitative analysis was completed by analyzing the roles of process, interaction, context, and capacity in relation to information brokerage activities through thematic coding.

Interview data preparation. Once interviews were complete, I uploaded the files to my computer and to a back-up hard drive. I utilized Rev, an online transcription software, to have the interviews transcribed, and then completed a check of the transcriptions and edited as needed to correct inaccuracies. The data were stored following the guidelines of the University of Minnesota for security and maintenance. Once all transcriptions were completed and reviewed, I extracted the raw data from each file and created a single file in Microsoft Word.

Participant responses are presented in Chapter 4, with some exceptions. All participants' identities are protected; names, phrases, or other identifying attributes have been restated or replaced with generic notation. In addition, conversational placeholders (such as "um" or "ah") have been removed to improve readability.

Analytical approach to interview analysis. The completion of the interview analysis was done utilizing a multi-cycle coding approach (Miles, Huberman, & Saldaña, 2020). In the first cycle of the interview analysis, I created theme codes to reflect the related concepts in the data; the approach of the first cycle allows for reflection of the

content at the same time as initial categorization of the content into themes (Miles et al., 2020). Due to the nature of the data and discussion of the action of information brokerage, the coding was primarily process coding, although concept coding was also necessary (Miles et al., 2020).

Utilizing the single Microsoft Word document created during the data preparation phase, I began coding the data by sorting all interviews by question. I completed initial coding in the order the questions were asked. At the same time that I began coding, I created a coding table in a separate document that included the thematic codes, descriptions, and notes as I grouped the data by common concepts in the responses to each question.

Upon completion of the initial coding, I completed a second cycle of coding in order to collect the summary themes into fewer groupings; these pattern codes utilize the thematic coding done during the first cycle to create “more meaning units of analysis” (Miles et al., 2020, p. 79). While completing the second cycle of coding, I continued to update the separate coding table to reflect the revised groupings of patterns. The number of patterns was different for each question, with some having a limited number of patterns, and others having more diverse answers and thus more patterns identified.

After the multiple steps of coding were complete and the data were sorted appropriately, I read through the data by theme and pattern before working through verification and conclusions. As I completed the data analysis, I considered my conclusions flexible in order to adapt to patterns and themes that became apparent. Based on the themes and patterns identified, I created the narrative in Chapter 4 that draws

conclusions about participants' experiences and perceptions of the information brokerage and theoretical concepts.

CHAPTER 4: RESULTS

This chapter presents the findings of the study, including results from both the survey and interviews. The research question is: *What roles do social capital and brokerage play in the exchange of institutional information among administrative staff in public universities?* The first section presents descriptive and bivariate analyses of survey data. The second section presents thematic analysis of the interview data on the role of brokerage in information exchange.

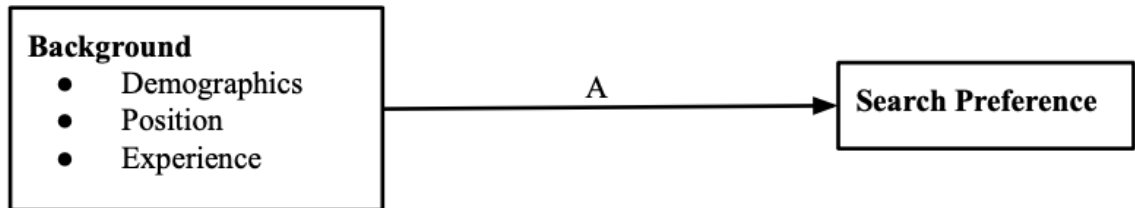
Survey Analysis

This section considers the relationships among background characteristics, search preference, social capital, and perceptions of information quality accessed. It begins with descriptive analyses and concludes with bivariate analyses of relationships among variables.

Part A. Relationship between Search Preference and Background

Part A of the survey analysis focuses on the relationship between background characteristics and search preference, presented in Figure 2.

Figure 2. *Relationship Between Search Preference and Background*



Background. Background variables are investigated as potential control variables in the study. These include age, gender, race/ethnicity and highest degree earned. In addition to demographic variables, position and work experience are examined, including position category, number of years worked at the university, and number of positions held at the university.

Table 6 presents the distribution of responses for age, gender, and race/ethnicity. Most respondents (79 percent) are between 30 and 59 years old, with the largest number of respondents (33.1 percent) being 50-59 years old. A majority of respondents (54.7 percent) identify as female, whereas 40.7 percent identify as male. A majority of respondents (81.2 percent) indicated their race/ethnicity as white.

Table 6 also presents data on respondents' work background including position, number of years worked at the university, and number of positions held at the university. The two largest groups of respondents were Information Technology Staff (26.2 percent) and Departmental Staff (24.9 percent). A majority of respondents (86.8 percent) indicated a staff position, whereas 12.8 percent of respondents indicated director-level positions and 0.6 percent of respondents indicated assistant or associate vice president positions. Respondents had, on average, a high number of years of work experience: 46.2 percent indicated 16 or more years, while 20.6 percent indicated more than 25 years. The number of positions held at the university by respondents ranged from one to six or more. The highest percent (40.8) indicated 2-3 positions while 23.3 percent indicated one position and 35.8 percent indicated four or more positions. Note that there were a substantial number of missing values for background characteristics.

Table 6: *Distribution of Background Characteristics (N=437)*

	N	Percentage
Age		
Under 29 years old	16	4.7 %
30 - 39 years old	72	20.9
40 - 49 years old	86	25.0
50 - 59 years old	114	33.1
60+ years old	43	12.5
Prefer not to respond	13	3.8
Missing	93	
Gender		
Female	188	54.7
Male	140	40.7
Not listed or prefer not to respond	15	4.4
Missing	93	
Race or Ethnicity		
American Indian or Alaska Native	2	0.6
Asian	18	5.3
Black/African American	11	3.2
White	277	81.2
Multiple or not listed	8	2.4
Prefer not to respond	25	7.3
Missing	96	
Highest Degree Earned		
High school diploma	13	3.8
2 year degree	21	6.1
4 year degree	159	46.2
Master's degree, professional degree or equivalent	140	40.7
Doctorate	11	3.2
Missing	93	

Table 6: *Distribution of Background Characteristics (N=437), continued*

	N	Percentage
Position		
Departmental staff	79	24.9
Collegiate staff	27	8.5
Facilities services staff	6	1.9
Finance services staff	37	11.7
Human resources staff	24	7.6
Research staff	2	0.6
Student services staff	11	3.5
Information technology staff	83	26.2
Institutional research staff	6	1.9
Provost staff	4	1.3
Academic director	1	0.3
Finance director	11	3.5
Human resources director	2	0.6
Research director	1	0.2
Student services director	7	2.2
Information technology director	13	4.1
Assistant/Associate vice president	2	0.6
Missing	120	
Years Worked		
Less than 1 year	8	2.3
1 – 2 years	21	6.1
3 – 5 years	42	12.2
6 – 10 years	51	14.8
11 – 15 years	63	18.3
16 – 25 years	88	25.6
More than 25 years	71	20.6
Missing	93	
Number of Positions		
1 position	80	23.3
2 – 3 positions	140	40.8
4 – 5 positions	77	22.4
6 or more positions	46	13.4
Missing	94	

Search preference. Table 7 presents the distribution of respondents' answers to questions about how likely they are to utilize information technology systems or to utilize social networks by contacting other people to collect information. The majority of respondents (94.3 percent) indicated that they were either likely or very likely to utilize an information technology system to gather information. Just over one half of respondents (52.6 percent) indicated that they were likely or very likely use social networks to gather information.

Table 7 also presents the distribution of search preference. About half of respondents (48.2 percent) indicated that they were likely or very likely to utilize an information technology system, but not likely to use social networks. Likewise, about half (49.2 percent) indicated that they were likely or very likely to utilize an information technology system *and* were also likely or very likely to use social networks. In contrast, very few respondents indicated they were likely only to use social networks or unlikely to utilize either an information technology system or to use social networks.

Table 7: *Distribution of Respondents' Likelihood to Utilize Information Technology Systems or to Social Networks to Gather Information (N=437)*

	N	Percentage
Likelihood to Utilize Information Technology Systems		
Very likely	363	83.6 %
Likely	45	10.7
Unlikely	8	1.9
Very unlikely and not at all	6	1.4
Likelihood to Utilize Social Networks		
Very likely	82	20.3
Likely	130	32.3
Unlikely	132	32.8
Very unlikely and not at all	59	14.7
Search Preference		
Information technology system only	202	48.2
Social Network only	6	1.4
Information technology system and social network	206	49.2
Neither information technology system nor social network	5	1.2

Search preference in relation to background. Table 8 presents the crosstabs of the relationship between search preference and background variables of demographics, position, and experience. Several groups showed higher likelihood to utilize both information technology systems and social networks over only using information technology systems: people of color (31.6% vs. 68.4%), individuals in roles of director and above (33.3% vs. 66.7%), and individuals that have worked at the university fewer than 2 years (31% vs. 69%). However, no background variables showed statistical significance in relationship to search preference.

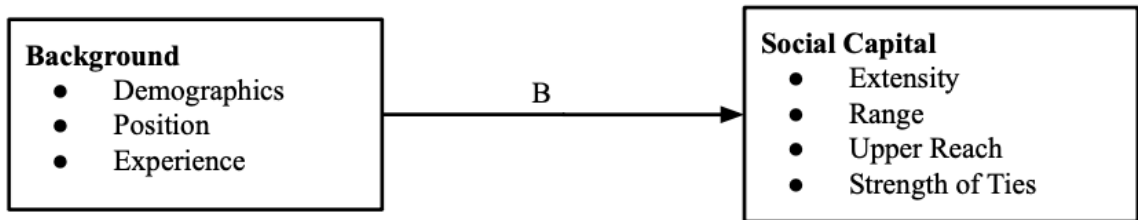
Table 8: *Relationship of Respondents' Likelihood to Utilize Information Technology Systems or Social Networks to Gather Information and Background (N=437)*

	Prefer Information Technology Systems	Prefer Information Technology Systems or Social Networks	Chi- Squared
Overall	49.5 %	50.5 %	
Age			
Under 50	44.4	55.6	0.22
50 and over	47.1	52.9	
Gender			
Female	44.0	56.0	0.55
Male	48.2	51.8	
Race or Ethnicity			
People of Color	31.6	68.4	3.69
White	48.2	51.8	
Highest Degree Earned			
High school/College	47.6	52.4	0.58
Graduate	43.4	46.6	
Position			
Staff	48.3	51.7	3.28
Director and above	33.3	66.7	
Years Worked			
2 years or less	31.0	69.0	5.85
3 – 10 years	39.6	60.4	
11 or more years	50.5	49.5	
Number of Positions			
Less than 4 positions	46.5	53.5	0.06
4 or more positions	45.1	54.9	

Part B. Relationship Between Social Capital and Background

Part B of the survey analysis focuses on the relationship between background and social capital measures, presented in Figure 3.

Figure 3. *Relationship Between Social Capital and Background*



Social capital. The descriptive analysis of social capital is presented in several tables. Table 9 presents the strength of ties of when individuals exchange (provide and receive) information with people in academic positions. The highest mean for providing to individuals in academic positions (13.22 interactions) was to departmental staff with a standard deviation of 26.53. The lowest mean for providing to individuals in academic positions (0.17 interactions) was to the president with a standard deviation of 1.47. The highest mean for receiving information from individuals in academic positions (5.16 interactions) was from departmental staff with a standard deviation of 11.31. The lowest mean for receiving information from individuals in academic positions (0.01 interactions) were from the president and provost, with standard deviations of 0.12.

Table 9: *The Number of Times Respondents Exchange (Provide and Receive) Information With Individuals in Academic Position Categories: Means and (Standard Deviations)*

	Provide Information	Receive Information
President	0.17 (1.47)	0.01 (0.12)
Provost	0.18 (2.17)	0.01 (0.12)
Assistant/associate/vice provost	0.91 (4.78)	0.24 (2.79)
Provost staff	0.42 (2.53)	0.16 (1.30)
Dean	1.18 (5.22)	0.28 (2.37)
Assistant/associate dean	2.39 (10.20)	0.33 (2.91)
Academic director	2.38 (12.62)	0.67 (7.14)
Faculty	7.95 (24.39)	1.59 (6.95)
Collegiate staff	4.80 (11.00)	2.84 (13.08)
Department chair	2.90 (8.58)	0.44 (2.27)
Department staff	13.22 (26.53)	5.16 (11.31)

Table 10 presents the strength of ties when individuals exchange (provide and receive) information with people in administrative positions. The highest mean for administrative positions (9.06 interactions) is services staff with a standard deviation of 28.36. The lowest mean for administrative positions (0.20 interactions) is institutional research director with a standard deviation of 1.10. The highest mean for administrative positions (5.46 interactions) is services staff with a standard deviation of 19.5. The lowest mean for administrative positions (0.04 interactions) is vice president with a standard deviation of 0.33.

Table 10: *The Number of Times Respondents Exchange (Provide and Receive) Information With Individuals in Administrative Position Categories: Means and (Standard Deviations)*

	Provide Information	Receive Information
Vice president	0.66 (4.01)	0.04 (0.33)
Assistant/associate vice president	1.17 (4.80)	0.24 (1.20)
Institutional research director	0.20 (1.10)	0.07 (0.63)
Information technology director	0.41 (1.61)	0.15 (1.06)
Services director	2.53 (8.21)	1.29 (5.90)
Institutional research staff	0.77 (3.21)	0.71 (4.17)
Information technology staff	2.83 (12.17)	1.95 (8.06)
Services staff	9.06 (28.36)	5.46 (19.50)

Means testing. Table 11 presents the means and standard deviations of social capital variables. Extensity, with a highest possible score of 19 positions with interactions, has a mean of 5.19 positions and standard deviation of 3.32 positions. Range, with a highest possible score of 5 has a mean close to the center (2.27) as does upper reach, with a highest possible score of 5 and a mean of 2.41. Finally, the total strength of ties (the sum of interactions, both providing and receiving information across all positions) has a mean of 70.53 interactions each month with a standard deviation of 103.73.

