Abstract

A MODEL OF CONTRACTUAL PROJECT-BASED WORK:

PERSONAL SOCIAL NETWORK CONNECTIVITY, ICT USE, AND SELF-

MONITORING.

"Organizations of one" are increasingly common in the modern workplace. How do individuals conduct work when they do not have access to the resources of conventional organizations? Research on the work of residential real estate agents suggests that the agents rely on their personal social networks to support their work. Research also suggests that information and communication technologies play an important role in supporting the use of social network ties in conducting work. The present research fills a gap in existing social network research by focusing on how accessing social networks affects the performance of contractual project-based workers. Residential real estate agents are studied as exemplars of contractual project-based workers. This study examines the personal social network connections of residential real estate agents in the form of ties to acquaintances or friends of friends (weak ties), and ties to coworkers with whom the agent shares mutual dependencies in the execution of work-related tasks (strong ties) These two types of ties are hypothesized as predictors of performance. Two individual characteristics were selected as predictors of individual social network use: (1) information and communication technology (ICT) use, and (2) self-monitoring.

A national survey was mailed to 9000 members of the National Association of Realtors. Factor analysis and structural equation modeling was used to analyze results. Strong tie personal social network connectivity predicted performance suggesting that

strong tie personal social networks are foundational in the work of the contractual

project-based worker. Weak ties were hypothesized to support the residential real estate

agent in prospecting for new buyers and sellers of homes. Surprisingly, weak ties were

not found to be significant predictors of performance. Website use was a predictor of

strong tie personal social network connectivity and performance suggesting the

importance of website use in the work of residential real estate agents. Self-monitoring, a

personality variable was a predictor of strong and weak ties as well as of performance.

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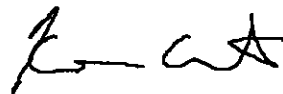
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in the Graduate School of Syracuse University, School of Information Studies.

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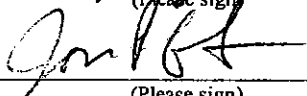
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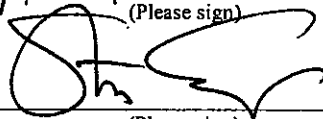
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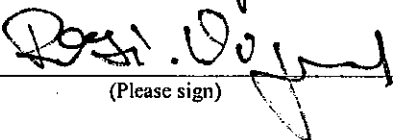
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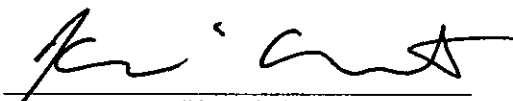
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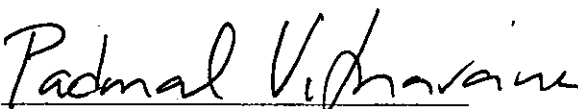
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List of Illustrative Materials

1 Chapter One: Introduction

1.1 Introduction

Increasingly, contractual project-based workers are using their personal social

network ties in order to conduct work. These individuals access labor and information

through the social network ties they create and maintain. Contractual project-based

workers use these ties to coordinate activities and provide services to their customers.

The present research used a social network perspective to understand the work of

contractual project-based workers. Indicators of strong and weak tie personal social

network connections were examined as predictors of individual performance. Focus was

placed on the effect of the individual characteristics of ICT use and self-monitoring as

predictors of performance of contractual project-based workers. A goal of the research

was to understand contractual project-based work. The setting for this research was the

study of residential real estate agents as exemplars of contractual project-based workers.

Focus on personal social network connectivity provides for a richer

conceptualization of social networks by looking at perceived levels of social network

connectivity relative to strength of tie. The focus on personal social network connectivity

complements the social network analysis approach that focuses solely on measuring

specific social structure. The gap this research addresses pertains to the degree to which

individual behavior impacts social structure. Focusing on accessing personal social

network structure complements the dominant social network perspective that focuses on

the effect of structure at the collective level. The present research addresses this gap in

research by studying the individual accessing of social networks and the benefits that accrue to the individual as a result. The research problem also addressed the call put forth by (Barley and Kunda, 2001) suggesting the need for studies on work and distinctive types of workers. My focus here is on contractual project-based work and the contractual project-based worker.

In this chapter, a discussion of the research problem and the research objectives is presented. The concepts of contractual project-based work and personal social network connectivity are explained. The work of the residential real estate agent is presented as an exemplar of contractual project-based work. Perspectives, concepts, and theories used in the present research are elaborated upon. Lastly, the significance and contributions of the study are addressed.

The two high-level research questions for the study are as follows:

1. To what degree does the personal social network connectivity of the contractual project-based worker impact performance?

2. What characteristics of the contractual project-based worker impact personal social network connectivity?

1.2 Contractual project-based work

This study argues that contractual project-based work can be viewed as a type of work and a context of work. This trend towards reduced access to institutional resources is exemplified by increasing numbers of independent contractors, contractual project-based workers, consultants, and small business owners in today's economy (Malone and Laubacher, 1998; Nardi, Whittaker, and Schwarz, 2000b).

Contractual project-based workers are an exemplar of a new type of knowledge-based worker. This type of worker is becoming more prominent due to changes in the business environment. Many different terms have been used to refer to contractual project-based work and contractual project-based workers. Malone and Laubacher (1998) refer to them as e-lance workers. Nardi, Whittaker, and Schwarz (2002) refer to them as NetWORKers. Barley and Kunda (2001) refer to contractual project-based work as contracted work.

Work and organizing affect one another in a reflexive manner. When the nature of work changes, this often leads to a change in organizing within organizations. Reduced access to institutional resources is feeding the increasing importance of independent contractors, consultants, and smaller organizations (Barley and Kunda, 2001). Increasingly, the work force is being made up of contractual project-based workers. This is reflected in the percentage of the work force that is comprised of self-employed, temporary, contract-based workers.

Contractual project-based work is distinguished from traditional types of work by the following characteristics: (1) work is formed around a project, (2) work is contractual in nature, and (3) workers maintain a degree of organizational autonomy. Contractual project-based workers rely heavily on communication that is lateral, nonhierarchical, and conducted outside of formal organizations (Malone and Laubacher, 1998; Powell, 1990). One way in which contractual project-based workers coordinate their work is through the use of their personal social networks. It is important to note that contractual project-based workers rely heavily on personal social networks ties, but not exclusively.

Networks are formed around projects rather than around formalized organizational structures. Workers often develop project-based networks in place of organizational or inter-organizational networks. The growing pervasiveness of the contractual project-based worker is reflective of the movement from centralized structures to network structures. Another way of expressing this is that there has been a movement away from "organizational-based" structures towards greater prevalence of "network-based" structures. These "network-based" structures serve as surrogate organizational structures.

In this research, Network Organization Theory (Powell, 1990) is used to examine the use of strong tie personal social networks as surrogate organizational structures and primary tools through which work is conducted (Powell, 1990). According to Powell (1990), organizational practices and arrangements that are network-like in form share the following common characteristics: (1) make use of lateral patterns of exchange, (2) are flexible and dynamic, (3) support interdependent flows of resources, and (4) make use of reciprocal lines of communication. These characteristics offered by Powell (1990) provide a framework with which to describe the use of strong personal social network ties by the contractual project-based worker.

In summary, the contractual project-based worker conducts a large part of their work outside the domain of their formal organizational environment. In many cases, contractual project-based workers work independently of a formal organizational environment. This research examines the work of the residential real estate agent as an exemplar of contractual project-based work. The next section presents the model of contractual project-based work proposed in this study.

1.3 A model of contractual project-based work

Figures 1 and 2 below present a conceptual model of the research at both a general level and a specific level. Figure 3 displays (1) the functions of strong tie personal social network connectivity and weak tie personal social network connectivity that affect performance, and (2) the functions of ICT and self-monitoring that affect personal social network development.

In figure 3, the two components of this research are presented: (1) the degree to which strong tie personal social network connectivity and weak tie personal social network connectivity explain performance, and (2) the degree to which the individual characteristics of ICT use and self-monitoring serve as predictors of strong tie personal social network connectivity and weak tie personal social network connectivity.

Strong ties are ties that connect close friends, and coworkers who share repeated contact and mutual dependencies in the execution of work-related tasks (Granovetter 1973; Granovetter 1982; Pickering and King 1995). **Weak ties** are ties that connect acquaintances or friends of friends, coworkers not central to an individual's task domain, and everyday acquaintances made in connection with work, social activities, and mutual friendships (Granovetter, 1973; Granovetter,1982; Pickering and King, 1995).