Table 11: *Analysis of the Variance of Social Capital Variables: Means and Standard Deviations*

	Mean	Standard Deviation
Social Capital		
Extensity	5.19	3.32
Range	2.27	1.13
Upper reach	2.41	1.11
Total strength of ties	70.53	103.73

Social capital and background. Table 12 presents the relationships between search preference and background variables of demographics, position, and experience. Of the background variables considered, three characteristics have statistically significant differences with social capital: highest degree earned, position group, and gender. Gender showed statistical significance with social capital variables of range and upper reach. Women have statistically significant higher levels of network range and upper reach. An individual's highest degree earned showed statistical significance with social capital variables of extensity, range, and upper reach. Individuals with graduate degrees have statistically significant higher levels of extensity, range, and upper reach. The position group that an individual is part of showed statistical significance with social capital variables of extensity, range, upper reach, and strength of ties. Individuals in positions of director or above have statistically significant higher levels of extensity, range, and upper reach.

Table 12: *Analysis of the Variance of Social Capital Variables by Background: Means (N=437)*

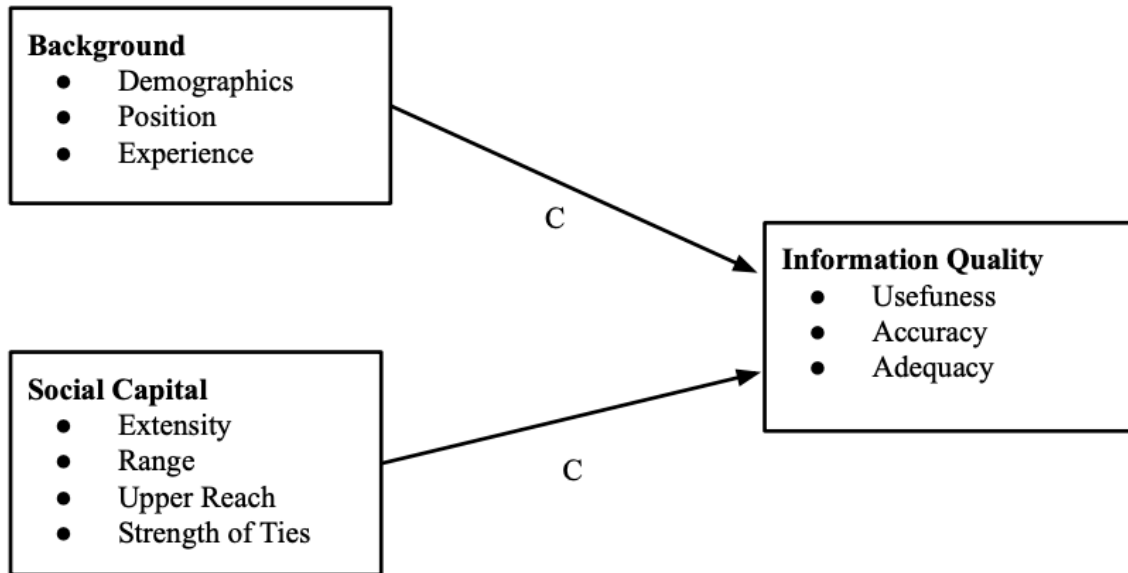
	Network Extensivity	Network Range	Upper Reach	Strength of Ties
Overall	5.19	2.27	2.38	70.53
<u>Demographics</u>				
Age				
Under 50	5.10	2.29	2.40	60.62
50 and over	5.30	2.28	2.39	76.26
Gender				
Female	5.42	2.40**	2.52**	70.93
Male	4.80	2.13	2.24	61.61
Race or Ethnicity				
Persons of Color	4.66	2.39	2.45	52.63
White	5.28	2.29	2.42	66.81
Highest Degree Earned				
High school/College	4.56***	2.06***	2.17***	63.99
Graduate	6.03	2.55	2.67	79.42
<u>Position</u>				
Staff	4.83***	2.19***	2.30***	66.29**
Director and above	8.17	3.10	3.17	104.76
<u>Experience</u>				
Years Worked				
2 years or less	4.62	2.14	2.28	43.07
3 – 10 years	4.78	2.18	2.32	64.57
11 or more years	5.47	2.34	2.43	77.06
Number of Positions				
Less than 4 positions	5.00	2.20	2.32	64.97
4 or more positions	5.62	2.43	2.52	81.54

Significance: * p<.05 ** p<.01 *** p<.001

Part C: Relationships Among Perception of Information Quality, Social Capital and Background.

Part C of the study investigates relationships among perception of information quality, social capital, and background, presented in Figure 3.

Figure 4. *Relationship Among Information Quality, Social Capital, and Background*



Descriptive analyses of measures of perception of information quality were completed as well as bivariate testing of the relationships between background, social capital, and perceptions of information quality measures.

Perceptions of information quality. Perception of information quality is the dependent variable for the study. Perception of information quality is divided into three components: usefulness, accuracy, and adequacy as well as a composite score. Dividing perceptions of information quality into three components shows the extent to which people perceive different aspects of the quality of the information retrieved. The composite score is the sum of the three components.

Table 13 presents the components of perception of information quality accessed through information technology systems and social networks. For those accessing information through information technology systems, overwhelmingly, respondents indicated high value of information quality in all three categories: 87 percent found it very or extremely useful, 87.1 percent found it very or extremely accurate, and 93.8 percent found it somewhat or extremely adequate

Table 13: *Distribution of the Components of Perceived Information Quality (Usefulness, Accuracy, and Adequacy) That Respondents Retrieved Through Information Technology Systems and Social Networks (N=437)*

	Through Information Technology Systems	Through Social Networks
Usefulness		
Extremely useful (4)	48.5 %	17.7 %
Very useful (3)	38.5	50.8
Moderately useful (2)	12.0	25.8
Slightly useful (1)	0.8	4.6
Not at all (0)	0.3	1.1
Accuracy		
Extremely accurate (4)	37.7	19.0
Very accurate (3)	49.4	52.5
Moderately accurate (2)	10.7	22.5
Somewhat accurate (1)	2.2	5.1
Not at all (0)	0.0	0.8
Adequacy		
Extremely adequate (4)	43.9	37.0
Somewhat adequate (3)	49.9	48.0
Neither adequate or inadequate (2)	3.5	10.5
Somewhat inadequate (1)	2.5	4.6
Extremely inadequate (0)	0.2	0.0

For those accessing information through social networks, in terms of usefulness, 189 respondents (50.8 percent) indicated the information to be very useful with 96 respondents (25.8) indicating moderately useful and 66 respondents (17.7 percent) indicating extremely useful. For accuracy, 196 respondents (52.5 percent) indicated very accurate, 84 respondents (22.5 percent) indicated moderately accurate, and 71 (19 percent) indicated extremely accurate. Adequacy results include 179 respondents (48 percent) indicated somewhat adequate and 138 respondents (37 percent) indicated extremely adequate.

Table 14 presents the composite information quality score, which is a combination of the three components of information quality (usefulness, accuracy, and adequacy) accessed through information technology systems and social networks. For those with a high likelihood to use information technology systems, the largest number, 90 respondents (22.4 percent) had the highest score of 12, while 67.9 percent had scores of 8 to 11. For those accessing information through social networks, the score of 10 had 80 respondents (21.4 percent) with 18.5 percent of respondents 11 or above and 59.3 percent of respondents below 10.

Table 14: *Distribution of the Composite Perceived Information Quality Score for Information Retrieved Through Information Technology Systems and Social Networks (N=437)*

	Through Information Technology Systems	Through Social Networks
2	0.0 %	0.8 %
3	0.0	1.3
4	0.5	2.7
5	0.5	1.9
6	2.5	6.2
7	6.2	9.4
8	10.0	16.6
9	19.2	21.2
10	19.7	21.4
11	19.0	8.8
12	22.4	9.7

Note: Potential composite score ranged from 0 to 12.

Means testing. Table 15 presents the means and standard deviations of perceptions of information quality. Composite scores of information quality and the three components for retrieving information from information technology systems and receiving information through social networks are presented. Retrieving information through information technology systems has a higher composite quality score of 9.91 versus a composite quality score of 8.80 when receiving information through social networks.

Table 15: *Analysis of the Variance of Information Quality Variables: Means and Standard Deviations*

	Mean	Standard Deviation
Information Quality		
Composite information technology system score	9.91	1.72
System usefulness	3.34	0.74
System accuracy	3.22	0.73
System adequacy	3.35	0.69
Composite social network score	8.80	2.09
Network usefulness	2.80	0.82
Network accuracy	2.84	0.82
Network adequacy	3.17	0.79

An analysis of information quality variables in relation to background variables was completed. Multiple background variables showed statistically significant differences in relationship to the perception of overall information technology system quality. Age showed statistically significant differences in relationship to the perception of information quality through information systems, with respondents under 50 perceiving overall lower quality of information gathered as well as usefulness of information gathered through information systems than those 50 and above.

Respondents with higher degrees earned perceive on overall lower quality of information gathered through information technology systems. In addition, the background variable of position showed statistically significant differences in relationship to the perception of information quality through social networks, with staff respondents perceiving overall lower quality of information gathered from social networks than those in positions director and over.

Table 16: *Analysis of the Variance of Perceptions of Information Quality Variables by Background: Means (N=437)*

	System Quality	Network Quality	System Useful	Network Useful	System Accurate	Network Accurate	System Adequate	Network Adequate
Overall	9.91	8.80	3.34	2.80	3.22	2.84	3.35	3.17
<u>Demographics</u>								
Age								
Under 50	9.72*	8.83	3.28*	2.84	3.18	2.83	3.28	3.19
50 and over	10.18	8.78	3.48	2.77	3.29	2.87	3.42	3.14
Gender								
Female	9.98	8.82	3.41	2.83	3.21	2.81	3.36	3.18
Male	9.86	8.76	3.32	2.77	3.24	2.90	3.33	3.13
Race or Ethnicity								
People of Color	10.13	8.38	3.38	2.69	3.33	2.72	3.41	2.97
White	9.92	8.89	3.38	2.83	3.21	2.89	3.34	3.20
Highest Degree Earned								
High school/College	10.10*	8.82	3.43	2.79	3.27	2.87	3.40	3.19
Graduate	9.65	8.77	3.28	2.82	3.13	2.81	3.26	3.14

Significance: * p<.05 ** p<.01 *** p<.001

Table 16: *Analysis of the Variance of Perceptions of Information Quality Variables by Background: Means (N=437), continued*

	System Quality	Network Quality	System Useful	Network Useful	System Accurate	Network Accurate	System Adequate	Network Adequate
<u>Position</u>								
Staff	9.91	8.63*	3.38	2.74*	3.19	2.79	3.35	3.12
Director and above	9.71	9.41	3.21	3.05	3.33	3.05	3.17	3.32
<u>Experience</u>								
Years Worked								
2 years or less	9.72	8.86	3.21	2.75	3.14	2.82	3.38	3.29
3 – 10 years	9.82	8.79	3.32	2.78	3.11	2.82	3.39	3.24
11 or more years	9.96	8.80	3.40	2.81	3.27	2.86	3.31	3.12
Number of Positions								
Less than 4 positions	9.89	8.73	3.34	2.77	3.18	2.82	3.36	3.13
4 or more positions	9.93	8.91	3.40	2.85	3.27	2.88	3.29	3.22

Correlation testing. Correlations of information quality and social capital are presented in Table 17. Due to the calculations of social capital measures, the social capital variables were highly correlated with each other. Similarly, components of perceptions of information quality were also highly correlated with each other. Social capital variables of network extensity and network range showed statistical significance with the perceived adequacy of information retrieved from information technology systems, while network extensity showed statistical significance with perceived usefulness of information retrieved through social networks.

Table 17: *Analysis of the Correlations of Perceptions of Information Quality and Social Capital*

	1	2	3	4	5	6
1. Composite information technology system score	1.00					
2. System useful	.80***	1.00				
3. System accurate	.80***	.45***	1.00			
4. System adequate	.79***	.44***	.46***	1.00		
5. Composite social network score	.40***	.25***	.39***	.32***	1.00	
6. Network useful	.29***	.23***	.27***	.20***	.85***	1.00
7. Network accurate	.42***	.19***	.47***	.35***	.87***	.60***
8. Network adequate	.32***	.22***	.27***	.28***	.86***	.59***
9. Extensity	-.04	.08	-.02	-.16**	.06	.12*
10. Range	-.05	.07	-.06	-.12*	.04	.09
11. Upper Reach	-.04	.07	-.06	-.10	.04	.06
12. Total Strength of Ties	.07	.11*	.04	.003	.005	.04

Significance: * $p < .05$ ** $p < .01$ *** $p < .001$

Table 17: *Analysis of the Correlations of Perceptions of Information Quality and Social Capital, continued*

	7	8	9	10	11	12
7. Network accurate	1.00					
8. Network adequate	.65***	1.00				
9. Extensity	.02	.02	1.00			
10. Range	-.002	.02	.78***	1.00		
11. Upper Reach	.02	.01	.68***	.96***	1.00	
12. Total Strength of Ties	-.02	-.004	.38***	.20***	.17**	1.00

Significance: * p<.05 ** p<.01 *** p<.001

Interview Analysis

The second part of the research question focuses on the role of brokerage in administrative staff's access to information. Information brokerage, a form of information gatekeeping, plays a significant role in the ability of individuals to gather the information they need from other people. There are many constraints on information brokers, related to the interaction that takes place, the context of the request, and the capacity of the information broker (Guido, 2016). In this section I describe findings based on interview analysis completed on interviews with eight information brokers at the University of Minnesota. Interviews were completed in person following a semi-structured interview structure.

This section presents the findings from interviews completed with eight staff and administrators from a research-intensive university, including a profile of participants and findings related to three aspects of information brokerage: interaction, context, and capacity. Interaction is the relationship between the brokers and the users (Guido et al., 2016), including individuals making requests, reasons for the request, and influences on how and why information is provided. Capacity is the availability of the information broker, particularly their time to respond to requests (Guido et al., 2016). Contextual aspects of the request, such as persuasion, urgency, and complexity of requests are included in the concept of context. In addition to the aspects of interaction, context, and capacity, process is considered in this study. The process of providing information brokerage, that is, the steps that brokers take to receive requests and provide information is an important aspect to consider in how the activity takes place and to ground the other influences of the

interaction, context, and capacity. Process, interaction, context, and capacity are all interconnected in information exchange within institutional settings and their perspectives.

To begin the interview, I asked the participant for permission to record the interview. I then asked about their position, the unit of the university in which they work, the duration of their employment, and the time they have been in their current position.

Next, I described the concept of institutional information, which is key for the questions in the interview. For the purpose of the study, I described institutional information as administrative data the University collects such as data about students, employees, and finances, which could be detailed (when the requestor wants very specific data) or summarized. I confirmed that the interviewee understood my definition of institutional information, and I answered any questions they had before proceeding with the interview.

Profile of Interview Participants

The interview participants' backgrounds at the university are relevant aspects to the information brokerage they provide. Of the eight participants interviewed, five work in collegiate units and three work in central administrative units. Six of the participants are directors or administrators and two are analysts. Five of the participants have been at the university for over 20 years, while four have been in their current positions for five to ten years.

Brokerage Process

In order to help participants focus on the experience of information brokerage in their work, I first asked participants to think more specifically of the brokerage process before asking about other concepts. The process of information brokerage is the act of receiving a request and providing the information. Individuals who frequently provide information may not think about the specific steps they take, and so initial questions guided them through the examples of requests and the specific steps they take to respond.

Frequently described as the information cycle, the interaction between a person requesting information and a person providing information is a fundamental aspect of information exchange. In the interview, I asked about the interaction, first asking each participant to tell a story about a recent request. After the interviewee told a story, I asked about the more general process of responses to requests, about those who request information from them, and about those to whom they might not provide information to.

Stories of typical information requests. To start the discussion, I asked the opening question, “*Can you please give me an example of a recent request for information that came to you from someone here at the University? I'd like an example that is more or less typical of these requests. Could you please tell me the story of this request?*” I included follow-up prompts about specifics if they did not provide the concepts in their answers including, “*Who asked you for information? What information were they asking for?*” These questions provided an opportunity for each participant to think about and talk through their roles as information brokers to others within the organization. As participants described a recent request, they each focused on various

parts of the cycle of information requests, such as the request itself, the interaction with others to determine the need, the steps taken to complete the work, and the presentation of the information requested.

Who are the requestors. Many responses to my request for an example started with who asked for the information. Over half of the participants named an individual who made the request, whether a dean, administrator, or colleague. Several participants discussed the request as coming from formal or informal working groups that had a particular need for information. One participant explained that “the solution really came out . . . it was a discussion with a group of people, groups of people, that were trying to always put . . . almost the same data together independently, and saying, ‘Can we do this once?’ ”

Types of requests. Nearly all participants described the type of request based on the frequency of the request. Over half of the participants described a single request for a specific piece of information. One participant described the situation of when “They're updating some information about the budget, the tuition model, and needed to use data from the previous school year.” In contrast to the specific, single requests, other participants described recurring requests that come to them on a regular, usually annual, basis. One participant said,

“There's a few others that are kind of like that, where there's some established form, whether it's required by somebody else or just something that we've done, where there's sort of ... there's a thing we produce every year at a given time.”

Processing the requests. Once a request was received, there were various steps in processing the request. Participants focused primarily on technical steps or analyses completed and working with others to complete the work. Half of the participants described specific steps they completed to retrieve the information request, such as challenges of replicating information provided in the past. A collegiate director explained:

“I went back and tried to run the query again ... But what I found was, when I went back in time and tried to run the data, ... to make sure that it was reflecting the data that I had from way back when, and then I couldn't reconcile the two very easily.”

In contrast to those who described technical steps, the others focused on analysis steps they completed in gathering the information. One participant described the analysis as the important part of the service that they provide: “And so one of my arts is data analysis; the other part is actually putting the processes in place to collect some of this data.”

Another important aspect of processing the was the involvement of other colleagues in completing the information request. Some participants described the importance of involving others who do similar work, so as not to replicate others' work. One administrative director said,

“I end up having to make this judgment call about who has the best data. Sometimes I talk to my colleagues about that in other colleges, and sometimes I just make the call myself because I have enough experience to know that I'm not

going to go with... Well, I'd rather not go with my own query if there's something the institution supports, and is put out there, that I can use.”

Others described the experience as either gathering the data or being the bridge between the requestor and an individual who was doing the technical work to gather the data.

Serving in either role, depending on the situation, one participant explained, “Sometimes, I'm doing the data pulling myself. Sometimes I'm just that go-between person. In this case, I was trying to get enough information for my analyst to figure out what to do.”

Half of the participants spent time describing the rationale behind the request. In some cases, it is to explain data that are provided publicly, such as collegiate rankings. One administrative director explained, “They release data. We have to have an explanation that we can let out into the public almost immediately for why we're ranked the way we are.” In contrast, several participants described the need for the information as justification for a decision or action, such as programming decisions. One collegiate director said, “I ended up having to dig up some data about the reasons we canceled that program ... and we had some very good data... We used data to make the decision about canceling the program.”

The cycle of information requests and brokerage. The following two stories related by respondents illustrate the kinds of requests these information brokers receive. The first story, told by an administrative director, concerns a working group. The second story, told by a collegiate director, centers on a dean.

A working group request. One participant in an administrative unit, describes a request from a working group. The administrative director described the request coming

from, “probably a combination of the budget office [and] human resources.” The director explained, “the group was interested in understanding exactly what the balance sheet numbers were and how they were compared to what the budget is going to be related to [the units affected].” The request had multiple facets. This participant went on:

“As we get closer to dealing with it and everything, and understanding all the budget as well as political issues that we're dealing with on that topic, people were looking for that specific information to know, what is the difference? What units really did we accrue, over-accrue for, or under-accrue for?”

Ultimately, request resulted in a specific set of data being gathered in order to answer the question in front of the group, with a straightforward set of data needed. The participant provided the needed data to the group. The director said, “So we had to come up with what's in the balance sheet and compare it to the actual, what they're budgeting for that.”

A dean's request. In the second story, a participant provided an example of a recent request that had come from a Dean: “A recent request I had from the Dean was on looking at ratios of faculty to staff, but...staff in certain categories that we don't necessarily group them in.” After receiving the initial request, the participant described working with others to determine how to answer the request: “In this case, I was trying to get enough information for [an analyst] to figure out what to do,...to think about things in terms of mission support versus other operational support.”

The request required approaching the data in a different way, so they decided to take a sample of data as a starting point:

“As I was working with [the analyst], we decided,...let's break it down. We'll take one department. We'll pull a bunch of data. We'll get it into some format that we think that then I can take it to the Dean and say, ‘Okay, here's the data and look.’ Because sometimes people need to see something before they really can get to what they want, and to help us narrow down the parameters.”

Finally, the participant described how a sample of data is used in the back and forth with the requestor: “So the next time I meet with them I say, ‘Okay. Here's some of the data. Now, what specifically do you need?’ So, a lot of it's at that iterative process, especially when....I am getting questions on things we haven't necessarily done before.”

The process of responding to requests. The opening question about a story of providing institutional information created a foundation for participants as they answered further questions on the process of information brokerage. To get beyond a single example of the process of providing information participants were asked, *“I'd like to know more about how the process of responding to a request actually works. What is the process from the beginning to the end? I'm emphasizing the process itself here – how you actually respond.”* I included follow-up prompts about specifics, including, *“How do you typically provide the information? Are there variations in how you present the information to them?”*

Receiving a request for information. When describing how they receive requests for information, over half of participants described receiving the requests via email. Some participants described the request via email as unpredictable. One respondent that explained, “Those will come directly to me via email or phone call or text or something

like this...any time of the day or day of the week.” In contrast, other participants described regular requests that always come to them via email. For example, one participant said:

“So, for this one particularly, [the requestor] is always good about sending me an email sometime in the summer reminding me that this is coming. And then I will usually send back a perfunctory email to remind her that the deadline is very, very quickly after the day [the data] becomes available.”

Some participants identified meetings, particularly one-on-one meetings, as the source of requests for information. One participant explained, “It usually starts out with just a question in my one-on-one weekly meetings. Usually, it's the question because there is some problem we're trying to solve, or some goal that we're trying to achieve and it'll start as a question.” Only one participant described typical requests as quick one-off questions usually via phone calls: “Although a lot of those are quick, one-offs from a vice president or university relations, or you get the call from [the requestor] down at the legislature.”

Gathering the information. Participants described the process of gathering and preparing the information. Half of participants described first trying to determine whether or not the information requested existed somewhere else to which they could point the requestor. Most participants described this as the ideal path; one participant described the benefit of this solution: “There are some requests for information that are already on our public websites somewhere. That is the official number of the university that nobody would dispute. The person just doesn't know it's there, or they're not quite sure of really

the definition that they're looking for.” One participant also described sending requestors to a public site to see if it could meet their needs first: “Well sure, sometimes I'll get questions and I'll say, ‘You know I think most of this is on our website.’ And I'll send them over a link and say, ‘If that's not enough get back to me.’ ” Nearly half of participants described automation for providing information. One participant explained the importance of this approach: “I am a big believer that anything that's done more than once should be automated. Anything that I can reuse, I'm going to reuse.”

Preparing information requested. When describing the process of preparing information requested, participants focused primarily on working with the requestor or others to ensure the correct information was gathered, and verifying that the information was correct.

Sometimes the information is not located in a public place. Over half of participants described back and forth communications with the requestor to gather more information, to confirm the information needed, or to verify that certain information is sufficient. Participants described such exchanges along a spectrum of approaches and needs. Some exchanges are clarifications: “Well there's often some back and forth questions, clarifying questions that I need, or would need to know to do it the right way.” Other participants described the exchange as determining what the requestor needs: “Then it's circling back again, showing the data, and then they'll start to pick at it. They'll think of more questions and then, going back and then probably coming up with something that's maybe 90 percent what they wanted at that stage.” Finally, several

participants work as intermediaries between the requestor and the data analysts who are pulling the data from the source and the requestor. One participant described their role:

“A lot of times with those types of requests, my value add is only I think people come to me sometimes because they know they can ask a modestly well-formed question, and I can translate it for people that actually have to, they have to know, which field are you going to use here...Where it's a lot of times if that requestor with the modestly well-formed question had to talk directly to somebody that's really deep in the data, it's hard. They can't talk to each other sometimes, and so I play that bridge.”

Half of participants described validation of the information as part of their process. Several participants said that the verification is in the technical systems, making updates to code as needed. One participant described a step-by-step approach: “I take the spreadsheet that was shared, find the source directory, look at the documentation, look at the SQL [structured query language] code, understand what's needed, and then make the appropriate updates to the SQL code that's used to get information from.” In contrast to a verification of code, other participants described using the technical systems in order to see what they need to look into. One participant said, “Sometimes I know of things that I want to account for ahead of time. In this, usually I run it and see what happens. It's a little my style anyway. I've always been sort of a run something and look at the errors and then go back and figure it out.” In contrast to participants who described technical aspects of verification, one participant described their role in verification as confirming for the requestor the information the requestor already has: “The person asking either feels

uncomfortable that they know how to find that right number, or sometimes just want to check that says, 'I think it's 30,823, I'm looking at your website link.' My website, ha. Then I look at it. Yup, you got it. Go.' ”

Providing the information. Participants were asked to discuss the formats in which they provide information. All of the participants indicated providing information through tables, primarily through spreadsheets. One participant said,

“But then there are other folks who... are much more responsive to sort of visual dashboards, things going up or down or whatever, instead of just the numbers... We have to be willing to provide both and be sensitive to all of this. So tables of numbers are great for some folks. But charts are great for other folks.”

Sometimes the role of information broker was described as taking detailed information and make it clearer in a variety of ways. One participant said:

“So often, what I get is, it's not the raw data, but it's maybe, it's in a format that is just too detailed for senior leadership in some way. And so I will take that information and summarize it up in a way, thinking about who I am giving that information to and what purpose they're asking it for.”

Another participant described changing data into other formats like graphs:

“So you look at them, and it's not intuitive to someone who's not building the pivot table, what those, like, sub-headers in the group bar and things like that mean. And so sometimes, if this is an important graph that we may want to show to all the department heads, or something like that, I may take the whole thing out of the pivot table and make it pretty in....I may use it to get the picture that I want

or tell the story that I want, and then take it out of there and format it in a prettier way so that it's consumable to others, because pivot table is pretty technical I guess.”

One participant talked about providing the information through a presentation: “It's usually something that we put into a presentation format. And it does get presented, usually to the department heads or some group, because whatever we're trying to solve or whatever goal we're trying to do usually involves that broader consultation.”

Over half of participants said that they provide more than just the information as a response. Most participants emphasized the importance of summarizing or providing analysis with the data through narrative descriptions. One participant said,

“However, I always provide a summary document, because if you're giving a spreadsheet that even has a pivot table with summaries, they also don't want to read through it to find the grand total and all different things. So I typically will provide some sort of summary or analysis in words for them to understand what it is they're looking at.”

Another focused on providing additional information, but noted the importance of “getting the answer down to the proverbial one pager, but having the right rows and columns, if it's a table. And also the right footnotes there, so that they actually know what they're presenting.” The participants who discussed the importance of their analysis, of providing the requestor with the context, “It's kind of like, what is it showing?”

Brokerage Interaction

The interaction between the requestor of information and the broker providing the information can be influenced in many ways. Although the focus of Guido et al. (2016) is specifically on the trust built through interactions, the concept of interaction was expanded for this study to investigate further the individuals requesting information and why they approach specific information brokers, reasons for not providing information, and the additional value that information brokers provide in the interaction.

Those requesting information. One of the key aspects of the information exchange is where the request comes from. To examine the initiation of the request in more detail, I first asked, “*Who are the people you primarily get requests for information from?*” The question deals with the typical interactions that the information broker has with others in the organization. The requestors identified by the participants fall into two general categories: administration/leadership and supervisors.