Figure 1.General level view of study of contractual project-based work.
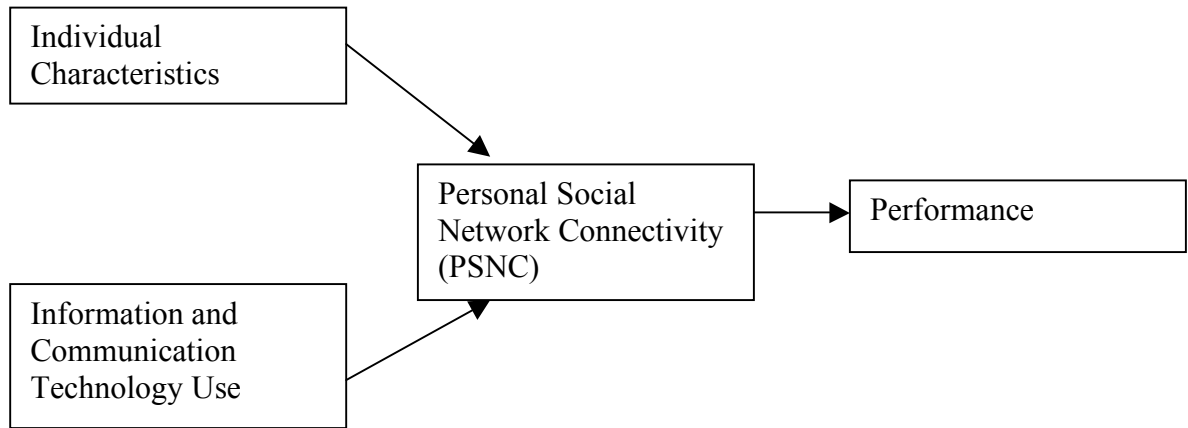
Figure 2. Specific level view of study of contractual project-based work.
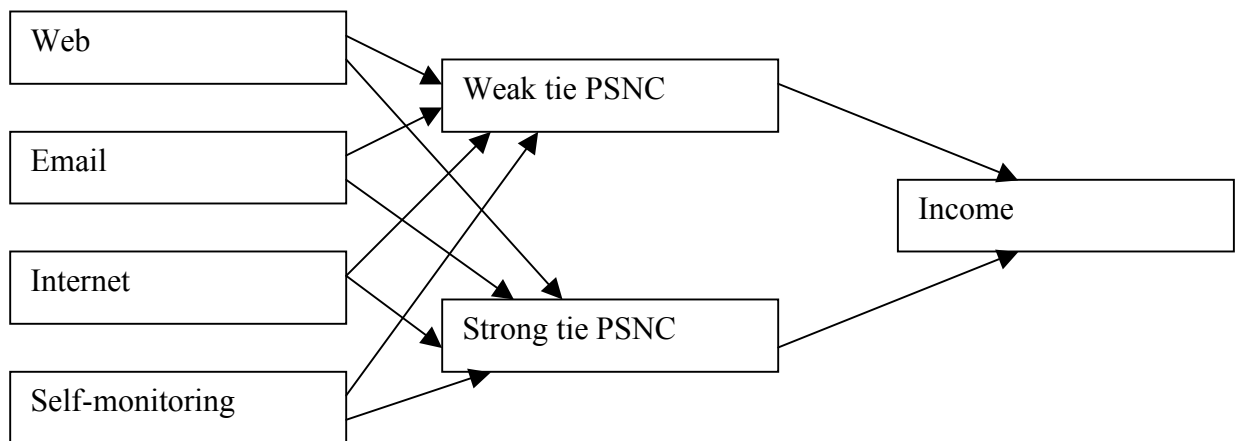
Figure 3. Model of contractual project-based work.

ICT Use

Reduces coordination costs.

Enables greater levels of personal social network connectivity.

Strong Tie Personal Social Network Connectivity
Serves as a surrogate organizational structure.

Self-monitoring

Enables personal social network connectivity.

Weak Tie Personal Social Network Connectivity
Enables greater levels of personal social network connectivity.

Performance

A main premise of this research is that it is useful to consider individual differences and individual actions with respect to social networks. The adoption of the individual-level perspective on social networks suggests a focus on factors of individual behavior that are predictors of accessing personal social networks. Two factors of individual behavior were chosen given their effect on social networks: information and communication technology use and self-monitoring (Mehra, Kilduff, and Brass, 2001; Wellman, Salaff, and Dimitrova, 1996).

ICT use and self-monitoring were selected as variables that predict levels of both strong and weak tie personal social network connections. The functions of ICT are two-fold: (1) ICT reduces the coordination costs of using social networks in order to conduct work. (2) ICT enables greater levels of personal social network connectivity. Self-monitoring is a behavioral characteristic that serves as a predictor of accessing social networks.

1.4 Social networks and personal social network connectivity

To better understand contractual project-based work, an understanding of how individuals develop their personal social networks to conduct work is necessary (Barley and Kunda, 2001; Burt, 1992; Malone and Laubacher, 1998; Nardi, Whittaker, and Schwarz, 2000b). This research fills a gap in existing social network research by focusing on (1) accessing personal social networks and (2) the characteristics of those individuals who access personal social networks.

I apply a social network approach in this study. However, I have adapted the approach to focus on individual accessing of social networks. Social network research has focused predominantly on the study of actual network structure and the effects of structure formation on the individual. In my research I seek to understand how individuals impact and make use of structure for their own benefit.

A review of social network analysis literature, Kilduff & Tsai (2003) found that there is a disconnect between those who focus on social networks but ignore the psychology of individuals, and those who study the psychology of individuals but ignore the social networks within which individuals are embedded. Network theorists have, for the most part, focused on the ways in which an existing structure limits and constrains human interaction, while neglecting strategies used by individuals to form, change, and organize their networks of relationships (Mehra, Kilduff, and Brass, 2001).

The structural or macro approach to social networks tends to emphasize the structure of positions in social space (Pfeffer, 1991; Blau, 1993) and avoids dependence on the individual properties of actors, which are difficult to measure (e.g., McPherson, Popielarz, and Drobnic, 1992). However, there is ample psychological research suggesting that individuals differ with respect to social influence (Mehra, Kilduff, and Brass, 2001). I focus on the perceptions individuals hold about their social structure rather than measuring the actual social structure. Focusing upon the individual characteristics that determine individual accessing of personal social networks further extends the focus on the individual.

The primary dimensions of social networks are configuration and tie type. Configuration, the structure of contacts, has been the dominant focus of attention often to

the exclusion of tie type (Nelson, 1989). Much research on social network focuses on identification and analysis of the social network rather than identifying the types and functions of ties relative to their strength. The type of tie that connects individuals is a fundamental aspect of social structure (Nelson, 1989) and should be focused on as well as the configuration of the social network.

I contribute to closing the gap in literature by focusing on the individual with respect to social networks as opposed to the dominant approach of focusing on the collective structure. Collective structure is represented as the mapping of social networks. While, I focus on personal social network connectivity and individual differences that have an impact on personal social network connectivity. The access of the individual to social networks informs the work of the contractual project-based worker.

1.5 Conceptualization of personal social network connectivity

This section presents the key concepts and constructs of personal social network connectivity: (1) social networks, (2) social network ties, and (3) personal social network connectivity. A **social network** consists of interconnected individuals linked by patterned flows of information and communication (Rogers and Kincaid, 1981b). In the present research, **personal social network connectivity** is measured as the perceived degree of accessibility to relationships with others in the social networks that an individual possesses. This perceived level of access to social networks is viewed as an antecedent to value creation and extraction in social networks. Value creation and value extraction refer respectively to maintaining and activating personal social networks. The line of argument

is that if agents have better access to networks, they can create and extract more value from those networks.

Personal social network connectivity is examined as social ties defined relative to the characteristics of the ties. In order to understand personal social network connectivity, I measure social networks from the perspective of the individual towards their immediate social network. For example, a real estate agent's immediate social network would include the direct connections to other individuals in the real estate agent's network. The social network that the agent belongs to includes their connections to other professionals who provide services in the real estate transaction, including agents, potential buyers, potential sellers, former buyers, former sellers, those that provide referrals, and community organizations.

Given the operationalization of personal social network connectivity and the design of the study, it is not possible to measure directly how much value real estate agents extract form their social networks. However, the perceived degree of access individuals have to their personal social networks is measured. This is explained in further detail in Chapter 2, section 2.6.1.

A **tie** is distinguished in terms of its intensity (strong or weak), based on three factors: (1) frequency of interaction occurring between the entities connected by the tie, (2) the function of the tie in terms of the type of information and communication that flows over the tie (Monge and Contractor, 2003), and (3) attributes of the individuals that are connected by the tie. **Strong ties** are ties that connect close friends, and coworkers who share mutual dependencies in the execution of work-related tasks (Granovetter, 1973; Granovetter, 1982; Pickering and King, 1995). The strong ties of a real estate agent

might include other agents who the agent works with, as well as others who provide services in the real estate transaction, such as home inspectors and finance officers.

Weak ties are ties that connect acquaintances or friends of friends, coworkers not central to an individual's task domain, and everyday acquaintances made in connection with work, social activities, and mutual friendships (Granovetter, 1973; Granovetter, 1982; Pickering and King, 1995). The weak ties of a real estate agent might include previous buyers of homes that the real estate agent has sold and individuals in the market to sell or buy a home that the real estate agent is acquainted with.

1.6 Personal social network connectivity, contractual project-based work and the work of the residential real estate agent

I use the construct of personal social network connectivity to better understand the work of the contractual project-based worker. In this section, I describe the function of personal social network connectivity and how it relates to the work of the residential real estate agent. The personal social network ties that an agent develops and uses are in the form of strong and weak ties. This research posits that the residential real estate agent develops and uses social ties with other professionals for coordination and provision of services in the real estate transaction. Furthermore, the agent develops social ties with potential buyers and sellers of houses and previous clients, and maintains these ties to in order to gain referrals for future business.

Residential real estate agents who regularly work together are often not members of the same organization. Agents also generally work outside the context of formal organizations. Each agent has their own network of resources that they call upon. When

two agents, a buyer agent and a seller agent, come together to sell a house, a network of ties to other professionals is used in the transaction process. In essence, a "surrogate organization" is created, in the form of a network of service providers working together on the project or task of selling a home. The new network is assembled and disassembled each time a home is sold. Yet the network ties among the individuals remain ready to - form again whenever there is another opportunity to close the sale of a home.

We can learn more about how work is conducted by real estate agents, as exemplars of contractual project-based workers, through the examination of personal social network connectivity and individual differences that facilitate the development of personal social networks. Two individual differences that allow us to understand more about personal social network connectivity in contractual project-based work are ICT use and self-monitoring. ICT use is measured in terms of Internet, email, and website. The conceptualization of these three basic measures of ICT is discussed further in chapter 3. Self-monitoring is a personality trait that represents an individual's willingness to adapt to their social environment. In other words, self-monitoring describes the degree to which individuals are willing and able to monitor and control their self-expression in social situations.

Thus by looking at individual differences in terms of ICT use and personality characteristics such as self-monitoring, we can better understand personal social network connectivity in the context of the contractual project-based worker. ICT use was selected as a variable because research and theory suggest that ICT reduces the coordination costs of personal social network connectivity and enables greater levels of social network

connectivity. Self-monitoring was selected because research and theory suggest that self-monitoring is a good predictor of accessing personal social network ties.

1.7 Theories and perspectives

In this section, I briefly introduce the theories and research that are used in this study. Table 1 presents these theories, research perspectives and key suppositions informing this research.

Table 1

Theory and key suppositions for the present research.

Theory or Research	Key Suppositions Informing Research
Strength of Weak Tie Theory (Granovetter,1973)	Weak ties enable greater levels of social network connectivity. Weak ties enable access to novel information. Strong ties connect individuals who work together. Strong ties provide a greater level of assistance (reciprocity). Strong ties are more easily accessible than weak ties.
Network Organization Theory (Powell, 1990)	The network of strong tie connections creates a flexible network that serves as a surrogate organizational structure.
NetWORK (Nardi, Whittaker, and Schwarz, 2002)	Personal social networks are a key structure in enabling work. Workers rely on their own individual resources rather than accessing organizational resources.
Coordination cost assumption of Electronic Markets Theory(Malone, Yates, and Benjamin, 1987).	ICT is posited to reduce coordination costs and enable greater levels of social network connectivity.
Role of social networks in the work of the residential real estate agent. (Crowston, Sawyer, and Wigand, 2001; Sawyer, Crowston, Allbritton, and Wigand, 2000a; Sawyer, Crowston, and Wigand, 1999; Sawyer, Crowston, Wigand, and Allbritton, 2003)	Strong tie connections are important to the work of residential real estate agent.

Descriptions of the work of residential real estate agents and the network of service providers that are connected together and coordinated by the residential real estate agent.	Strong tie and weak tie social network connections are used for the coordination and provision of services in the work of the residential real estate agent.
Description of contractual project-based work (Barley and Kunda 2001; Malone and Laubacher 1998)	Strong tie networks are used for coordination of projects and accessing resources.

Supposition: Strong tie personal social network connectivity is a predictor of performance. Strength of Weak Tie Theory (Granovetter, 1973) and Network Organization Theory (Powell, 1990) are used to explain the relationship between strong tie personal social network connectivity and performance. Network Organization Theory (Powell, 1990) suggests that strong tie personal social networks serve as surrogate organizational structures and primary tools through which work is conducted**.** Granovettor (1973) describes the functions of strong ties as ties that connect individuals who work together.

Nardi, Whittaker, and Schwarz (2002) describe personal social networks as a key structure in enabling work. Workers often rely on their own individual resources rather than accessing organizational resources. Personal social network resources are accessed in order to conduct work. Descriptions of contractual project-based work (Barley and Kunda, 2001; Malone and Laubacher, 1998) suggest that strong tie networks are used for coordination of projects and accessing resources.

In their research (Crowston, Sawyer, and Wigand, 2001; Sawyer, Crowston, Allbritton, and Wigand, 2000a; Sawyer, Crowston, and Wigand, 1999; Sawyer, Crowston, Wigand, and Allbritton, 2003) found that the social context of residential real estate transactions played key role in the work of the residential real estate agent. Strong

tie connections were found to be important to the work of residential real estate agent given the context of the work environment. Social network connections are used for the coordination and provision of services in the work of the residential real estate agent (Kennedy and Jamison, 1989; Nash-Price, 2000; Zeller, 2001).

Supposition: Weak tie personal social network connectivity is a predictor of performance. Strength of weak ties theory asserts that weak tie personal social network ties are enablers of greater levels of connectivity allowing for connecting with a greater number of individuals and networks (Granovetter, 1973; Granovetter, 1982). Novel information accessed through weak ties often cannot be obtained through strong ties (Granovetter, 1973; Granovetter, 1982; Mehra, Kilduff et al., 2001). Weak ties are critical in "prospecting" (accessing and being accessible to potential buyers and sellers) conducted by real estate agents (Sawyer, Crowston et al., 2003).

Supposition: ICT is a predictor of strong tie and weak tie personal social network connectivity. ICT reduces the transaction costs of communication and information exchange within social networks. The transaction costs assumption of electronic markets theory is used to provide support for this supposition. Increased use of ICT allows for the creation and maintenance of greater levels of social network connectivity with lower transaction costs (Malone, Yates, and Benjamin, 1989). Thus, the characteristics of ICT allow for creating, developing, and maintaining greater levels of personal social network connectivity.

Supposition: Self-monitoring is a predictor of strong tie and weak tie personal social network connectivity. Self-monitoring is a psychological construct that refers to the degree to which individuals are willing and able to monitor and control their

self-expression in social situations (Barley and Kunda, 2001; Eppler, Honeycutt, Ford, and Markowski, 1998b; Mehra, Kilduff, and Brass, 2001; Snyder, 1987b; Snyder and Gangestad, 1986). Self-monitoring theory contends that a high self-monitor gives more attention to social interactions and more readily adapts to them (Snyder, 1987b; Snyder and Gangestad, 1986). Individuals who are high self-monitors are more attentive to the development of personal social networks. Thus, self-monitoring theory helps to explain the predisposition of an individual to access social networks.

1.8 The work of the residential real estate agent

In this section I discuss the rationale for selecting residential real estate agents as an exemplar of the contractual project-based worker. I also provide a description of the work of the residential real estate agent and a description of the real estate transaction or the process of buying or selling a house. Several rationales can be provided in support of studying residential real estate agents: (1) the real estate industry is a pervasive industry, (2) the formal classification of work conducted by agents enables a clear description of work tasks, making it easier for the work of real estate agents to be studied, and (3) real estate agents are representative of contractual project-based workers.

The residential real estate industry is a sizable industry. There are over 900,000 licensed real estate agents in the United States (National Association of Realtors, 2003). The real estate industry makes up a significant part of the entire U.S. economy. Real estate accounted for 11% of the U.S. gross domestic product (GDP) in 1998 (U.S. Bureau of Economic Analysis, 2000). In 1999, 5,197,000 existing single-family houses and 907,000 new houses were sold (National Association of REALTORS®, 2000). Total

revenues for the real estate industry were nearly $153 billion in 1997 (U.S. Bureau of the Census, 1999).

In the case of contractual project-based workers, it is difficult to identify and access respondents given that contractual project-based workers often do not work within formal organizations, are spread out at different locations, and generally no longer accessible as network of individuals once the project has been completed. In the case of this research, a professional trade association, The National Association of Realtors, provided access to real estate agents, who served as exemplars of contractual project-based workers.

One advantage of studying the work of residential real estate agents is that standard task descriptions of the work conducted can be obtained. Descriptions of work tasks are standard, to a large degree, because the work (1) is regulated on local, state, regional, and federal levels, (2) involves open contractual agreements between the agency and the agent, and (3) involves open contractual agreements between buyers, sellers, agents, agencies, and other providers of real estate related services. Given that these agreements include tasks descriptions of the real estate process, the description of the performance metrics for real estate agents can be ascertained.

In this section, I provide a description of the real estate transaction. Figure 4 presents the entities that an agent might interact with in a real estate transaction. The real estate transaction can be divided into five distinct stages: listing, searching, evaluation, negotiation, and execution (Crowston and Wigand, 1999). The overall process of the real estate transaction is described as follows. (1) **Listing** involves placing a house on the market. In order to list a house, a real estate agent must determine how to market the

house and the initial asking price. On the seller's side, the agent gets in touch with the seller and convinces them to sign a contract to list their house for sale. (2) On the buyer's side, **searching** involves the reviewing of information about houses by buyers to select those houses that might be appropriate. Searching is often conducted through the use of the multiple listing service (MLS), a listing of houses for sale controlled by the regional real estate association. (3) **Evaluation** involves the evaluation of houses selected in the searching process. Based on the evaluation, a desirable house is selected and an offer is made. (4) **Negotiation** involves the negotiation process of making or accepting an offer to purchase a house. This part of the process includes the creation of a binding contract of sale that lays out the terms for the sale and any conditions to be met prior to the sale.

Once a binding contract of sale is agreed upon, the agent coordinates activities with other professionals to remove the contingencies in the contract. Services coordinated by the agent include home appraisal, home inspection, financing, title search, and home improvements or repairs agreed upon in the contract. (5) **Execution** involves the closing of the sale after contract contingencies have been met. In this stage the money and the house change hands. The real estate agent coordinates activities with other professionals. Lawyers, title companies, and finance companies are involved in this stage. Who exactly conducts the close in the sale of a house is dependent upon state and local laws and varies by geographic location.

Figure 4. Entities and individuals in the real estate agent's personal social network.
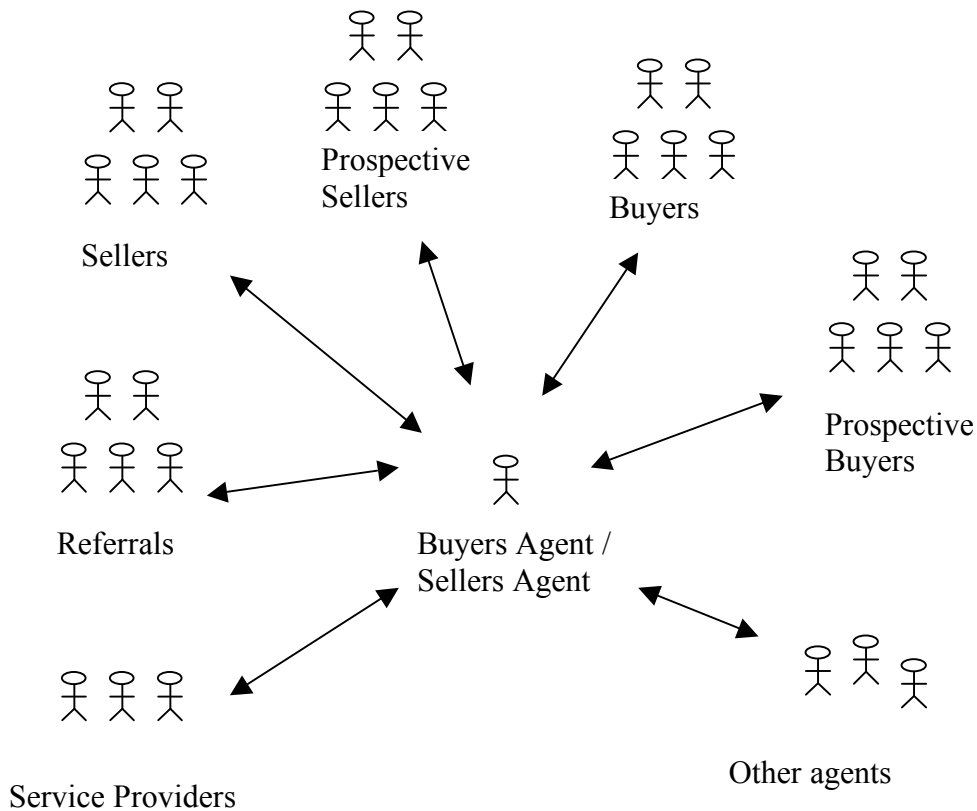
The role of an agent is to bring together a seller and a buyer of a property, and advise each party on the transaction (Crowston, Sawyer, and Wigand, 2001). Two different types of agents are usually involved in the real estate transaction: seller's agents and buyer's agents. Both types of agents generally receive their commission from the seller of the house, so the buyer's agent has a fiduciary duty to the seller. It is to the advantage of both agents that the property is sold. The agents get paid by part of a commission that comes from the sale of the house.