Administrators and leaders. Nearly all participants described administrators or leaders as the primary people from whom they receive requests. Participants who work in collegiate units described requests coming primarily from collegiate leaders. One participant listed a range of collegiate leaders: “Mostly from deans, associate deans and department heads. Sometimes maybe from directors of an operational area, like HR [human resources] directors.” Several participants specifically described requests from the dean of their college. For example, one participant described the requestor in the context of their role in the process: “I get requests for information from the

Dean...because a lot of my role is advising and recommending, making data-driven decisions. I mean, helping everyone make data-driven solution or decisions.”

In addition to collegiate leadership, participants who work in central administration units identified a broader set of administrators and leaders as the people from whom they receive requests. Some participants described very specific groups of leaders. One participant explained that the requests coming in are not just about the data:

“Let's just call it director level, though that could be both in administrative or academic units. [Financial] managers I would throw in there, that don't necessarily have a specific request about a data element, but want to understand how the data in whatever world they're using actually works...It's not necessarily a request for data as it is *about* the data.”

When describing whom they receive requests from, other participants noted that people in specific roles make the requests. One participant said, “Sometimes it's going to be a chief financial manager out in an academic unit, if they're looking for something a little bit different.”

When discussing the administrators and leaders from whom participants receive information, two participants said these leaders make requests on behalf of someone else or some other group. One participant described the requests from the Dean as indirect requests: “And then there's a class of sort of indirect requests. So somebody like the Regents or somebody asked the Dean for something or whatever.” Participants described a wide range of areas from which indirect requests can come. One participant explained how varied it can be:

“And so we provided all the information for that. And that can be legislators, that can be folks in the University, outside the University. Could be literally anybody. Could be press. That happens. Those are some...like...I am meeting with the *StarTribune* tomorrow talking about X, Y, and Z.”

Another participant identified the senior leadership as the ultimate source of many requests. An administrative director explained, “A lot of what I'll call university leadership requests. That can be the Regents. That can be the president. That can be the senior vice president, provost, vice provosts, those folks.”

Supervisors. Some participants described the primary source of requests as their direct supervisor. When describing how requests come in, one participant said they have formalized processes to come through their supervisor:

“The majority of it flows through from [my supervisor] and that's both sort of by design and he's my primary supervisor and the person who my job is dedicated to supporting. But we also try and drive a lot of questions that come [in] so that he can decide is that something we want to do.”

Requests to provide information. In further discussion of who asks brokers for information, I posed the question, “*Are there people to whom you do not, or no longer, give information? Why?*” Over half of participants said that there is no one to whom they do not provide information. One participant explained it at an individual level, “I don't think I've ever...said never again.” A different participant described it in terms of the culture of the university:

“No longer give information to...I would say that I think this university's posture historically...that we have been more transparent, sometimes vastly more transparent, about institutional data than a lot of places I know of. I think that's a positive value, so I am loathe to not help people answer their question.”

Constraints and redirection. In contrast to saying no to an individual, some participants identified constraints that would result in either not providing information or directing the requestor to someone else for the information. If the information broker is aware of other ways to get the data, they may direct the requestor to another source or individual. One participant explained the options:

“Sure. Yup. There are people that, depending on what they contact me for...I would think are individuals that either should be able to run that report themselves, because it exists, or they have a resource within their unit that they can rely on to give them that information.”

Another participant described redirecting requestors to others due to the type of information they were looking for:

“Definitely. Especially because I'm ... Student data isn't my forte, so anything that direction, I would lead them directly to there. The questions are happening between those people. But if it's HR [human resources], payroll, finance, I know enough of the nuances and I like to have an understanding of the data, then I like to be that one to do it.”

Use of data. When discussing other reasons why information brokers do not provide information to those requesting it, some participants discussed concerns about the

use of the data by the individual requesting it. One collegiate director discussed trust in the individual receiving the information:

“You know, there are some people, and I honestly don't want to pass any judgment at all, but there are people that don't know how to use the data and kind of, maybe, use it to, or don't really understand what it means....And I would probably stop giving someone like that data, because I just wouldn't want to be partner in providing misinformation or misinterpreted information or something like that.”

A second participant described concerns about use in terms of patterns of behavior.

Without refusing to provide information, this person would adjust the interaction:

“I will say that when I've encountered people that have consistently misinterpreted or misused the data, I will vastly slow down the speed of the process, and take more personal time to explain to those folks what the information analysis says and what it does not say.”

Role of the information broker. I asked, “*Why do you think people come to you to get information?*” To prompt participants to think further about why people come to them, I later asked, “*Are there any other reasons why people come to you for information? (Please don't be modest.)*” Participants discussed their expertise, their reputation, and requestors' trust as the reasons people approach them. In addition, some participants described their position as the reason people come to them.

Expertise. Half of the participants identified their own expertise as the reason why people approach them to request information. Several participants talked about their expertise with the data, specifically. One analyst said:

“I think that for certain things I'm kind of, well, I guess you could call me the expert at the university. So one thing I will tell people is that the institutional research, that's the source of the official data about the University of Minnesota. But they do it at the collegiate level, and what we do differently here is tell you things at [our program level].”

A collegiate director talked about expertise of both data and how to get it: “So I think probably my understanding of the data is also why people come to me, because they know that I can understand how to get at some of the data...I can help guide them to be able to understand where to get the data.”

Several participants discussed their knowledge of past experience and background in the area. One administrative director explained, “Some of it is just experience in the fact that we've probably encountered similar questions in the past. Or it really is a question in a new emerging area, but we have enough ideas about how to get at those answers.” Another participant shared, “I've worked on a lot of different kinds of problems, and I've got a very deep background in a lot of things that folks are interested in knowing about.”

Reputation. All of the participants talked about their reputation in some form as the reason why people contact them for information. Several participants discussed their reputation for responsiveness. One participant explained how having a reputation for

responding results in people come back again and again: “Well, if you have a reputation of delivering your information, they typically know who you are and they'll come back to you to get that. And yeah, I just think that if you can deliver on things that they need, they'll keep coming back to you.” In addition, one participant shared a similar experience: “One is that I'm responsive...I've had people more or less tell me that they have gone other places and they don't get answers, and so they come to me.” One collegiate director also discussed how the combination of responsiveness and longevity in the position plays a role in requests:

“If I wasn't being responsive, they'd probably quit coming to me, right? I think I'm responsive, and I follow through. Also, when you think about it...there have been a lot of turnovers...I have some of that institutional knowledge that other people don't have.”

Other participants described their reputation in terms of the questions and problems they have tackled in the past. One analyst talked about how reputation is developed over time:

“Longevity is helpful, but doesn't answer all the questions. So I think that's part of it, because you see a lot of different things. The systems we have available to us to get data have been around for a while, and after a while you sort of understand the cadence and the type of questions you get, who asked them, why they're asking them. So you can kind of position yourself to be able to answer those in a way that's quicker, more effective, more complete.”

Another participant mentioned how their past work built a reputation of helping people solve their problems using information:

“I know people feed me stuff because they know I will either solve the problem or I'll give them the information, or I'll take it up. Or if I don't, I will tell them why it doesn't matter or help them understand maybe why it doesn't matter. But in most cases, I know people feed me information that they want something solved. Not everything gets solved. I do not take everything on.”

In contrast to the participants who described their responsiveness in terms of their reputation or problem-solving, one participant talked about their receptiveness to requests and their desire to provide accurate data:

“I've always loved doing data work and I've probably have been very receptive to the requests. That's probably part of it...I want data to be accurate and if I think I'm in a better place to give them accurate data than somebody else, then I'm willing to, because I just think it's better for the organization.”

Trust. Half of participants talked about trust as a reason why people approach them for information. One participant described how they have built trust over time among the people who request information: “I've gotten to be trusted enough that people think they will get actually the right answer from me.” One administrative director described the value of trust:

“I think people feel safe that they can get, from a question they might not even really understand. They might be asking a question that somebody else has given

them, but that they'll get a defensible answer, and they don't have to spend a ton of time. I'll do the translation. You don't have to.”

The administrative director continued on to explain how trust is also embedded in the interaction, noting the importance of the exchange and relationship between individuals in information brokerage:

“I'm not going to give you the answer that you want. I'm going to give you the answer where the data leads us. You get to decide what to do with that answer...I'll tell you exactly how I got it. Here's how I would interpret it. Here's the data. We're all going to look at the same data analysis together.”

Finally, one collegiate director described trust in the context of willingness and commitment to sharing information:

“Well, I think part of it is that I'm really open. I think one of my...I'm not...I've known people in my career that think, ‘Information is power, and therefore, I'm not going to shared,’ and I don't believe that way at all. I feel like the more people that know most, how to find the same things I know, how to find and can answer these questions and think more broadly about things than just their little window”

Position. Half of the participants discussed how their position at the university is the reason that people approach them for information. Several participants described their role as information providers, whether in administrative or collegiate units. One participant explained their responsibility of providing information as their responsibility: “Some of it's positional too...My job is to provide some of this information. And I have [an administrator] standing behind me saying that I'm the one who's supposed to be

providing this information.” Another participant said, “Yeah, I think it's my role and my position, and also that people know that I was a data person or I kind of know where to go to get things too.” Another participant contemplated the influence of experience or position:

“The other thing I'd say is that I think the place, whether it's through experience or just my current role, but they're willing to bet that I know at least a little bit about a pretty broad swath of the place... They can just come here and they can kind of throw something on the table and say, ‘Well, if I was going to answer that question, I'd start here, and maybe go there.’”

Finally, in contrast to those who see the position they were hired for as the reason people approach them for information, several participants described how they came into the position when replacing someone else. One collegiate director explained, “When that person left, I sort of navigated getting the data part of that into my area.” An analyst described, “If you're filling in behind someone who retired, for example, the people who used to go to that person who retired now come to you.”

Additional value. In addition to the information that brokers provide, requestors approach specific people for other reasons as well. I asked participants, “*What do you think people are hoping to get from you, other than the information?*” Frequently it is more than information that is gained in information transfer. Participants described three key points in addition to the information: coaching for the requestor, context of the information, and decision support.

Coaching. Assisting the information requestors in the form of coaching, particularly on the questions they are asking and what the information means, was discussed by several participants. One participant explained that coaching takes the form of helping them understand both the question and the data: “Maybe a little bit of coaching relative to the kinds of questions that people are asking and information they think they want, so as they kind of have conversations with people who sort of have worked in this space a while and know what's available.” In contrast, another participant described coaching in the form of walking them through the questions that come next, after their information request:

“I think experience in getting a lot of questions similar to that offer a little bit broader context and the ability to be more of a consult to help them...If you're talking to somebody who has a business need who is a decision-maker at college or something, here's the basic question. They're not exactly sure what's available. But that's when you really have an opportunity to kind of help them with, ‘Have you thought about this’, or, ‘You might consider that.’”

Context. Half of the participants described the value and importance of providing context in addition to the information being requested. One participant explained, “I think context about what can be done, what can't be done, what the information means, so that little bit of analysis part.” Another participant described in more detail the type of context provided:

“I can provide some context on stuff. Is it changing? Is it good or bad? No number really make sense out of context. It has to be explained. I can provide

some of that. I've got the experience here to know... Yeah, what the trends are, and where things have been before, sort of the comparative environment, not only internally but also compared to other universities.”

One administrative director discussed the context of the university as well: “Certainly institutional context. Whether that's historical, or cross-institutional, or here's the number, but here's why I don't trust it” Finally, one participant explained that the context also comes with their opinions on what the combination of the data and context shows: “I think they want context, and I think in some cases, they want opinions. What do I think about ... Because the data is going to tell us something. Oftentimes, I make recommendations based on the data as well, because that's really my role.”

Decision-support. Nearly all of the participants discussed their role and the value of decision support in addition to the information being provided. One participant specifically described their role as decision support:

“I'm in decision support, effectively... They want to make a call on something, and so they need to know not just that the answer is six, but what does six mean? Is that good? That's what I provide in addition to numbers when I can. Sometimes I'm a layer or two removed from the actual conversation... And so in those cases I'm just trying to arm the person who I'm supporting in being able to go and have that conversation.”

One administrative director described how decision-support can only be provided with an understanding of what the request is for: “If I know who I'm preparing for a conversation and I know what the conversation is going to be, I can try and prepare them more. If it's

really, it's divorced from me and all I'm getting is a request, they just get a spreadsheet back.”

Helping requestors understand not only the information they are requesting, but also next steps was discussed by several participant. One analyst aptly described the interaction: “I suppose if I can help them understand what it is they're looking for, then if I can think of a good example of that just by asking clarifying questions. ‘Oh I never thought of that, well okay.’” Another participant described the support role as a way for the requestor to explore the topic further and talk through the information needed: “It's also me taking that information and helping them think about it, think of what the options might be. I do a lot of that part of it as well.”

One administrative director described decision support further in terms of their role in helping to solve a problem by providing information: “Looking for me as a person that will support whatever initiative it is they're trying to raise, or solution they're trying to solve. And in some cases, someone that will help advocate for whatever it is that that person or unit is trying to raise or solve.”

Brokerage Context

Brokerage context encompasses the external factors that can influence information exchange when an information broker is responding to a request. There are many contextual factors that can influence the exchange; concepts of position of the requestor, approach, appeal, and persuasion are related to how the context of the requestor can influence the exchange. The type of information, urgency, and complexity

are related to the information need. The context of the information exchange focuses on these factors that influence the exchange. I asked participants to describe how they are approached by individuals requesting for information including how they are approached, the initial appeal for information and persuasion used. After the initial approach, I asked about the factors that influence the likelihood that an information broker would respond, including the type of information requested, the position or role of the requestor, the urgency of the request, and the complexity of the request.

Initiation of the request. I first asked, “*When people request information, how do they typically approach you?*” A majority of participants indicated that individuals approach them for information by email or in person, with a few participants discussing alternative methods.

Email. All participants mentioned email in their description of how people approach them to request information. A majority indicated that email is the typical way that people reached out to them to provide information. One administrative director explained that “The vast majority of what I get comes through email. There's the occasional in-person, occasional phone, but probably more than 95 percent is email.” Email was described by participants as a traditional way to reach out; one participant described shifting to a centralized account for requests, but “Right now, it's primarily the current, old way. They're used to it.” Although email was described as the way people approach them, one participant explained that it is usually just the start to the interaction: “We might start with an email, and then we meet after that.” Email is also seen as a

necessity due to location: “The department heads would probably be more of the ones that would do an email, just because they're located in different buildings.”