Table 2 provides a summary of the tasks in each stage in the real estate process. These tasks are grouped by the stages discussed above and the functions of the tasks are provided. The table is divided into two sections based on the strength of ties developed relative to the stages, and on the tasks of each stage.

Table 2

Stages, tasks and functions in the real estate transaction.

	Stages	Tasks*	Functions
Prospecting (weak ties)	Listing	Prospecting for sellers. Getting a new listing. Marketing a listing. Promotion. Market research. Market analysis. Showing properties. Service referrals.	Access new information. Connecting to other individuals and networks.
	Searching	Prospecting for buyers. Promotion. Following up clients.	
Provision and coordination of services (strong ties)	Evaluation	Finding a house for a buyer. Helping a buyer select a house. Market research. Market analysis.	Coordination of tasks. Access to resources.
	Negotiation	Negotiating a contract to purchase. Transaction. Handling offers. Service referrals. Financing.	
	Execution	Removing contract contingencies. Closing on a sale of a house. Service referrals.	

*Some of the tasks above in the listing and searching categories may not be exclusive to weak ties.

1.9 Significance of the study

The audience for this research includes: real estate agents and other practitioners in the real estate industry and related industries, researchers of social networks, organizational studies, and management of information systems. Findings from my research indicate the degree to which specific individual characteristics contribute to the development of personal social networks relative to type and intensity of tie. Findings also assess the affect of personal social network connectivity on the performance of the residential real estate agent. This knowledge of social behaviors, individual characteristics like self-monitoring, and individual information and communication technology use could be used to inform practitioners, in that it provides a description of contractual project-based worker's development of social networks.

Through the examination of personal social network connectivity and individual differences that facilitate personal social network connectivity, we can learn more about what kinds of individuals are best at successfully using personal social networks in their work. For example, research findings could inform practitioners of the characteristics of those contractual project-based workers that are more likely to be high performers.

Theoretical contributions include the further development of social network theory as it is applied at the individual level, specifically through the application of strength of weak ties theory and the concept of personal social network connectivity. The study also demonstrates the need to look at both individual characteristics and social network factors in order to understand more about accessing social networks. Methodological contributions include the further refinement of empirical measures of

strength of ties, personal social network connectivity, and methods of measuring social networks at the micro or individual level.

The contributions of this study can be categorized in three ways: (1) further development of social network theory through a focus on personal social network connectivity, (2) an analysis of individual differences that explain personal social network connectivity, (3) further understanding of contractual project-based workers and contractual project-based work.

In this chapter I have described the problem and objectives of my research. A diagram of the study was presented. Key concepts in the study were defined and placed in the context of the study. I then briefly discussed the theories to be applied in the study. A description of the context of the residential real estate agent was provided in terms of occupation and work tasks. Lastly, significant contributions of the study were presented. In Chapter 2, I will discuss the variables, theories and perspectives used in this study.

2 Chapter Two: Theory Development

2.1 Introduction

In this chapter, I review relevant research conducted in preliminary stages of this research. I conceptualize contractual project-based work. Literature on the social network approach and accessing social networks is examined. Literature and theories on strong and weak social network ties are also reviewed. Lastly, I examine ICT use and self-monitoring as individual characteristics that influence the personal social network connectivity of the contractual project-based worker.

The research gap, or problem, addressed in the following study is threefold: (1) the need for a focus on the study of work, (2) the importance of studying contractual project-based work as a definitive type of work, and (3) the focus on individual access of personal social networks rather than on the collective effect of social structure on individuals.

The literature reviewed in this chapter relates to the three overarching research questions driving the design of the study. All three research questions are posed relative to strength of tie (strong tie or weak tie). Research Question #1: To what degree does personal social network connectivity affect the performance of the contractual project-based worker? Research Question #2: To what degree does information and communication technology use impact the personal social network connectivity of the contractual project-based worker? Research Question #3: To what degree does the level

of self-monitoring impact social network connectivity of the contractual project-based worker?

Figure 5, below, presents an overview of the study, including theoretical assertions that support the hypothesized relationships. As such, Figure 5 serves as a framework for this chapter. It can be summarized as follows: It was posited that strong ties serve as a surrogate organizational structure for contractual project-based work. Weak ties were posited to enhance indirect connectivity and connectivity to extended networks. ICT use was posited to reduce coordination costs, and enable greater levels of social network connectivity. Figure 6 presents the conceptual development of personal social network connectivity that will be reviewed in this chapter.

It was also posited that an individual's capacity for self-monitoring serves as a predictor of the levels of weak and strong tie connectivity. Researching ICT use and self-monitoring characteristics of contractual project-based workers provided insight into the type of workers who are most likely to shape individual social network ties, and consequently improve their performance.

The overall objective of this research was to better understand the work of the contractual project-based worker and individual access of personal social network ties by the contractual project-based worker. One of the main research questions of the study asks about individual access of social networks that affect performance.

A further objective of the research was to determine the degree to which the characteristics of information and communication technology use and self-monitoring shed greater understanding on personal social network connectivity and, indirectly, the

Figure 5. Layout of concepts and functions.
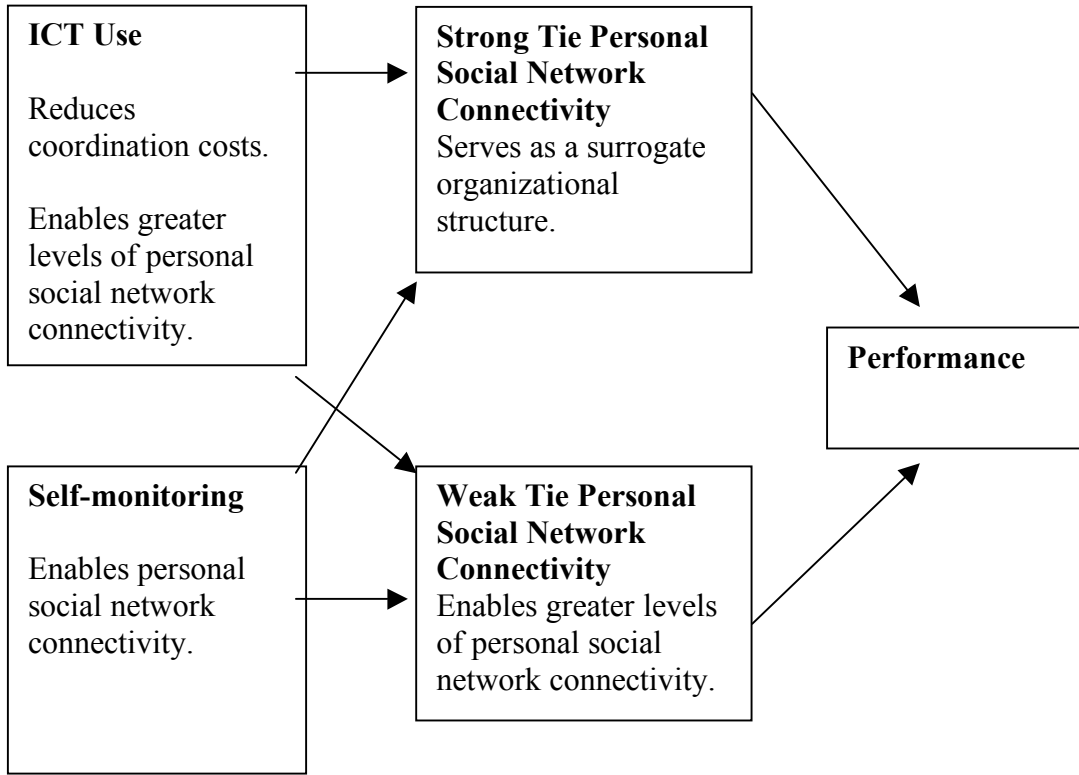
Figure 6. Conceptual development of personal social network connectivity.
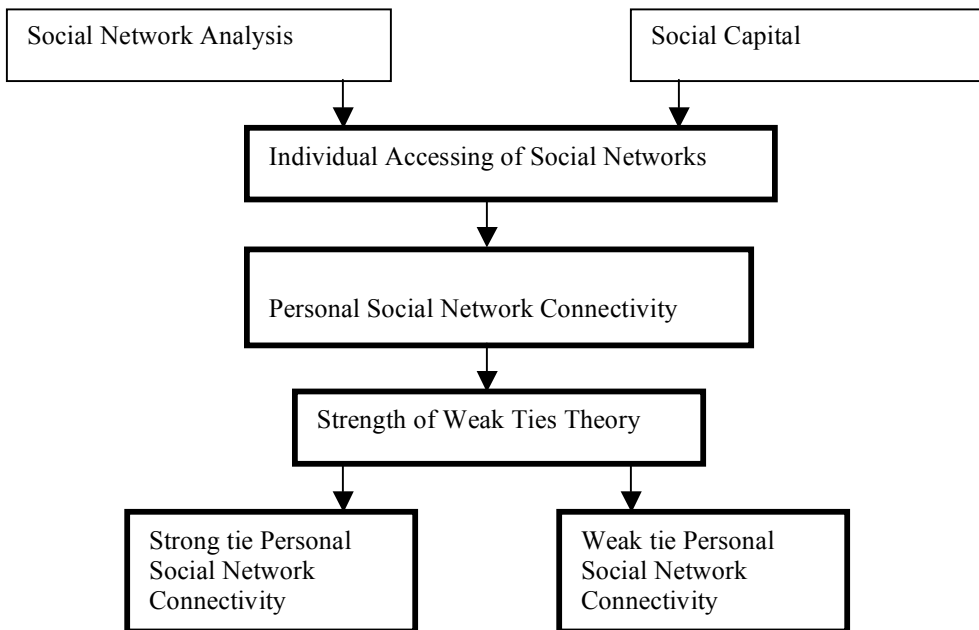
performance of contractual project-based workers. The social network approach was used to observe the way in which contractual project-based workers shape their social networks. The effect of personal social network connectivity on the performance of contractual project-based workers was examined relative to strength of tie. By focusing strength of tie, a more definitive understanding can be obtained about the specific function and application of personal social network connectivity. Furthermore, specific context and tasks might be matched to specific types of personal social network connectivity.

2.2 Contractual project-based work

In this section, I describe contractual project-based work and characteristics that distinguish contractual project-based work as a definitive type of work. The need for the study of changes in work is becoming more apparent given that a large part of the work force is increasingly making use of non-hierarchical and non-bureaucratic forms of organizing mechanisms in their work. Barley and Kunda (2001) suggested that a form of organization for work might be viewed as a set of work processes and relationships that differ from more traditionally defined entities. These work processes and relationships involve multiple types of actors and social collectives.

Work can be defined by the nature of the work, and the way in which that work is organized (Barley and Kunda, 2001; Hinds and Kiesler, 1995; Powell, 1990). The concept of contractual project-based work is used to describe both the type of organizing and the nature or characteristics of the work itself. Contractual project-based workers are often only loosely affiliated with formal organizations. Their access to formal organizational or institutional resources and coordination mechanisms is often very

limited. This constraint impacts the manner in which work is conducted and the coordinating mechanisms used to do the work.

Contractual project-based labor is making up an increasingly larger part of the labor market. Given this increase, it becomes important to study work conducted partially outside of organizational boundaries using network-based forms of organizing. The growing trend of increasing contractual project-based work is due to factors such as the high costs of hiring and retaining full time employees. The modern day business environment resembles leaner organizations that contract out labor. In many cases large corporations are becoming more "hollowed" through the contracting of labor rather than hiring more full time workers. The cost of providing healthcare and benefits to full time employees is one of the fastest increases in costs to modern business organizations. Business organizations have responded to the trend of rising healthcare costs by hiring greater numbers of contractual or free-lance workers.

Many workers, today, are aware that the security of their full time jobs is not guaranteed. Large numbers of people are leaving big companies and going into business for themselves as contract workers or freelancers. In addition, many workers in the job force prefer contract-based work that can give them greater flexibility and independence. Workers often move from contract to contract rather than holding a full time job position. Temporary employment agencies are employing growing numbers and new models of contract work are being created.

Malone and Laubacher (1998) described e-lance work as an instance in which workers join together into fluid and temporary networks to produce and sell goods and services. This description suggests that temporary, self-managed gatherings of diverse

individuals engaged in common tasks are a model for a new kind of business organization. Malone and Laubacher (1998) suggested that trends point to devolution of large permanent corporations into flexible temporary networks of individuals.

When it is cheaper to conduct transactions external to the business organizations, the organization is more likely to make use of contractual project-based labor. Thus, large business organizations are making up a smaller portion of the labor market, and contractual project based work is making up a larger part of the labor market. For some time organizational theorist such as (Handy, 1998) have predicted a "hollowing" out of large business organizations .

In the modern workplace, it is becoming increasingly common for workers to replace the organizational backdrop and predetermined roles of corporate work with their own assemblages of people who come together to collaborate for short or long periods. These assemblages are recruited to meet the needs of the current particular work project. Once the joint work is completed, the network has some persistence in that the shared experience of the joint work serves to establish relationships that may form the basis for future joint work (Nardi, Whittaker, and Schwarz, 2002).

2.3 **Characteristics of contractual project-based work**

In this section I describe the characteristics of contractual project-based work that set this type of work apart from other more traditional types of work. The characteristics of contractual project-based work are as follows: (1) work is formed around a project, (2) work is contractual in nature, and (3) contractual project-based workers maintain a degree of organizational autonomy.

Workers performing project-based, virtual, and contractual work have been termed e-lance workers, knowledge workers, contingent workers, and virtual workers (Barley and Kunda, 2001; Chudoba, Crowston, and Watson-Manheim, 2002; Malone and Laubacher, 1998). While these terms all refer to project-based work, they have distinctions relative to the focus of the phenomena researched and the research questions or research approaches used.

Barley and Kunda (2001) described projects as the context for postindustrial organizing of work. In other words, the organizing of work is less dependent upon and constrained by formal organizational structures. Projects are a more salient structural feature for contractors than are managerial hierarchies and functional departments (Barley and Kunda 2001).

Contractual project-based work is project-based in that a project serves as the core-organizing unit around which work is conducted. Thus the project defines the nature of the work. For example, in the case of the residential real estate agent, the transaction or sale of real estate becomes the project around which work is organized.

The contractual nature of the work serves to clarify the overall purpose and roles of individuals involved. Given that a hierarchy of formal organizational structure is not the coordinating mechanism for contractual project-based work, there is a need to have mechanisms that clarify roles and responsibilities of those involved. A contract is generally a formal or legally binding agreement that stipulates terms and agreements among those involved in completion of the project. The contract serves to provide additional structure and formalization of roles among contractual project-based workers, other vendors of services, and the clients. Thus the contract, to some degree, provides

what formal organizational structures and job descriptions might provide in the context of a conventional organization.

The characteristic of autonomy serves to describe contractual project-based work in terms of both the context of work and the activities of the contractual project-based worker. In terms of context, the contractual project-based worker is autonomous — they often manage their work independent of other organizations or institutions. In terms of work activities, contractual project-based workers are autonomous in that they manage themselves, coordinating their efforts with other independent parties. Thus the autonomy of the contractual project-based worker is a result of limited access to institutional resources and a choice made by the contractual project-based worker. The level of organizational autonomy is one of the characteristics that differentiates contractual project-based work from other types of project-based work, such as cross-organizational teams or inter-organizational collaborations (Barley and Kunda, 2001; Malone and Laubacher, 1998).

2.3.1 Level of personal social network connectivity for the contractual project-based worker.

The need for access to social networks in contractual project-based work is not equal among all contractual project-based workers. The context of a construction job will help to illustrate this example. Both a skilled tradesman and a general contractor might be considered contractual project-based workers in the context of construction work. However, for the general contractor, access to his or her personal social network is much more critical than in the case of the skilled tradesman. The general contractor must use his personal social network in carrying out the work of managing multiple workers and

job tasks. Whereas, the skilled tradesman does not need to use his personal social network beyond carrying out the single trade or job that he was contracted to carry out.

It is important to note that findings from this research might not apply as fully to a contractual project-based worker whose work does not require a great deal of access to his or her personal social network.

In summary, it is the characteristics of being project-based, contractual and autonomous that serves to distinguish the contractual project-based work from other types of work. In the next two sections, I describe the social network perspective and the construct of personal social network connectivity.

2.4 Social network perspective

In this section, I provide a review of the social network perspective. The social network perspective is the study of how information flows and communication takes place through direct and indirect network ties, and how people acquire resources through these networks (Garton, Haythornthwaite, and Wellman, 1997). The social network perspective studies the social network ties that directly and indirectly connect individuals to other individuals in their social network (Kilduff and Tsai, 2003).

A social network perspective posits that when people interact with others, they build a network of social ties. Through these networks, comprised of both formal and informal ties, people conduct their work, searching for and sharing information (Sawyer, 2001). In this respect, a social network perspective provides a means of insight into communication, the sharing of information, and access to information through the mechanism of social networks.

Social network analysis has emerged as a key technique in modern sociology, anthropology, geography, social psychology, communication, information science, and organizational studies. The study of social networks is often referred to as social network analysis or communication network analysis depending on the field or discipline that is researching the phenomena. A social network is a social structure made of nodes, which are generally individuals or organizations. Network theory concerns itself with the study of representations of relations between discrete objects often viewing social relationships in terms of nodes and ties. Nodes are the individual actors within the networks, and ties are the relationships between the actors. There can be many kinds of ties between the nodes. In its most simple form, a social network is a map of all of the relevant ties between the nodes being studied. These concepts are often displayed in a social network diagram, where nodes are the points and ties are the lines.

Social network analysts seek to describe networks of relations as fully as possible, assess the prominent patterns in networks, trace the flow of information and other resources through them, and discover what effects these relations and networks have on people and organizations. The analysis of networks can thus provide descriptions and characterizations of the systems structure (Wigand, 1988). The goals of network analysis are to detect and to describe any structure at the dyadic, group, and organizational level of the network (Wigand, 1988). Thus there is a focus on the recognition of patterns of social relationships.

Rogers and Kincaid (1981a) provided a summary and review of social network methodology, used a network analysis approach to look at relationships and electronic communication technologies in communication networks, and used social network

analysis to understand the flow of information and communication in the diffusion process.

Reviews and summaries of social network analysis include (G. A. Barnett, and Danowski, 1993; Rice and Richards, 1985; Wigand, 1988). Monge and Eisenberg (1987) examined how emergent communication networks influenced and were influenced by new media in organizations and the identification and measure of information flow between among. Wellman (1988) used a network approach to analyzing social structures specifically in the context of computer-mediated communication. Rice and Aydin (1991) described structural, relational and physical proximity in social networks among groups using computer-mediated communication.

Social networks have also been used to examine how companies interact with each other, characterizing the many informal connections that link executives together, as well as associations and connections between individual employees at different companies. Wigand (1988) described procedures and methods for analyzing communication networks in organizations and examined how companies interact with each other, characterizing the many informal connections that link executives together, as well as associations and connections between individual employees at different companies (Wigand, 1979).

It is important to explain how the concept of social network is applied in the context of this study. A **social network** consists of interconnected individuals linked by patterned flows of information and communication (Rogers and Kincaid, 1981b). Wassermann and Faust (1994) describe a social network as consisting of a finite set or sets of actors and the relation or relations defined by them.