In person. Half of participants discussed in-person interacts as a common approach to request information. When discussing in-person requests, participants mentioned both individuals approaching them and meetings. In-person requests come to information brokers in a variety of ways. One collegiate director told about those that come seeking expertise:

“There are some people that know that I can write a query, and there's no other way to get some information...And so, a lot of people know that I can do something for them in that space. I'll write a query to get all that for them. There are people that know I can do that. They'll come in and ask me.”

One administrative director discussed unplanned requests in specific spaces: “I do get the hallway conversations and the bathroom conversations... especially at [an administrative building], when I'm over there, because I don't see those people as often. So it's that you see me, and sometimes it's easier to talk about it in person.”

One participant described in detail the value of having an individual come in person to make the request:

“The more interesting ones really are when they don't really have a well-formed question yet. They're like, ‘I need to know something about this.’ Whenever possible, I drag them in here...and draw on the board, really more to make sure that I understand the question that they're really asking. Again, it's a little defensive, because you could just whip off an analysis, and if they come back

twenty minutes later and say, 'No, that's wrong. What I really meant was that.'

Well, now I've got to go do it again in a slightly different way. I'd rather have them in here and talk, and draw, about what the question really is. Then together we can figure out what the analysis might be."

In addition to individuals coming to them to make the request, some participants discussed in-person meetings as a familiar approach. One collegiate director said, "Yeah, usually, it would probably come out of a meeting. I have periodic meetings with the associate deans, and so it would usually, probably, come out of that weekly meeting with the Dean." Another collegiate director described similar meeting requests: "Also, we'll be at a meeting and someone, usually, like, the Dean, who knows that I can get data...might say, 'Well...can you look into that?'"

Other approaches. In contrast those approaches, one participant described the pre-emptive nature of knowing what requests will come to them: "Usually I would do that on my own, because I know that's going to be her questions. I think a lot of the questions that I get are... I don't know. I mean, I guess I'm intuitive at this point about what I know the questions are that I should answer, so, I don't get a lot of people knocking on my door saying, 'Can you prepare this?'"

Finally, several participants described more formal avenues for information requests through departmental accounts and ticketing systems. One participant described trying to move more into formal processes for requests that come in:

"But what we often do - and what we're really trying to do 100 percent of the time is the goal - is to put that into [our ticket system] so we can track it. So, for a

couple reasons. One is so we know what the work is and the categories, the buckets at work, but we also can point back to where the documentation lives so that we can have better continuity in tracking it for what we're trying to do.”

Basis of appeals for information. Next, I asked, “*What’s usually the basis of their appeal for information?*” I included a prompt to further consider the appeals: “*Are there other ways they appeal to you for the information?*” Participants talked primarily about data for decision-making and ideas being explored.

Decision-making. A majority of participants described a decision that needs to be made as the basis for the request for information. One participant explained the data needed to make a decision: “They have to make a decision about something. And they need data. They want data to help them come to a conclusion.” A second example of the request for information came from an administrative director who was discussing the value of data as one part of the decision-making process:

“If you have a difficult idea to sell and you can base it in facts and information, it's much more powerful than just saying it, I guess. My current boss is very much data-driven. In fact, he's just always wanting to take it in from different ... You know, to get that fuller picture. Data is only part of that, or quantitative data I guess is only part of that.”

Participants also frequently described the decision-making process in the frame of solving a problem at the university. One participant provided an example of trying to solve problems:

“A problem shows up, somebody calls in and says, ‘I can't graduate because this form hasn't been filled out.’ And by way of finding out who can help them with that question, we find out that there's a problem with something...I think it's because we're all trying to solve problems, and we all come at it from different angles.”

Exploration of ideas. Half of the participants talked about the appeal for information based on either an idea being explored or attempts to understand the idea better through data and information. Sometimes the idea is a broad concept, as one collegiate director explained, “My boss will come up with broad ideas and I'll start poking around, seeing if I can come up with what he's interested in or something that might be useful.” Participants also noted that the information requested by leaders could be on any topic, as one participant who explained, “Anything that matters to a Dean can be a basis for request. And it's the same thing for academic leadership.”

In contrast to participants shared examples of appeals based on decision-making and exploration of ideas, one participant indicated that there is no need to know the basis of an appeal for information. The participant explained, “I will say that I do not typically ask for motivations. Now, I will try and clarify what they want to know, but why they want to know it is their business.”

Persuasion. I asked participants, “*What do they do to persuade you to provide information?*” A majority of participants responded that persuasion was not needed, although a few participants provided specific examples of persuasion.

No persuasion. More than half of participants indicated that there is no need for persuasion when an individual requests information from them. One participant exemplified this point of view, explaining, “It's not usually much of a matter of persuasion. They ask, and it's a matter of capacity and prioritization whether we can handle it. But otherwise, I don't typically turn people away.” Others said that persuasion is not necessary, because providing information is their job; one participant simply stated, “I'm just an information provider.” Another participant, an analyst, joked, “What do they do to persuade me? I feel like, just ask nicely...I mean I don't think people bring me chocolate cake or anything like that [laughter].” Finally, one participant said, “At the end of the day, this is the institution's data, not my data, not your data...We're working through your issue, we're going to do it with transparency, but we're working through your issue.”

Position and authority. Several participants mentioned the authority and position of the individual requesting as aspects of persuasion. Although one administrative director noted positional authority, they indicated their role: “Well, obviously, some is just positional authority. That's fine. They don't need to persuade me very much. It's part of the job.” One collegiate analyst framed it in terms of authority and timing: “But I will say, based on what it is and who it is, some of those people take priority over others. But I typically always provide what people are asking for.”

Institutional needs and priorities. Although most participants did not identify any persuasion needed for information request, several participants talked about institutional needs and priorities. When describing institutional needs, multiple participants noted that

they do not see such needs as persuasion. One collegiate director explained, “I guess I wouldn't use ‘persuade’ as the word, maybe. But I think the only way they can persuade me is if there's some institutional dean's-level kind of need for that information.” Another collegiate director shared a similar perspective:

“If I think that what they're asking isn't really getting at what they think it is, then we'll have a conversation about that. But I don't see it as them persuading me. I think of it as just making sure that they fully understand what they need and what they're asking for. Yeah. And sometimes they'll ask something because they're really more curious than really needing it. I do try to weed those out because time is precious...So it is really good to understand how it's going to be used and the value.”

Like institutional needs, priorities were brought up by one participant: “There are times where I might say, ‘If I do this now, then this isn't gonna happen.’ And they'll say, ‘Well, no, this needs to happen, so wait.’ I will be frank if time is an issue.”

Finally, in contrast to explanations of authority and institutional needs that some participants described, one administrative director described the desperation of the person requesting the information:

“I would say that most people don't do any overt persuasion towards me, other than to try to explain how desperately important this analysis is to the future of the world. Luckily, I've been around here long enough that I can often sort out which ones are desperately important to the world. Or more importantly, is the

analysis that they're trying to figure out really within the current strategic wheelhouse of the university?"

Likelihood of response. The response by the information broker is important. I asked, "*What is it about a request that would make it more or less likely for you to respond?*" The requestor is dependent on the information broker for the information they are searching for. In considering the likelihood of their response, participants identified several factors that impact their response: priorities and time sensitivity, the data being requested, other sources for the information, and the business need for the information. Several participants did, however, discuss a clarification of the question, that it is not a matter of if they respond, but rather what the response is. One director explained, "Basically there's no request we're not going to respond to, either to give them the data, or tell them where they can get it, or tell them that they can't get it." Another director clarified, "I typically always will respond in some way. Sometimes it might be a 'No,' but I will typically always respond."

Priorities and time sensitivity. Half of participants described the influence of priorities and time-sensitivity on their responses. One participant framed time sensitivity in terms of deadlines: "Those that are time-sensitive for whatever reason, so maybe we have a requirement to submit the information by a certain timeframe. So those will drive the priority of providing the information." Another participant discussed how lower priorities may not be addressed immediately: "If I perceive it as being lower priority, I probably would still give them that information, but it would take me awhile to do it." Although some talked in terms of either clear deadlines or perceived priorities, one

participant described the difficulty of determining time sensitivity and the challenge of providing information in the appropriate time frame:

“You can do the most thorough analysis on topic X by Friday, but if the meeting where the decisions were going to be made were on Wednesday, it's worthless. I don't care how good it is. If you get me 90 percent of what we need by Wednesday, the data has to be accurate, understandable and timely to the decision. You have to understand what's the decision-making cycle that this analysis is so critical for. The individual asking for it always wants it yesterday. It's the most critical thing ever. Other times they won't tell you at all that, no, the meeting where people are deciding this is next Monday. Okay, we will move some things around and get you some stuff by Friday.”

Type of data being requested. Half of participants also discussed the type of data being requested as impacting their response. Several participants discussed data to which they do not have access, or limitations on the quality of the data. One analyst explained, “Well, if it's not data I have, or maybe we have the data but it's not very good, or kind of largely incomplete.” Other participants discussed the limitations on sharing the data. In one way, an analyst discussed the limitations of the sensitivity of the data: “If they're asking for sensitive data, data that's classified as private.” A director described the limitations of data agreements: “But it is not my data. I'm bound by a data agreement to not provide that, even if I have access to it.”

Other sources for information. Several participants talked about the impact on their response if the information was available from other sources, either other people or

other tools. One participant mentioned individuals who could access the information from reporting systems themselves: “If it exists somewhere and they can get it on their own. And if ... they don't know how to do it, I'm not going to walk them through how to run a report. They've got people in their units that can help them do that, or colleagues or somebody.” Another participant told about directing an individual to a report that meets the requestor's need: “There's a report out there that [will] get them exactly what they want, but I would count that as responding with what they need. Or the data that they want is just completely unavailable. Or it's available very narrowly.” In contrast, one administrative director described having to learn over time to send requestors to other people to get the information: “I've had to learn how to hold back and say, ‘No actually, somebody else is really on point on that at this point.’”

Business need. Several participants discussed the requestor's business need in their response to the request for information. One analyst explained that, as long as there is a clear business need, the information would be provided: “If you have a business need, a legitimate business need, whether it's classified in that way or not, we usually give it them if it's appropriate.” One participant, however, discussed the challenge and importance of understanding the business need:

“The other piece of it is, I do need to understand the business need for what they're asking for. So for example, [a department] has asked a couple of times for something. Took me awhile to get to their request, but they weren't really super good at telling me what they really wanted. But they didn't know what they

wanted, and they didn't know how to ask the questions. So it took me a little bit of time to get to that one.”

Type of information. I followed up the question on likelihood of response with an additional question: *“I’m interested in how certain factors might affect your response to a request. For example, how might the type of information being requested affect your response?”* A wide range of factors can influence the decision-making process of the information broker in providing information. Participants described several aspects of the type of information being requested that might influence their response, including the sensitivity of the data and their own data expertise in the area. One participant, however, discussed the difficulty of requests for information that is not currently available:

“There are things that people ask that truly are not things that we can do right now. And where I can give them some sort of hope or prospect that someday we might be able to answer them, I let them know. But there are questions we don't collect data for...where we've just started collecting data for. And so it's not available for the kinds of things they want to know yet, or we're building new systems. So yeah. So I try and tell people that we can't deal with that question now, but try back in two years if you can remember, because we may actually be able to deal with it.”

Sensitivity of data. Half of participants discussed the sensitivity of the data affecting their response to the request. A collegiate analyst explained, “It's pretty much the classification of, is it private. And then there's additional scrutiny that's provided on

those.” A collegiate director described the consideration of sensitivity in more detail beyond the classification:

“There is a classification of stuff that's like, it's neither private nor public, but I mean it's, it could be technically public, but it's sensitive stuff like retention and graduation rates by students at different racial and ethnic backgrounds. For example, there are differences of opinion across colleges and central administration about should that information be shared publicly or not.”

Instead of discussing the sensitivity in terms of the data, one administrative director framed sensitivity around the understanding of the sensitivity of the data:

“The other one...that's coming up more and more, is broadly the appropriate and ethical use of some of these data. We have to worry. We're getting questions and we have to worry now more...People do not understand private versus public data.”

Data expertise. Several participants talked about their own understanding of or expertise in the data being requested. One collegiate analyst thought about their own expertise with others who know the data better:

“If I think there's a better source somewhere else ...like I look at human resources data but I'm not an expert on human resources data so I might say, ‘talk to your [human resources] specialist in your college’ or something like that.”

Another participant concerned with their own knowledge indicated that they may provide information but recommend that the person verify it with someone else: “Then there's the subject matter, as well. If it's something that I'm not as confident about my knowledge of,

and I know someone who's better, I wouldn't give them that information...I might start it and then suggest that they have someone check it over.”

Position or role of requestor. The next factor that I explored with participants was the position or role of the requestor. I asked, “*How about the position or role of the person requesting information?*” Participants described the influence of the position or role of the requestor in terms of the speed of their response and their familiarity with request patterns.

Speed of response. More than half of the participants talked about the speed of their response being impacted by the requestor’s position. Most described the impact as a matter of fact. One collegiate director explained, “Well, obviously, their relative role within the University...So if it's someone higher on the org chart than me, I would be much more apt to get that information very quickly.” One analyst further explained the impact of the organizational hierarchy in their response: “We try to apply a criteria for decision-making which includes who's asking for it. And if it's someone higher up in the organization, it matters, because there's a greater sense of urgency.” Another participant explained further the differences in the requests based on position: “And usually too, just the time scales they operate on, those are quick-turnaround things... The short-term stuff, it's literally sub-hour, a good portion of the time.”

Familiarity with request patterns. In contrast to the speed of response, several participants reflected on their own awareness of the request patterns of individuals in leadership positions as a way to evaluate and respond to the requests. One administrative director explained the value of experience:

“I know what he wants, how [my supervisor] likes it. And typically, unless he says, ‘I need it right away,’ I know within a three- to four-day time period is good enough...So otherwise, within a week I'll get him what he's asking for...He has to give me one or two pieces of information and I know what he wants...I don't know enough about [university leader], so I will provide that information to what I believe [my supervisor] is looking for, and then he may take that information and shake it up in some way, because I don't have as many interactions from that perspective.”

Another participant described a similar dynamic: “You develop a sense of just what is most pressing. And it also is combined, if you're trying to answer a question like, what do I need to work on right now? Who's asking for something and what it is in relation to is another piece of this.”

Urgency of requests. Next I asked participants about how urgency affects their responses. I asked participants, “*How about the urgency of the request?*” A requestor’s urgency can take on many forms in interactions between requestors and information brokers. In general, participants described balancing urgent requests or seeing no difference in their response due to urgency, while several participants discussed the challenge of determining urgency.

Determining urgency. Several participants described the challenges of determining degree of urgency. One participant said, “I have tried to develop a sense of what things are truly urgent...I think I've had to develop this because there are a lot of folks who work in communications who think of their stuff as super urgent. But it's not

when compared to things that are really, truly urgent.” Another participant described in depth the challenge of the concept of urgency in information requests:

“Everybody thinks their request is urgent. There's no formal filter. I don't produce a data request form that people have to fill out. That's why I say, it's always nice to talk to somebody for three minutes...What is urgency? I think you have to unpack what urgency really means. Urgent could be, well we're having the meeting tomorrow, and that meeting is at a low enough level, and you're going to have five more of them over the course of the semester. That, maybe, we can get this to you in two weeks...People may not realize how hard or how much lead time people need to actually answer the question competently. They think that this should be an easy analysis. They have no basis to know or not know. Actually to do it well, it's quite complicated, and so sometimes you have to install urgency in their request and say, ‘If you want this, not only do we need to get started yesterday, but we also need to talk to peoples A, B, and C to understand this.’ That's the flip side of urgency.”

Balancing urgent requests. Several participants described the challenge of balancing the urgent requests with all of the other requests that come to them. One participant expressed the difficulty as a recurring issue:

“The great challenge of my life is actually to keep [longer-scale projects] moving, because most of what I end up having to spend any given day on is new and short-term. So I'd say at least half the days that I come into the office, I do not do the thing that I had been planning on doing that day.”

Many of the participants framed the urgency around the date by which the information is needed. One participant commented, "It's not too bad. I think usually there's enough lead time. Not a lot of lead time, but usually enough. Oftentimes, it's something that doesn't have a deadline, and so that's helpful."

No difference based on urgency. Several analysts described not receiving urgent requests very often, or being given adequate time frames to do them, so there is no difference in response. One analyst explained, "It's not often that I get the 'I need this yesterday.'" The analyst went on to say, "Often if it's fairly urgent they'll say, 'I'm using it for X, Y, Z, and I need it by tomorrow, would be useful.'" One participant, however, described negotiations when an urgent request cannot be completed in the time frame:

"If there was an urgency with a request like that, I would be really frank to say, 'We can get you something, but we're not gonna get what you want by that time frame.' I just have to manage expectations, because if there's that much ambiguity in it at that stage, I just know there's no way. If it's Tuesday or Wednesday and he wants it on Friday, it's not going to happen, and I just have to be frank about that and say, 'Look, but we could maybe do this by then or that,' and segment that out that way."

Finally, one participant described how their own interest can also impact their response and timing of work in relationship to the urgency of the request: "If it's something I'm really curious about too, and it's something maybe little, a tidbit that will help the college or hurt the college, I might be really inclined to find that information, even before the due date, so that we can have some time to talk about it."

Complexity of requests. The last factor that I asked about in relation to likelihood of response was, “*How about the complexity of the request?*” The complexity of requests is a key aspect of the information brokers’ responses. All participants indicated that the complexity of a request does not impact the likelihood of their response, *per se*, but rather how and when they respond. Participants described three aspects of the complexity of requests: complexity of the analysis needed to complete the request, negotiations with the requestor, and requests with hidden complexity.

Complexity of analysis. Half of participants mentioned the complexity of the analysis that they need to complete as impacting their response. One participant explained how complexity affects not the likelihood of response, but timing: “So complexity does play a role into how quickly you can provide information too, but you can get at anything. You can make some sort of answer at any question.” One director described the process of how complexities of requests are addressed in real time:

“So we went down the list of these sort of buckets of data, if you will, breaking it down, and then looked: Is it conceivable? Is it doable? Is it hard to do? How long would it take if we could do it? I still spent a good chunk of the time we were in the meeting with query tools open, with Tableau open, yeah, chasing down things that came up in the conversation so that I could answer questions as we went through.”

Another participant aptly described how even very complex information can be obtained with enough time:

“I always say when people - and you'll find this interesting as somebody that does what you do - when people say, ‘Ugh, we can't get at that data,’ I know you can get at something. It's how you analyze and interpret the data that tells the story. It isn't that you don't have the data. Or you may have the data, but not in the right way you need it, and you have to classify it or aggregate it in some way to get at whatever it is you're trying to answer. So, from that perspective, the complexity sometimes will drive how long it takes to get the information.”

Complexity of negotiations with requestors. Half of participants also discussed complexity of negotiations. One participant described potentially taking longer to complete the request: “Well, I mean, we'll discuss the issue, and I'll say, ‘So I can probably do this. I might need to do a little more digging to see if I really can do it this way. Could make it take longer. It's not something I've done before.’”

Several participants discussed negotiation about the information needed to satisfy the requestor. One participant described the negotiation about what information would be acceptable: “The data that's not available, it's like, well, usually they're saying, ‘Well, okay. Thanks for looking into it’, or, ‘If I can't get A, can I get B? Because it'll help me answer my business question.’” Another participant explained, “This thing that is complex to answer to the nth degree is actually less complex if you just need a general answer. Is primary major just fine? Okay, great. We have that.” Finally, an administrative director described negotiation for complex requests:

“I mean, there are requests that people can make very complex, but again, they get 90 percent of the answer, or directionality, from a simpler analysis. You've got

to convince me that the last 10 percent is really, really worth it, and that you're going to use it to affect an institutional decision in some way.... On the flip side, sometimes you can make things less complex, again, just by talking to them to say, 'You want to look at all of these variables, but if I could get you just these four today, or waiting five weeks for the whole data set, which would you choose?' Because my guess is you can answer a lot of your questions with the four. De-complex for them what could be a very complex, could absolutely make this a complex analysis, but maybe we only need this, and that's good enough."

Hidden complexities. Several participants discussed requests that seem simple but have hidden complexities. When discussing complex requests, one participant described the trickiness of navigating such requests: "[An example is] the very simple question that's actually complex and difficult to get them an accurate, understandable, nuanced answer." Another participant illustrated the need to acknowledge potential complexities in requests:

"That is surprisingly tricky to work out. Sometimes it's very easy. It's like, 'It's already there.' And everything like that. But I am constantly running into things where there's hidden levels of complexity that I had not expected. And you just have to work through them. This is where we build in, like, we know something will take, we're like 90 percent sure if something will take a week to put together, we'll say we'll have it in two weeks."

In contrast, one administrative director discussed efforts to simplify requests in repeatable processes:

“So there's a bunch of stuff that I anticipate and am used to and have pre-cooked a bunch of things to get me as much of the distance as I can. And so a lot of them, they either are simple by nature or they have become simple because I've built things that make them simple.”

Brokerage Capacity

The capacity of the information broker plays an important role in providing information. Capacity is specifically the information broker's time that is available to respond to a request (Guido et al., 2016). I asked participants to describe how their own time and capacity influence their responses to information requests.

Capacity to respond. The capacity for an information broker to respond to request is a crucial factor. I asked, “*I'm interested in how your capacity to respond influences your response to requests for information. If you have limited capacity (like time or workload), how does that affect your response?*” Participants talked about four ways that their own capacity influences the response. First, their responsiveness can be influenced by priorities and expectations of the many requests they receive. Second, capacity can impact the information that they provide to the requestor. Third, it can impact the timing of the response. Finally, their response capacity can result in their redirecting the requestor to someone else.

Priorities and expectations. Nearly half of participants described the influence of priorities and the need to set expectations, due to the number of requests they receive. One collegiate director explains very simply to requestors: “I will say, ‘That's on my list,

but I have to get to these other things first.” One participant explained in more detail the balancing of simple requests versus being up front with requestors of how long it will take:

“What we try to do is get back to people within a reasonable amount of time after the response is made, saying, ‘Here's the result,’ or ‘I can get to this next week on Tuesday.’ Something like that. If the workload is, it's a simple request that I can knock out quickly, I usually do it the same day or the next day after they've made the request. But often it's the management of, ‘I'll try to get to you next week on whatever you're asking for.’”

A collegiate director explained the constant effort of balancing requests based on priority: “I get into triage mode basically. What are the most pressing things right now? And I will throw time at that and then making adjustments throughout the day every day.” The participant continued to describe the challenge of the amount of work with limited capacity due to resources: “I do have limited resources...so that has been something that I navigate, not always successfully, all the time, every day.”

Another participant described the influence of priority based on who is making the request: “There are things that I probably never get to. But it's all prioritized. I mean, if it came from the Dean, I get to it” Only one participant described occasionally refusing to complete it due to time: “I occasionally will say, ‘No, I can't do that.’ That doesn't happen a lot, but based on workload and importance.”

One participant described a dependency on requestors to follow up due to the number of requests and their capacity, particularly in relation to requests that are longer-term:

“Yeah, some of them ultimately, if they sit on my to-do list long enough, some of them become irrelevant, and not necessarily for good reasons. They age out of relevance. And so I do periodically go back and take a look at some of the things that were on my to-do list and realize, yeah, that didn't happen in the time that makes it worth doing, and they just disappear. I really encourage people to come back and poke me, because they will get lost if it's a longer-term thing and they're not willing to push me a little bit. I've got... Whenever I get the apologetic, ‘Just checking in,’ I say, ‘Thank you very much. I do actually appreciate that.’ And so I try and pick them up when I get a chance, when I get the sort of immediate kind of pressure stuff to stop.”

Information provided. Several participants discussed their capacity's impact on the information being provided. One collegiate director commented on the necessity of utilizing what is available, because of limited time, due to capacity:

“I'm never going to recreate the wheel unless I think there's something wrong. I mean, if I think that just doesn't look right, then I would probably recreate everything to see if I could see the details of why it looks that way. And then maybe find an error or not.”

In contrast to those who described the influence of priorities, some participants expressed concern about the negative impact of not having enough time. One collegiate

director felt frustration when realizing the impact of limited time: “And there are times where some decisions you made, three years later you're like, ‘Dang it, if I would have only looked and thought about it a little harder.’” One administrative director described concerns about not having time to scrutinize :

“There are times where, whether it's requests for information or solving situations, where you know you should be spending more time on doing some sort of due diligence, some sort of double check, some sort of reread of that contract or whatever it is. But because of the sheer volume, you are every day determining what warrants that level of scrutiny versus what warrants a medium level of scrutiny and what warrants maybe a minor level of scrutiny. And by scrutiny, I just mean that full package: my complete attention, my complete analysis, my complete review, my due diligence to talk to other people and all that kind of thing. Same thing with the requests for information. Because of all that, some of them are better than others.”

Timing of response. Over half of participants described how capacity impacts the timing of their response. Participants talked about the importance of deadlines, delays in responses, and sometimes not getting to requests. One administrative director described working through requests based on deadlines: “I work very much to deadline, so whatever is needed by a given time, I will try and work to the next one, and then just sort of adjust down...So I just sort of shift things around as I need to.”

Several participants talked about how capacity impacts not whether someone will get a response, but rather *when* they receive the information. One participant said: “It's

one of those things that just makes me say, 'I'm going to need three months to do this,' or I don't get to it." Another participant commented, "Well I suppose it delays it. You know, occasionally it might get delayed enough that they don't want it anymore or it's of no use to them. They never call me back."

Although several participants talked about delays in responding, one participant described a continual revisiting of requests due to shifting work throughout the day:

"First thing I'll go back and do is take a look at my list and try and remember where on earth I was on something. And so, even within a day, I am often pulled away from the thing that I was pulled away from. The thing that was pulled away from, the thing that I was working on. And so sometimes in the late afternoon I'm winding back through the day to try and figure out what I'd abandoned during the day, to finish off."

Finally, one collegiate director told how those delays can also sometimes lead to requests never being completed:

"Sometimes things fall through the cracks too, frankly. I'll run across something in my notebook where someone had asked for something and I completely lost it. Usually those are not major projects. And I also think, well, if it didn't come up again, maybe it was really one of those curiosity things versus something they really had to have."

Redirect to others. A couple of participants said that their own capacity results in their trying to find someone else to answer the request or sending them to another source. One participant acknowledged a preference for sending them to another source: "I think

that's huge. I mean, that's the biggest pieces, that if I have to go... if I could get that somewhere else, I would far prefer that.” In contrast, one participant described taking on the task to find someone else who can help the person, although it is difficult:

“Then if there's things that need to be done and I really am just booked, I will try and see if there's somebody else I can talk into doing it. I honestly find I can't pawn off a lot of stuff, in part because I can't get ... other people to respond within the time that I need them to respond.”

One participant articulated a balance between redirecting to others and the need for the information: “And if it's something that's more like 'would be nice to have,' then that might be something more likely to be in the list of things I just didn't get to. And then I have no qualms about delegating stuff that I think someone else can get.”

Additional Comments

I concluded the interview with a final question: “*Is there anything else you would like to add?*” A few participants talked in more detail about the people across the university who are requesting and providing information. Several participants also discussed information available at the university.

Information community. Many of the participants talked about the challenges and needs of the people across the university who are looking for information. Participants focused on two specific areas: improving the experience of those looking for information, and helping others to access information themselves.

Improving experience. When talking about the needs of those looking for information, analysts described the need for improving experiences and processes for people requesting information. One analyst described continued efforts to make getting answers to routine questions more efficient:

“I heard [a colleague] say this once and I think I kind of think along the same lines: the second time you get a question, you start thinking about how can I put this up on the website so people can come and help themselves? So if I get, if I start getting a lot of similar questions, I start thinking about how do we help people? You know, how do I stop being a bottleneck?”

Another analyst described the value of improving the experience for those looking for information. Improving that experience involves eliminating dependencies on individuals for access to information:

“What I'd like to specifically do is a couple things. One is, try to improve the process, and make it so that it's not dependent specifically on an individual, but make it so that, as people come and go a little bit, we have better continuity. We're using better tools, better approaches and so forth, so we can deliver on what we're asked to deliver on.”