If the social network is the phenomenon of study, the presence of relational information is a critical and defining feature of a social network. In the context of social network analysis, the social network is a phenomenon comprised of sets of actors, relations, and relational information. A collection of ties of a specific kind among members of a group is called a relation. Social entities are referred to as actors. Actors are discrete individual, corporate, or collective social units. Actors are linked to one another by social ties. The defining feature of a tie is that it establishes a linkage between a pair of actors (Wassermann and Faust, 1994).

This study adopts a social network perspective but does not perform social network analysis. The focus is on the phenomenon of personal social network connectivity. In this context, the focus is on the characteristics of relations and the access that individuals have to other actors in the social network. Personal social network connectivity is defined as the degree of accessibility an individual possesses to others they are connected to in their personal social network.

2.5 Social capital

Along with social network analysis, the construct of social capital informed the conceptual development of personal social network connectivity. In this section I provide a brief review of the construct of social capital. Social capital is often couched in economic terms. It explains how some people gain more success in a particular setting through their superior connections to other people. The term social capital has been defined in multiple ways and used by multiple disciplines from management, sociology, economics, and communication. There is a focus on the actual connections and the use of the connections as "capital".

Social capital does not belong to the individual, but rather is considered a property of the collective. Social capital refers to the collective value of all 'social networks' and the inclinations that arise from these networks to do things for each other (Putnam, 1993). Bourdieu (1986) describes social capital as the aggregate of actual or potential resources, which are, linked to the possession of...membership in a group.

Operationalization of social capital varies relative to the field, methodological approach, and unit of analysis. Nahapiet and Ghoshal (1998) describe social capital as the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition. Social capital is the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit (Nahapiet and Ghoshal, 1998). Fukuyama (1997) describes social capital as the norms and values that permit cooperative behavior. Lin (1999) described social capital in three ways: (1) resources embedded in social structure – structural (embeddedness), (2) accessibility to such social structures by individuals - opportunity (accessibility), and (3) use or mobilization of such social resources by individuals in purposive actions – action oriented (use) aspects.

The social capital view of social network connections as (1) resources and (2) as a form of access to resources (capital) informs the conceptual development of personal social network connectivity. Social capital is at once the resources contacts hold and the structure of contacts in a network. The first description refers to who you reach. The second describes how you reach them (Burt, 1992). In the next section, I discuss further

distinctions between social capital, social network analysis, and personal social network connectivity.

2.6 **Personal social network connectivity**

The limitations of focusing solely on structure suggest the need for a complementary conceptualization of social networks. The gap that my research addresses pertains to the degree to which individual behavior impacts social structure. This research addresses this gap by studying individual access to social networks and the benefits that accrue to the individual as a result.

As discussed in the earlier review of the social network perspective, social network research views social networks primarily from a macro perspective. In my research, I focused primarily on the micro perspective of social networks. The micro and macro perspective can be distinguished in terms of individualism and structuralism. From the perspective of individualism, the unit of analysis is the individual. From the perspective of structuralism, the unit of analysis is the social network connection (Mayhew, 1980). The dominant focus of social network analysis at the collective level has shaped the present knowledge and understanding of social network research in organizations.

The social network perspective focuses on the effect of structure on individual behaviors while the personal social network perspective places emphasis on how individuals shape the social structure in order to gain benefit for themselves. Table 3 describes the level, unit of analysis, effect, and benefit of the social network perspective and the personal social network connectivity perspective.

Table 3

Characteristics of social network and personal social network perspective.

	Social Network	Personal Social Connectivity Network
Level	Macro	Micro
Unit of analysis	Structuralism	Individualism
Effect	Effect of structure on individual	Effect of individual on social structure
Benefit	Benefit to structure	Benefit to the individual

I am unable to directly measure the value that is created and extracted by the real estate agent, so instead I am looking at the access to networks that an individual possesses. This access is used as a representative measure of the importance of the social networks to the contractual project-based worker. The thesis is that access to these social networks is critical to the work of the real estate agent as an exemplar of the contractual project-based worker and a predictor of performance. My research posits that agent's with greater levels of access to social networks are more likely to be high performers.

My conceptualization of connectivity is different than that of connectivity as defined on the collective level focusing on the actual analysis of the social network structure. Wigand (1988) describes **connectivity** in this sense as a measure typically expressed in the form of a ratio, specifically a comparison of the degree to which members of a network are actually connected among each other, with the total number of maximally possible connections within the network.

Personal social network connectivity was developed from existing macro level measures of social network structure, measures of social network ties, and research on the micro level use of social network ties (Burt, 1992; Granovetter, 1982; Granovetter, 1995). In the present research, **personal social network connectivity** is measured as the

perceived (not directly measured) degree of accessibility an individual possesses to others they are connected to in his or her social network. Personal social network connectivity emphasizes the connectedness of the individual to others.

As mentioned previously, the dominant approach in the study of social networks places the emphasis on opportunity and constraint derived from structure, as opposed to individual actions and strategies that influence structure and compensate for structural limitations or maximize network resources (Nohria and Eccles, 1992). Thus it is important to understand not only social structure but also the individual accessing of social structure.

Personal social network connectivity was used in this research for the following reasons. (1) Personal social network connectivity focuses on the individual access of personal social network connections that helps to explain the work of the individual contractual project-based worker. (2) Personal social network connectivity provides for a more resource-based approach to social network connectivity in complement to the structural-centric social network approach of social network analysis. (3) Personal social network connectivity focuses on perceived access rather than measuring specific structure.

Focusing on perceived access is methodologically easier than measuring specific structure that is the case for social network analysis. In the context of the residential real estate agent and, to some degree, with contractual project-based work, the structure of the social networks is not accessible or constantly changing from project to project. Thus, measuring perceived level of personal social network connectivity rather than specific

structure is a more appropriate in the content of residential real estate agents and contractual project-based work.

2.6.1 Access of personal social networks as an antecedent to value creation.

Personal social network connectivity is measured as the perceived degree of accessibility an individual possesses to others they are connected to in his or her social network. This perceived level of access to social networks is viewed as an antecedent to value creation and extraction in social networks. Value creation and value extraction refer respectively to maintaining and activating personal social networks. The line of argument is that if agents have better access to networks, they can create and extract more value from those networks. Access to social networks is a necessary precondition to maintaining, and activating social networks. Value is created through maintaining social networks and extracted through the activation of nodes in the social network.

The creation and activation of social networks includes recruiting labor or alliance partners, establishing working relationships, and finding information. These relationships can involve a variety of actors in the social network including customers, clients, colleagues, vendors, outsourced service providers, contractors, partners, strategic peers, experts, contractors, consultants, and temporary workers.

Nardi, Whittaker, and Schwarz (2002) noted that workers constantly attend to three tasks: (1) building a network by adding new nodes (people) to the network so that there are available resources when it is time to conduct joint work; (2) maintaining the network, where a central task is keeping in touch with existing nodes; and (3) activating selected nodes at the time the work is to be done. Nardi, Whittaker, and Schwarz (2002)

conceptualizes value extraction of social networks as the activation of the social network connection at the time work is to be done.

In contractual project-based work, network activation and deactivation forms a temporal patterning. Building, maintaining, and activating the social network connections support the contractual project-based work serving in part as a surrogate organizational structure. Once joint work is completed, the network has some persistence; the shared experience of the joint work serves to establish relationships that may form the basis for future joint work.

Access to personal social networks enables creating value through creating and maintaining social networks, and extraction of value through the activation of personal social network connections. Thus, access to personal social networks serves as an antecedent to the value creation and value extraction.

2.7 Distinction between social network analysis and personal social network connectivity

The goal of social network analysis is to obtain higher-level descriptions of the structure of a system from low-level raw relational data. The higher-level descriptions identify various kinds of patterns or tests hypotheses about those patterns in a set of relationships (Rice and Richards, 1985). In social network analysis, the focus is on structural analysis rather than individualism. Social network analysts look beyond individuals to consider relations and exchanges among social actors. Social network analysis focuses on the effects of characteristics of networks and characteristics of connections among people and organizations. In social network analysis, the attributes of individuals are less important than his or her relationships and ties with other actors

within the network. Thus the social network perspective does not focus on individual agency, the ability for individuals to influence their success, but rather focuses on the structure of the network.

The basic unit of analysis is the relationship itself. Conceptually, the existence of a relationship between two individuals is constituted by the recognition of some constraint which restricts the behavior of one or both individuals (Wigand, 1988). Constraints in network analysis generally focus on descriptions of structure. The term "tie" is used to represent a relationship between two entities. The constraints that this research focuses on are attributes which describe the tie or relationship relative to the strength of the tie as set forth by (Granovetter, 1973; Granovetter, 1982). The present research focuses on relational characteristics but not patterns of social network structure. The relational characteristics are described as personal social network connectivity.

This research is distinctive from much research on social network analysis that focuses on patterns in social relationships. In the context of this research, the focus is not on analyzing the structure of the network, but rather analyzing the perceived level of connectivity that an individual possesses. Focus is placed on the relationships an individual has to others in his or her social network based on perceived accessibility. In personal social network connectivity, the focus is on how the individuals makes use of his or her level of connectivity to shape the social networks they are a part of for their own individual benefit.

Social networks are often viewed as an attribute of a social unit. The individual benefits in a secondary way. Social networks are studied primarily at the macro level and emphasize the secondary nature of individual benefits. The dominant macro level

perspective on social networks suggests that the payoff from the individual who acts to develop social networks accrues to the social unit as a whole, and only indirectly back to the individual. Social networks are viewed as being embedded collectively and not being directly accessible to the individual (Burt 1992; Lin 2001).Table 4 describes the focus, characteristics and level of the social-based perspectives, which informed this study.

Nardi, Whittaker, and Schwarz (2002) found that the most fundamental unit of analysis for computer-supported cooperative work, for many tasks and settings, was at the individual level — rather than the group level, as personal social networks come to be more and more important. Nardi, Whittaker, and Schwarz (2002) suggest that personal social networks are just as important as work teams in understanding labor management.

Table 4

Distinctions among constructs that informed personal social network connectivity.