Access to information. Several participants also described the value of helping individuals to access information themselves rather than having to go through individual information brokers. One participant described the difficulties of the gap between the systems invested in and the skills of those who need to get information from the system:

“It would be really helpful to close the gap [between] the need for information and the ability to provide it. Huge chasm for lots of reasons. One is, we got major gaps in systems and processes and data. But we also have, I think, the bigger gap is how people think about their work and their needs, and how they can communicate those specifically to the organization.”

Another participant went into detail about how the experience is improved with new tools, and how the ability to adopt and utilize new systems for understanding data is improving within the university for more people:

“I think it's improving slowly across the board, because we've got better systems and tools in place that come closer to the employee who needs it. Whereas before there's this, I really have to understand the data...As you get aware of what's available, even a little bit, you can go into the system and get some information that is helpful, so that you can at least take the next step.”

Others who share need. Other participants talked about the importance of others who share the same questions, who can share approaches. One participant described it as the importance of connection: “There’s major barriers still, but it's less because of the systems and the people in place to help do a lot of that, to connect folks together with what's available.”

Another participant described the value of a community and sharing approaches due to the relative similarity of questions that people receive:

“Having a community of people that have the same questions and same issues helps too, because...if somebody else has done the same thing, and already came

up with the answers, let me use their stuff...Even if it involves calling someone asking for a query of, 'Who ran that for you?' And I'll call them. It does help, because...I think that we all have the same general list of questions.”

Available information. Several participants took time to discuss the information itself within the university. One director noted a concern with the disconnection between what information is collected and what is utilized: “I think about the pure volume of information that this organization has, and yet we do nothing with. Because we don't have either the resources, the right resources, or the leadership or direction to, say, prioritize gathering information and providing this information in some way.” The director went on to talk about the need for strategies to utilize the information: “I believe there are more strategies that this institution can...think about and go after and do, if we had more time to just consume all the data that we create around everything we do.”

In contrast to concerns about the utilization, there was also acknowledgement of the progress that has been made:

“It's been interesting to see how the university has evolved. I mean, actually evolved and un-evolved maybe too. Things change, and it's nice now because we're really finally on a nice trajectory...I enjoy working with data and I enjoy when the data you need is available and available in the tool that I understand.”

Finally, one participant aptly explained the challenge of an environment with increasing focus on data and information: “There's just so much information. It's just crazy.”

The analysis of the survey data examined relationships among individual characteristics, search preference, social capital, and perceptions of information quality,

completed in three parts. The analysis of the interviews examined the experiences of information brokers in a public university setting. The next chapter presents discussion of the results of the analysis.

CHAPTER 5: DISCUSSION

As in most other organizations, information has become a commodity within higher education, with continually increasing demands to utilize data and information for decision-making (Gagliardi & Turk, 2017; Muller, 2018). Universities continue to struggle with the balance between investments in information technology systems and routes that individuals take to gather the information they need to improve performance and outcomes (Gagliardi & Turk, 2017). The power that comes with access to information includes the ability not only to support decisions, but also to influence the direction of many discussions and decisions across the organization. Information technology systems strain to support the breadth of questions that people are trying to ask within universities; investigating the information flow that takes place through social networks can help inform what types of information can be provided through systems, while considering how better to support the vital resource of information brokers.

The results of the quantitative and qualitative analysis of this study address the research question: *What roles do social capital and brokerage play in the exchange of institutional information among administrative staff in public universities?* To explore the research question, this study used a conceptual framework that first considered the relationship of search preference, social capital and background characteristics to the information quality of the information resources accessed. Second, the conceptual framework considered the information brokerage activities, which is important when investigating how individuals utilize social networks to access information.

The results of the study indicate that several social capital variables are statistically, significantly related to perceptions of information quality for those utilizing information technology systems and social networks. Network extensity and range are associated with perceived adequacy of information retrieved from information technology systems. In contrast, network extensity is related to perceived usefulness of information retrieved through social networks. The finding of a significant relationship between network extensity and perceived usefulness is connected to the experiences of those who are providing essential information brokerage services to those who are dependent on social networks for information gathering.

The interviews conducted provide insight into the depth of the interaction that takes places between those searching for information and those that are providing the information. The interviews provided greater clarity on all aspects of the process, from examples of who information brokers provide information as well as the value they provide beyond the information being requested.

Discussion

This mixed-methods study addressed the question of the role that social capital and brokerage play in the access to information within higher education. Through a mixed-methods approach, the investigation was done in the areas of search preference, social capital, perceptions of information quality, and information brokerage.

Search Preference

The search preference of respondents in this study aligns with other research showing that people utilize multiple approaches when searching for information (Johnson, 2004). This study reflects this reality, with 49.2 percent of respondents indicating they were likely or very likely to utilize both information technology systems and social networks to access information within the University. The fact that there is not a single approach for the extraordinary amounts of data being collected and exchanged reinforces the need to support multiple approaches, not just build information technology systems (Gagliardi & Turk, 2017; Huysman, 2004). The results also support the assumption that many people make that a majority of individuals within an organization are looking for and utilizing information for their work, with only 1.4 percent of people indicating they were not likely to use an information technology system or social networks to access information.

In investigating the relationship of background characteristics with search preference, some differences were seen in the preferences in categories of race or ethnicity, position, and years worked at the university, though these differences were not statistically significant.

Social Capital

The relationship between social capital and background characteristics, including demographics, position, and work experience, showed some statistical significance in this study. In terms of demographic characteristics, gender showed statistical significance

with social capital aspects range and upper reach. An individual's highest degree earned showed statistical significance with social capital variables of extensity, range, and upper reach. As in other studies that show the relationship between positional characteristics such as years at an organization and position (Fu et al., 2014), this study did not find any statistical significance between positional and work characteristics and social capital.

Although the results of this study show significant information flow between individuals within the organization, with large numbers of information exchanges each month across the entire organizational hierarchy, there was limited statistical significance between measures of social capital and the perception of information quality retrieved, with statistical significance noted for individual information quality components in both information technology systems and social networks. This may be in part because the population for the study showed overwhelming use of information technology systems, with very few people in the study entirely dependent on social networks for accessing information. The fact that nearly half of participants were likely to use both information technology systems and social networks to access the information shows the flexibility of multiple approaches, but also a lack of complete dependence on social networks (Johnson, 2004).

In the interviews with information brokers, the value of social networks came through in their discussions of their ability to respond to requests that they receive. Similar to Huysman's (2004) discussion of information brokers serving as "outposts" connecting people and technologies, these information brokers discussed their utilization of networks not only to solve problems in answering questions they receive, but also to

redirect requestors to others that can help them whether due to better expertise elsewhere, or capacity restraints that they cannot provide the information in the time that is needed.

Information Quality

Although access to and retrieval of information are vital aspects of the information flow within organizations, the perceived quality of the information being retrieved is particularly important because of the amount of data and information available is increasing so quickly (Muller, 2018). When considering perceptions of the quality of information obtained via information technology systems and social networks, the perceived quality was very high for information technology systems in all three categories: 87 percent of respondent found the information very or extremely useful, 87.1 percent found the information very or extremely accurate, and 93.8 percent found the information somewhat or extremely adequate. Overall, information technology composite scores of the three components of information quality (usefulness, accuracy, and adequacy) indicated that 61.1 percent of individuals had scores of ten or above. These findings do not support the concept that people are not able to gather and understand the information through systems (Silver, 2012).

In contrast to the high perceptions of the quality of information obtained through information technology systems, perceptions of information quality through social networks was significantly lower in all three categories: 68.5 percent of respondent found the information very or extremely useful, 71.5 percent found the information very or extremely accurate, and 85 percent found the information somewhat or extremely

adequate. Although people are likely to use social networks to access information they need, the responses showed lower perceived quality of the information they received in comparison to information technology systems.

Although, in general, relationships between perceptions of the quality of information obtained and demographic characteristics did not show any statistical significance, age and highest degree showed statistical significance in relation to the perception of the quality of information obtained through information technology systems while position showed statistical significance in the perception of the quality of information obtained through social networks. This finding may support of the concerns raised that systems are not providing information in appropriate ways. In particular, those with higher degrees earned have a lower perception of the quality of information obtained through these channels, showing distrust or critical evaluation of what the tools are providing.

Information Brokerage

The results of this study support much of the research around the role of information brokerage within organizations, particularly in the value and role of the information broker in the flow of information within organizations.

Information brokers within higher education are providing a service particularly to leadership and administration within the university. Participants described their role of understanding the individuals who are asking for information in a way that anticipates their needs through past experiences, which supports the findings from Smith (2005).

Participants' understanding of the requestor as well as the information provide value and expertise that the institution utilizes regularly (Burt, 2005). The relationship that information brokers have with those requesting the information influenced the information transfer, as also seen in other research (Cross & Borgatti, 2004). Participants' experiences also support previous research on the role of information brokers within the context of information flow, particularly the extent to which they evaluate and determine priorities and urgency within their own contexts, and not necessarily coordinated amongst each other as discussed by Watts (2003).

The results of this study also support the continued proliferation and decentralization of decision support away from formal institutional research offices discussed through case studies (Hearn & Corcoran, 1988). Information brokers who participated in this study have positions across administrative and collegiate units, and are all serving in similar decision-support and problem-solving roles, providing information and expertise to leaders in their areas to support decision-making, embedding it as seen in other studies (Morest & Jenkins, 2007).

The role of the information broker as a facilitator of resources, in this case information, was supported through all of the participants' experiences discussed. Many of them talked about their reputation, expertise, and their receptiveness to requests for information as reasons why they have the role of information broker, beyond providing information to their unit by virtue of their position.

Perhaps due to the context of the study within a higher-education institution, the results of the study did not support some of the characteristics of brokers frequently

discussed as barriers for access to those making the request, such as uncooperativeness or competitiveness (Small, 2009). Instead, many of the participants in the study discussed the culture of the institution and higher education as supporting information as being shared and made available to anyone who asks. Several participants did echo Smith's (2005) findings on the element of trust in the individual making the request as affecting their willingness to provide information. Overwhelmingly, the information brokers discussed not a question of *if* they would provide information to those making the requests, but rather *when* they would be able to get to the request, due to their own capacity and time constraints.

The value of information brokers' time and resources came through all of the interviews conducted. As other research has shown, the process of serving as an information broker is time-consuming, both in the negotiation of the request as well as in the gathering and preparing of the information to satisfy the need (van den Hooff et al., 2004). Responses reflected the reality that information brokers receive more requests than they can process. They frequently mentioned that those in higher positions would get priority in responses, suggesting that many individuals looking for information may not be getting what they need either due to lack of connections to a broker, or to their own position, that places their request lower in priority.

Implications for Theory

According to my study, there are implications for theory in the area of social capital. Implications for social capital theory, particularly related to positional approaches

to analysis and the treatment and analysis of information as a social capital resource are key aspects of considerations based on the investigation of the information exchange occurring within higher education across administrative staff.

This study utilized a positional approach to social network analysis to see if there are relationships between social capital measures and perceptions of information quality. Based on the results of this study, there is a significant relationship between only the one social capital measure of network extensity and perceptions of information quality access through social networks. The wide range of people within positions at a large research university could have impact on the range of experiences individuals exchanging information due to the large number of interactions that take place at a positional level, obfuscating individual-level experiences.

As research continues to look at access to data and information as an example of a social capital resource, consideration of information quality would need to be investigated further to support success when individuals are searching for information. The finding that there is lower perception of quality for those that do utilize a social networks indicates that there are differences in information access between the information technology systems and social networks.

Implications for Policy

The use of information for decision-making at universities is only going to increase, and current policies do not address the changing dynamics of the way that people interact with others in the information search process. The that people are looking

for information both through information technology systems and through social networks requires policies that not only financially support technologies that allow people to search and access information in meaningful ways, but also support programs that increase the understanding and sharing of information amongst individuals across the organization. Funding both systems and education programs that help support information brokerage are important, but putting policies in place that encourage sharing of information through a variety of methods is necessary to support the administrative staff's need to utilize information for data-informed decision-making on a daily basis (Muller, 2018).

Implications for Practice

The findings of this study support both the utilization of and dependency on information technology systems as well as the broad sharing of information between people across institution in a large public university context. Results of the study, however, show lower perceptions of quality of the information retrieved through social networks. The perception of lower quality for those who utilize social networks suggests that there should be greater focus on programs that facilitate and emphasize both connections through social networks and data education programs to help those searching for information be able to not only access information, but find usable and understandable information to help inform their decision making.

Information brokerage activities cannot be centralized in a single location and feasibly support the amount of information needs of the university staff and

administration. As discussed above, information brokers routinely face more requests than they can reasonably handle. Currently they are using limited resources to support administration and leadership requests, suggesting that there are many others across the organization without access to individuals who can help them with their information needs.

Limitations

With a mixed-methods study, there are limitations for each part. Limitations for the survey include participant selection and survey design. Limitations for the interviews include the number of participants and participant representation.

Survey Limitations

For the survey portion of the study, one limitation is the use of a distribution list within the university that primarily focuses on individuals who are regular data consumers. The resulting participant group does not represent the wide variety of experiences of use of data within the university. Although respondents represented a wide range of roles and positions within the university, the participants represented primarily administrative staff on a large public university campus.

Although the participant group provided consistent results regarding information exchange, recruiting participants outside of those who regularly work with data could have provided different perspectives, particularly related to access to information within the university context.

Interview Limitations

For the interviews, one significant limitation is the number of participants and participant representation. The group of participants included eight individuals with the objective of providing perspectives of both collegiate and administrative perspectives who share a broad set of experiences within the University.

Recruiting individuals who work in more colleges and administrative units could have strengthened findings in several areas, particularly in brokerage context and brokerage capacity. In addition, the majority of participants are in director-level positions within the university; recruiting more analysts could have added additional perspectives on the interaction process as well as on aspects of brokerage.

Study Limitations

One limitation spans both parts of the study. All participants were recruited from the same institution; having participants from different institutions could provide a wider variety of perspectives of information access and sharing particularly due to differences in institutional culture of information usage, but it is unknown how different the results would have been across several institutions. This is particularly relevant to the type of university; universities that are not large, public, research-intensive universities have different constraints, opportunities, and cultures that could impact results.

Directions for Future Research

There are several directions for future research. In the area of social capital, information exchange could be investigated from a different positional perspective. In

addition, several areas surrounding the information exchange experience from multiple perspectives could be useful to explore.

The survey provided a view into information exchange from a positional perspective; although it showed the extent to which a large number of information exchanges are occurring, both providing and receiving information across the organizational context, more detailed data collection could be informative in exploring the information exchange that is occurring. Asking participants at a more detailed positional level, rather than at the position-category level, could provide insight in where the differences between providing and receiving information are occurring.

Interview participants discussed the constraints on their time and resources for providing information in many contexts. Completing interviews with the individuals who are requesting information would provide the alternative perspectives of those who are looking for information, both those who are able to get the information they need as well as those who do not. There is a gap in perspectives between those making the decisions to provide information with the broad group of people that search for it.

The interviewees discussed the role of the information broker and capacity, but further exploration of the information brokerage experience, particularly in the area of the additional value that they provide within a higher education context could shed light on how better to support those who serve in this role. In addition, further exploration of the skills and education that universities should be providing would be useful to provide not only information but the context and support that these individuals provide to peers, administrators and leadership.

Conclusion

The increased focus on data-informed decision-making within higher education creates a context of information as a valuable resource that administrative staff need access in their daily work. As universities are forced to make choices on funding and support of information resources, consideration should be made both for the information technology systems that can answer many of the information questions that administrative staff ask, and also the support needed for social networks to facilitate information exchange. Information exchange allows for not just information, but the necessary context, understanding, and thoughtfulness to be integrated together. Facilitating meaningful information exchange will allow for not only informed decision-making, but also efficient use of time to find and utilize the information needed.

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APPENDICES

Appendix A: Institutional Review Board Response

UNIVERSITY OF MINNESOTA

Twin Cities Campus

Human Research Protection Program
Office of the Vice President for Research

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NOT HUMAN RESEARCH

June 6, 2019

Melissa Anderson

612-624-5717
mand@umn.edu

Dear Melissa Anderson:

On 6/6/2019, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	The Role of Social Capital and Brokerage in Information Search through Social Networks: Experiences of University Administrative Staff
Investigator:	Melissa Anderson
IRB ID:	STUDY00006710
Sponsored Funding:	None
Grant ID:	None
Internal UMN Funding:	None
Fund Management Outside University:	None
IND, IDE, or HDE:	None
Documents Reviewed with this Submission:	<ul style="list-style-type: none"> • Survey Protocol, Category: Other; • Schult IRB Protocol HRP-580 updated.docx, Category: IRB Protocol; • Survey Consent Form, Category: Consent Form; • Interview Consent Form, Category: Consent Form; • Interview Protocol, Category: Other; • Recruitment Materials, Category: Recruitment Materials;

As the data collected are focused on the processes individuals use to share data/information, and not collecting private identifiable information about themselves personally, the IRB determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations. To arrive at this determination, the IRB used "WORKSHEET: Human Research (HRP-310)." If you have any questions

about this determination, please review that Worksheet in the [HRPP Toolkit Library](#) and contact the IRB office if needed.

Ongoing IRB review and approval for this activity is not required; however, this determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether IRB review is required, please submit a Modification to the IRB for a determination.

Sincerely,

Jeffery P Perkey, CIP, MLS
IRB Analyst

We value feedback from the research community and would like to hear about your experience. The link below will take you to a brief survey that will take a minute or two to complete. The questions are basic, but your responses will help us better understand what we are doing well and areas that may require improvement. Thank you in advance for completing the survey.

Even if you have provided feedback in the past, we want and welcome your evaluation.

https://umn.qualtrics.com/SE/?SID=SV_5BiYrqPNMJRQSBn

Appendix B: Survey Protocol

In this survey, you will be asked about your experiences searching for institutional information and providing it to others at the University. Please answer honestly: there are no "right" responses, and the data from the survey will only be helpful if they truly reflect your viewpoints and experiences. The consent form is available [here](#).

1. Please remember that this is an anonymous survey and that your participation is voluntary. If you do not want to answer a particular question you are not obligated to do so.
 - a. I am 19 years of age or older and I consent to participate in this study
 - b. I do not consent to participate in this study

2. For the purpose of this survey, institutional information is defined as the detailed and summary data the university gathers about its people, research, money, and facilities. This information can take the form of data tables, summarized visualizations, and presentations, for example. What type of institutional information do you use most frequently?
 - a. Research*
 - b. Student
 - c. Human Resources
 - d. Finance
 - e. Facilities

*Throughout the survey, display logic will be used to display the choice the respondent picks in question one. For simplicity, Research will be used in brackets as a placeholder.

3. How likely are you to access [Research] information using an information technology system? (e.g. PeopleSoft, Data Warehouse, UM Reports, UM Analytics)
 - a. Very Likely
 - b. Likely
 - c. Unlikely
 - d. Very Unlikely
 - e. Not at all

4. In a typical month, how useful was the [Research] information you retrieved from an information technology system?
 - a. Extremely Useful
 - b. Very Useful
 - c. Moderately Useful
 - d. Slightly Useful
 - e. Not at all Useful

5. In a typical month, how accurate do you think the [Research] information you obtained from an information technology system?
 - a. Extremely Accurate
 - b. Very Accurate
 - c. Moderately Accurate
 - d. Somewhat Accurate
 - e. Not at all Accurate

6. In a typical month, how adequate was the [Research] information you obtained from an information technology system?
 - a. Extremely Adequate
 - b. Somewhat Adequate
 - c. Neither adequate nor inadequate
 - d. Somewhat Inadequate
 - e. Extremely Inadequate

7. How likely are you to contact another person for [Research] information?
 - a. Very Likely
 - b. Likely
 - c. Unlikely
 - d. Very Unlikely
 - e. Not at all

8. In a typical month, how useful was the [Research] information you received from other people?
 - a. Extremely Useful
 - b. Very Useful
 - c. Moderately Useful
 - d. Slightly Useful
 - e. Not at all Useful

9. In a typical month, how accurate do you think the [Research] information you received from other people?
- Extremely Accurate
 - Very Accurate
 - Moderately Accurate
 - Somewhat Accurate
 - Not at all Accurate
10. In a typical month, how adequate was the [Research] information you received from other people?
- Extremely Adequate
 - Somewhat Adequate
 - Neither adequate nor inadequate
 - Somewhat Inadequate
 - Extremely Inadequate

In this section, please respond to each item in the context of sharing (receiving and providing) institutional information. This can be at the individual data or summary level information, in any format such as detailed data in spreadsheets, summarized graphs, visualizations, etc.

11. How many times in a typical month do you PROVIDE information to an academic staff member in this role? (complete all that apply)
- Departmental Staff
 - Departmental Chair
 - Collegiate Staff
 - Faculty
 - Academic Director
 - Assistant/Associate Dean
 - Dean
 - Provost Staff
 - Assistant/Associate/Vice Provost
 - Provost
 - President

12. How many times in a typical month do you PROVIDE information to a central administration staff member in this role? (complete all that apply)

- a. [Research] Services Staff
- b. Information Technology Staff
- c. Institutional Research Staff
- d. [Research] Services Director
- e. Information Technology Director
- f. Institutional Research Director
- g. Assistant/Associate Vice President
- h. Vice President

13. How many times in a typical month do you RECEIVE information from an academic staff member in this role? (complete all that apply)

- a. Departmental Staff
- b. Departmental Chair
- c. Collegiate Staff
- d. Faculty
- e. Academic Director
- f. Assistant/Associate Dean
- g. Dean
- h. Provost Staff
- i. Assistant/Associate/Vice Provost
- j. Provost
- k. President

14. How many times in a typical month do you RECEIVE information from a central administration staff member in this role? (complete all that apply)

- a. [Research] Services Staff
- b. Information Technology Staff
- c. Institutional Research Staff
- d. [Research] Services Director
- e. Information Technology Director
- f. Institutional Research Director
- g. Assistant/Associate Vice President
- h. Vice President

15. What is your age?

- a. Under 29
- b. 30 – 39
- c. 40 – 49
- d. 50 – 59
- e. 60 and Over
- f. Prefer not to respond

16. What is your gender?
 - a. Male
 - b. Female
 - c. Not Listed
 - d. Prefer not to respond

17. What is your race/ethnicity? (check all that apply)
 - a. American Indian or Alaska Native
 - b. Asian
 - c. Black or African American
 - a. Native Hawaiian or Pacific Islander
 - b. White
 - c. Not Listed
 - d. Prefer not to respond

18. What is your highest earned degree?
 - a. High school diploma
 - b. 2 year degree
 - c. 4 year degree
 - d. Master's degree, Professional degree or equivalent
 - e. Doctorate

19. What category best fits your position? [Combined List of position list (See Appendix C)]

20. How long have you worked at the university?
 - a. Less than 1 year
 - b. 1 - 2 years
 - c. 3 – 5 years
 - d. 6 - 10 years
 - e. 11 - 15 years
 - f. 16 - 25 years
 - g. More than 25 years

21. How many positions have you had at the university?
 - a. 1
 - b. 2 - 3
 - c. 4 - 5
 - d. 6 or More

Thank you for taking the time to complete this survey!

If you have any questions about the survey please contact the researcher at schu2965@umn.edu.

Appendix C: University of Minnesota Organizational Hierarchy

A) Job Families and Job Family Classification

Job Family	Job Family Level	Included	Translated Level	Excluded Reason
Academic	Assistant Dean	Y	Dean	
Academic	Assistant Provost	Y	Provost	
Academic	Assistant Vice chancellor	N		System Campus
Academic	Assistant Vice President	Y	Vice President	
Academic	Assistant Vice Provost	Y	Provost	
Academic	Associate Dean	Y	Dean	
Academic	Associate Provost	Y	Provost	
Academic	Associate Vice Chancellor	N		System Campus
Academic	Associate Vice President	Y	Vice President	
Academic	Athletic Director	N		Outside Scope
Academic	Attorney	N	Staff	
Academic	Chair	Y	Department Chair	
Academic	Chancellor	N		System Campus
Academic	Chief Information Office	Y	Vice President	
Academic	Chief of Staff	Y	Staff	
Academic	Controller	Y	Vice President	
Academic	Dean	Y	Dean	
Academic	Dentist	N		Outside Scope
Academic	Deputy chief of Staff	Y	Staff	
Academic	Director	Y	Director	
Academic	Executive Director	Y	Director	
Academic	Executive Vice President/Provost	Y	Vice President	

Academic	Fellow	Y	Staff	
Academic	Foundation President	N		Outside Scope
Academic	General Counsel	N	Director	
Academic	Head	Y	Director	
Academic	Leader	Y	Director	
Academic	Medical Director	N		Outside Scope
Academic	Optometrist	N		Outside Scope
Academic	Physician	N		Outside Scope
Academic	President	Y	President	
Academic	Provost	Y	Provost	
Academic	Research Specialist	Y	Staff	
Academic	Senior Attorney	N	Staff	
Academic	Senior Fellow	Y	Staff	
Academic	Senior Physician	N		Outside Scope
Academic	Senior Teaching Attorney	N		Outside Scope
Academic	Senior Teaching Specialist	Y	Staff	
Academic	Senior Vice President	Y	Vice President	
Academic	Special Assistant	Y	Staff	
Academic	Special Project Associate	Y	Staff	
Academic	Teaching attorney	N		Outside Scope
Academic	Teaching Specialist	Y	Staff	
Academic	UMN Foundation VP	N		Outside Scope
Academic	University Librarian	N		Outside Scope
Academic	Vice Chancellor	N		System Campus
Academic	Vice President	Y	Vice President	
Academic	Vice Provost	Y	Provost	
Administration	Analyst	Y	Staff	
Administration	Associate	Y	Staff	

Administration	Compliance Associate	Y	Staff	
Administration	Compliance Officer	Y	Director	
Administration	Director	Y	Director	
Administration	Manager	Y	Director	
Administration	Specialist	Y	Staff	
Administration	Supervisor	Y	Director	
Campus Ops	Director	Y	Director	
Campus Ops	Manager	Y	Director	
Campus Ops	Professional	Y	Staff	
Campus Ops	Specialist	Y	Staff	
Campus Ops	Supervisor	Y	Director	
Finance	Analyst	Y	Staff	
Finance	Director	Y	Director	
Finance	Manager	Y	Director	
Finance	Professional	Y	Staff	
Human Resources	Consultant	Y	Staff	
Human Resources	Director	Y	Director	
Human Resources	Generalist	Y	Staff	
Human Resources	Manager	Y	Director	
Human Resources	Specialist	Y	Staff	
Human Resources	Supervisor	Y	Director	
Information Technology	Business/Systems Analyst	Y	Staff	
Information Technology	Design/System Administrator	Y	Staff	
Information Technology	Developer	Y	Staff	

Information Technology	End User Support	Y	Staff	
Information Technology	Manager	Y	Director	
Information Technology	Technical Expert	Y	Staff	
Information Technology	Technologist	Y	Staff	
Research	Director	Y	Director	
Research	Manager	Y	Director	
Research	Professional	Y	Staff	
Research	Researcher	Y	Staff	
Research	Specialist	Y	Staff	
Research	Supervisor	Y	Director	
Student Services	Associate	Y	Staff	
Student Services	Counselor	Y	Staff	
Student Services	Director	Y	Director	
Student Services	Manager	Y	Director	
Student Services	Professional	Y	Staff	
Student Services	Program Specialist	Y	Staff	

B) Positions Identified for Use in the Study

Departmental Staff
Collegiate Staff
Facilities Services Staff
Finance Services Staff
Human Resources Staff
Research Staff

Student Services Staff
Information Technology Staff
Institutional Research Staff
Provost Staff
Departmental Chair
Faculty
Academic Director
Facilities Director
Finance Director
Human Resources Director
Research Director
Student Services Director
Information Technology Director
Institutional Research Director
Assistant/Associate Dean
Dean
Assistant/Associate Vice President
Assistant/Associate/Vice Provost
Provost
President