	Social Network Analysis	Social Capital	Personal Social Network Connectivity
Focus	Structural characteristics. Network description. Patterns of interaction. Description of relational patterns. Ties or relations – direction, content, and strength.	Norms. Values. Accessibility. Aggregated resource. Social capital accrued at the collective level.	Individual attributes. Functions of connectivity. Social connections.
Characteristics of connectivity	Collective. Structural characteristics.	Collective property	Individual attribute. Individual resource. Individual access.
Level	Embedded.	Embedded in social structure. Institutionalized. Firm level. Societal level.	Extracted. Individual.

2.7.1 Distinction between measuring personal social network connectivity and specific structure.

This research does not focus on measuring specific structure. The focus of the research is on contractual project-based work, the individual access of social networks, and the benefits that accrue to the individual through his or her network connections. The focus on structure is secondary in the form of variables that indicate the level of access individuals have to the social structure in their social network. Measuring the perceived level of personal social network connectivity supports a focus on the individual. In

addition, measuring the specific structure of the contractual project-based worker is often prohibitive given the broad distribution of and limited access to all of the individuals that comprise the social networks of contractual project-based workers.

Social network analysis (1) focuses on measuring social structure on a collective level, (2) pertains primarily to the structure of the network and the characteristics of relations and exchanges between actors, and (3) generally focuses on measuring the specific structure of the social network in the form of characteristics and properties of the actual structure of relations.

Personal social network connectivity (1) pertains to the individual agency of the actor rather than measuring the specific structure of the social network, (2) is focused on individual access to personal social networks, and (3) deals primarily with the benefit of social networks to the individual rather than the collective.

In this research, the context of contractual project-based work is understood by a focus on the individual and his or her management of personal social network connectivity. These connections serve as a surrogate organizational form supporting the work of the contractual project-based worker. Thus the phenomenon of importance is not a description of structure and assessing its effect on the individual, but rather focusing on the access an individual has to his or her personal social network in order to conduct work and the degree to which he or she benefits from this access.

2.7.2 Personal Social Network Connectivity.

Personal **social network connectivity** is measured as the perceived degree of accessibility an individual has to others in the social networks that he or she possesses. The concept of social network connectivity for the benefit of the individual focuses on

social network ties that connect individuals to other individuals in their social network (Kilduff and Tsai, 2003). The concept of personal social network connectivity builds upon that of previous research focused on how social networks can work to the benefit of an individual (Burt, 1992; Granovetter, 1982; Granovetter, 1985; Granovetter, 1992; Leana and Buren, 1999; Lin 2001; Mehra, Kilduff, and Brass, 2001).

Understanding personal social network connectivity provides insight into ways in which individuals shape their social networks and accrue direct benefits for themselves. The qualitative research of (Nardi, Whittaker, and Schwarz, 2002) is very similar to the focus on personal social network connectivity. (Nardi, Whittaker, and Schwarz, 2000b) conducted a study of the way people wield their personal social networks to get things done at work. They carried out in-depth interviews in a small representative sample of people who work across organizational boundaries. They asked people about the work they did and how they communicated.

Earlier qualitative research on the work of residential real estate agents suggested that studying how agents make use of their social networks would provide insight into how they successfully carried out their work. Research also suggested that, through researching social networks, a greater understanding of the work of residential real estate agents could be attained (Sawyer, Crowston et al., 2000; Crowston, Sawyer et al., 2001; Sawyer, Crowston et al., 2003). Findings from research suggested that the study of social networks is a useful perspective for understanding the contributions of agents to the real estate transaction (Crowston, Sawyer et al., 1999).

Sawyer et al., (2003) viewed real estate agents as building relations within, and because of, their social structures. Research findings suggest that transactions in real

estate are socially embedded (Sawyer, Crowston, Wigand, and Allbritton, 2003) and that

successful agents placed attention on developing social contacts (Sawyer, Crowston,

Allbritton, and Wigand, 2000a). Nardi, Whittaker, and Schwarz (2000a) found that

today's workers increasingly access resources through personal relationships.

Nardi, Whittaker, and Schwarz (2002) made use of activity theory to understand

the nature of collective subjects in work. Their goal was to investigate how people come

together for joint work. Like the present research, (Nardi, Whittaker, and Schwarz, 2002)

sought to understand how social networks function in the modern workplace.

Nardi, Whittaker, and Schwarz (2000b) used the term NetWORK to describe the

work of establishing and maintaining personal social networks. These personal social

networks are referred to as intensional networks. NetWORK consists of three tasks: (1)

building a network, (2) maintaining a network, and (3) activating selected nodes at the

time the work is to be done. Nardi, Whittaker, and Schwarz (2000b) found that work

activities are accomplished through the deliberate activation of workers' personal

networks. Nardi, Whittaker, and Schwarz (2002) describe intensional networks as the

personal social networks workers draw from and collaborate with to get work done. The

term intensional was chosen to reflect the effort and deliberateness with which people

construct and manage personal social networks. In intensional networks work activities

are accomplished through the deliberate activation of workers' personal networks (Nardi,

Whittaker, and Schwarz, 2000a).

In research of a similar nature, (Østerlund, 1996) found that even workers who are

part of an organization may often rely on their own social network resources rather than

organizational resources. Østerlund (1996) attempted to apply the notion of community of practice to the copier salespeople he studied at a large American copier company.

However, he found that rather than having access to a ready community of mutual support and shared understandings, new salespeople had to form personal relationships, one by one, with colleagues and other specialists in order to learn their jobs. Østerlund's findings reflect a set of intensional networks formed among the copier salespeople. Østerlund's observations match the findings of (Nardi, Whittaker, and Schwarz, 2000a) in that there was much focus on creating, maintaining and activating personal relationships as the core of the salesperson's activity (indeed as the very source of success or failure in sales work). Østerlund also documents the extreme heterogeneity of salespeoples' networks, which included all kinds of customers as well as many different kinds of specialists within the copier company. This heterogeneity suggests that the salespeople were making use of weak tie personal social network connectivity as well as strong tie personal social network connectivity.

Nardi, Whittaker, and Schwarz (2000a) found that rather than being nurtured by institutional resources, workers had to rely on their own individual resources. Access to labor and information comes through workers own social networks (Nardi, Whittaker, and Schwarz, 2000a). Many of the subjects emphasized the centrality of personal relationships and networking for the success of their work (Nardi, Whittaker, and Schwarz, 2000b). The finding and research discussed in this section support the focus of this research on personal social networks in order to understand contractual project-based work. In the next section I provide research and discussion on the value of researching personal social network connectivity in terms of strength of tie – strong tie and weak tie.

2.8 Strength of tie and personal social network connectivity

In order to understand the individual access of social networks by contractual project-based workers, social network connections are examined relative to the strength of tie of the connection. This section presents Granovettor's operationalization of strength of tie and the operationalizaton of strength of tie relative to personal social network connectivity. I adapt Granovettor's description of strong and weak ties in order to define the characteristic of the type of connectivity possessed by an individual relative to strength of tie.

Seminal research on the concept of strength tie was presented by (Granovetter, 1973). (Granovetter, 1973) focused on the distinction between the functions of the strengths of ties in social networks. Granovettor operationalized strength of tie in terms of (1) time (length of relationship), (2) emotional intensity, (3) intimacy (mutual confiding), and (4) reciprocal services. Most studies have not adopted Granovettor's criteria for establishing the strength of tie (Mehra, Kilduff, and Brass, 2001). This is due to the difficulty of measuring the constructs suggested and the various ways in which the constructs might be interpreted.

Granovettor assumes a stable network structure in his definition of strength of ties. Measuring intimacy is not straightforward. For this reason, many researchers often do not use Granovettor's definition and substitute a more easily measurable and narrowly defined operational definition.

In my research, ties between the agent and others are described as strong or weak depending upon (1) the frequency of interaction (Granovetter, 1973), (2) the function of

the tie (Monge and Contractor, 2003), and (3) the attributes of the individual to whom the individual is connected.

Strong ties are ties that connect close friends, and coworkers who share mutual dependencies in the execution of work-related tasks (Granovetter, 1973; Granovetter, 1982; Pickering and King, 1995). The strong ties of a real estate agent might include other agents who the agent works with, as well as others who provide services in the real estate transaction, such as home inspectors and finance officers.

Weak ties are ties that connect acquaintances or friends of friends, coworkers not central to an individual's task domain, and everyday acquaintances made in connection with work, social activities, and mutual friendships (Granovetter, 1973; Granovetter, 1982; Pickering and King, 1995). The weak ties of a real estate agent might include previous buyers of homes that the real estate agent has sold and individuals in the market to sell or buy a home that the real estate agent is acquainted with. During the real estate transaction the buyer or seller are connected to the agent by strong ties in that the real estate agent interacts with them frequently. However, after the sale of the home is closed the connections between the real estate agent and buyers and sellers becomes weak tie connections.

Most network models deal implicitly with strong ties focusing on smaller well-defined groups of individuals. On the other hand, weak ties generally focus on relations between and across groups and on the analysis of social structure not easily defined in terms of primary groups (Granovetter, 1973). In other words, weak ties often extend beyond the actual network structures being researched.

My research posited that performance level is impacted in different ways depending upon the strength of the tie. Generally, different types of ties connect the agent to different entities or individuals in the real estate transaction. The work of real estate agents depends on their creation and use of social ties: weak ties to find potential buyers and sellers and strong ties with other professionals (other agents, lawyers, mortgage brokers, etc.) to provide services (Sawyer, Crowston, Wigand, and Allbritton, 2003).

The work of the real estate agent can be broken down into two general groupings of tasks relative to strength of tie. Personal social network connectivity of residential real estate agents is defined in the form of ties to acquaintances or friends of friends (weak ties), and ties to coworkers with whom the agent shares mutual dependencies in the execution of work-related tasks (strong ties). The groups of tasks of the real estate agent are (1) strong ties, which support the provision and coordination of services to the client, and (2) weak ties, which support prospecting for potential buyers and seller (Crowston and Wigand 1999; Sawyer, Crowston, Wigand, and Allbritton, 2003). A description of the tasks in the real estate transaction associated with type of personal social network connectivity was presented in Chapter 1 in Table 2.

The results of my research led me to make the following arguments: (1) Strong ties affect agent performance by serving as a surrogate organizational structure that is used to organize, coordinate, and support the activities of the real estate transaction. (2) Weak ties affect agent performance by enabling greater levels of connectivity and greater access of novel information that in turn leads to greater access to potential buyers and sellers.

2.9 Strong tie personal social network connectivity as a predictor of performance

In this section, theory is discussed that explains the relationship between strong tie personal social network connectivity and performance providing support for the following hypotheses: **The higher the level of strong tie personal social network connectivity, the greater the level of performance.** The functions of strong ties and how they relate to the work of the residential real estate agent are also discussed.

Network organization theory (Powell, 1990) provides insight into the organization and coordination of contractual project-based work, and explains strong tie personal social network connectivity as a predictor of performance. In addition, initial field research and literature in the real estate industry suggested that strong tie connections are important to residential real estate agents, given the context of their work environment (Crowston, Sawyer, and Wigand, 2001; Sawyer, Crowston, and Wigand, 1999; Sawyer, Crowston, Allbritton, and Wigand, 2000b; Sawyer, Crowston, Wigand, and Allbritton, 2003). Strong tie connections are used to connect the real estate agent to other professionals in order to conduct the real estate transaction. This network of strong tie connections creates a flexible network of connections that serve as a surrogate organizational structure. This network of connections is formed around each new project or real estate transaction. The agent needs to develop and maintain a reliable, high-quality network of coworkers and other business professionals who can aid the real estate agent in coordinating the entire real estate transaction.

Table 5 below provides a more detailed description of the functions of strong ties, the tasks that the real estate agent performs relative to strong ties, and characteristics and

attributes of others the agent connects to using strong ties. This table presents the

functions of strong ties in contractual project-based work and the description of those

connected by strong ties in the context of the residential real estate agent.

The network of professionals that might participate in the real estate transaction

include other agents, home appraisers, mortgage officers, lawyers, home improvement

specialist, title professionals, and finance officers. The agent develops and maintains a

reliable, high-quality network of coworkers and other business professionals who can aid

them in conducting the real estate transaction. This network is described in Table 5, as

the "description of others the individual or the real estate agent is connected to."

Table 5

Functions, tasks, and characteristics of strong ties.

Strong ties	
Function of tie relative to project-based work.	(1) Coordinate tasks with others in strong tie network. (2) Maintain relationships with others in the strong tie network. (3) Access resources. (4) Gain a greater level of assistance (reciprocity) from others.
Tasks	(1) Provision of services. (2) Coordination of service providers.
Description of others the individual real estate agent is connected to.	(1) Other real estate professionals. (2) Buyers or sellers that the real estate agent works with. (3) Other real estate agents that the agents works with. (4) Other real estate agents that the agent is affiliated with.

Figure 4 in Chapter 1, discussed previously, presents a personal social network

that includes most of the entities that the residential real estate agent interacts with in his

or her work. The real estate agent is often the principal coordinator of these professionals.

The development and maintenance of this network of professionals is part of the agent's

work, suggesting that strong tie personal social network connectivity contributes to performance of the real estate agent.

Network Organization theory proposed by (Powell, 1990) is used to situate and describe the networks of strong ties used by contractual project-based workers. Powell (1990) identified a coherent set of factors that make it meaningful to talk about networks as a distinctive form of coordinating economic activity. He then employed these factors to further explore the frequency, durability, and limitations of networks. Network Organization Theory (Powell, 1990) is used to describe the function of strong tie personal social network connectivity and as a framework for understanding how strong sties serve as a surrogate organizational structure for the contractual project-based worker. Network Organization Theory (Powell, 1990) also lends support to the hypotheses that strong tie personal social network connectivity is a good predictor of performance in contractual project-based work. In other words, the characteristics of the network organization (Powell, 1990) map onto the surrogate organizational structure of strong ties used by the high-performing contractual project-based workers.

According to (Powell, 1990), organizational practices and arrangements that are network-like in form share the following common characteristics: (1) make use of lateral patterns of exchange, are (2) are flexible and dynamic, (3) support interdependent flows of resources, and (4) make use of reciprocal lines of communication. These characteristics offered by (Powell, 1990) provide a framework with which to describe the use of strong tie personal social network ties by the project-based worker.

The network organization is **lateral** and non-bureaucratic in structure. A network organization form is integrated across formal boundaries; interpersonal ties of all types

are formed that are not necessarily specified by vertical, horizontal, or spatial boundaries. Much of the work of the residential real estate agent is conducted outside the realm of the organization to which they belong. The real estate agent and the professionals they work with are not members of the same organization. In lieu of a single or central organizational structure, the agent makes use of their strong tie connections to others.

The network is **flexible**. Connections among nodes in the network are temporary and discontinuous in nature. The network form can be seen as a loosely connected ad-hoc network. Words such as dynamic, temporary, and elastic are synonymous with the term flexible, and are used to describe the nature of the network organization. Strong ties in the network organization form are often temporary, in that they are activated around a project and once the project has been completed, they become deactivated. However, the potential connections between ties remain, to possibly be reactivated at a later date. Rather than a permanent cooperation, an elastic network is formed that may exist only to complete specific projects (Malone and Laubacher 1998). Networks of strong ties can lie dormant and then be activated when a suitable project remerges.

With the network form, networks of temporary alliances of firms with key skills are usually organized around a lead or brokering firm. Each of the units tends to be independent and collaborates on a specific project or opportunity. For example, in the fashion industry, manufacturers, designers, and retailers frequently use the network form in creating a manufacturing network (Miles and Snow, 1986). One or several coordinators are connected with others who oversee different parts of the process. The strong tie organizational connections among these individuals serve as a surrogate organizational structure in lieu of a formal organizational structure.

Powell (1990) builds upon (Miles, Snow, and Meyer, 1978) in which the network form is described as a form that uses flexible, dynamic communication linkages to connect and reconnect multiple individuals and organizations into new entities that create products and services. (Nardi, Whittaker, and Schwarz, 2002) found a similarly flexible use of social networks, concluding that social networks are complex, dynamic systems in which, at any given time, various versions of the network exists in different instantiations. Powell (1990) and (Nardi, Whittaker, and Schwarz, 2002) provide multiple support for looking at strong tie networks in this way. In the context of contractual project-based work, the influence of an agent on others in the network may emerge or fade with the creation or dissolution of ties to others. The flexible or dynamic nature of the network is reflected in the creation and dissolution of ties and the quantity of ties that can remain dormant and possibly be reactivated around an emerging project.

There is an **interdependent flow of resources** in the network organization form. This creates a situation in which network members are interdependent on one another in order to complete a project. Members in the personal social network of the contractual project-based worker rely on mutual assistance, support, and cooperation. The interdependent flow of resources serves the function of supporting coordination and control within the network. For example, from the description of the real estate transaction in Chapter 1, it is clear that real estate agents and other participants in the real estate transaction are interdependent on one another. This interdependence serves to support the network of strong ties or network organization form.

The network organization form makes use of **reciprocal lines of communication,** in that members of the social network share information, and often access to information,

about the project. Reciprocation suggests a sharing in return among members of the social network. For example, in the case of the real estate agent, service providers and other real estate agents may exchange information and provide reduced fees to one another as a reflection of their long-term working relationships. In many ways, the reciprocal connections provide a form of cohesion to the surrogate organizational structure.

It is important to point out that the focus on the network organization form is not to suggest that the network form is new. Networking is not new, nor is the formation of networks. Conventional organizational forms are, of course, comprised of networks. What is new is the necessity for surrogate organizational networks, often occurring outside of conventional organizational boundaries, that support contractual project-based work (Nardi, Whittaker, and Schwarz 2002).

However, work relations in organizations are changing, and these changes are likely to alter the way organizations are structured. The focus is on work practices and the way they structure interaction (Barley and Kunda, 2001). Thus, the suggestion is not that work is more networked-based than in the past, but rather that the nature of the networks is different.

2.10 Weak tie personal social network connectivity as a predictor of performance

In this section, theory is discussed that explains the relationship between weak tie personal social network connectivity and performance providing support for the following hypotheses: **Hypotheses: The higher the level of weak tie personal social network connectivity, the greater the level of performance.**

Weak ties support contractual project-based work in numerous ways. Strength of weak ties theory posits that the weak ties (1) connect individuals to different types of individuals and extended networks, and (2) provide access to novel information not obtainable from strong tie networks.

One of the main functions of weak ties is the ability of the ties to provide information that would not be obtainable through the use of strong ties. The strength of weak ties theory asserts that our acquaintances ("weak ties") are less likely to be socially involved with one another than are our close friends ("strong ties") (Granovetter, 1973; Granovetter, 1982). Acquaintances, as compared to close friends, are more prone to move in circles different from one's own (Granovetter, 1995; Granovetter, 1973; Granovetter, 1982).

Strength of weak tie theory is a heterophily theory that makes predictions about how the individual can develop ties, outside of closed social circles, to access diverse knowledge and other resources (Kilduff and Tsai, 2003). The heterophily perspective suggests that new information and unusual resources tend to flow from relative strangers who may be members of other social organizations, or who may be brokers joining groups that are themselves disconnected (Kilduff and Tsai, 2003).

Weak tie personal social network connectivity also allows the real estate agent to maintain and manage relationships with others involved in the real estate process. Novel information not related to prospecting may be critical to the work of the residential real estate agent. Weak ties allow the real estate agent to remain connected to a larger number of professionals involved in the real estate process. The relations between the real estate agent and these other individuals may turn from weak ties into strong ties. Thus a greater

number of weak ties may result in a larger network of ties, in general, being accessible to the real estate agent.

Granovetter (1973) identified weak ties as a way in which individuals were most likely to find information about potential jobs. The main point was that the weak ties among respondents were essential to successfully finding a job. Individuals with many weak ties were best placed to receive new and novel information. Similarly, when studying weak ties within organizations, (Burt, 1992; Granovetter, 1982) found that greater diversity of weak tie contacts across levels and departments increases the probability of finding out new information and identifying problems and solutions.

Given the lack of access to institutional resources, contractual project-based workers often rely on their weak tie connections in order to connect with others and access information essential to conducting their work. The process of prospecting for potential buyers and sellers suggests a specific function of weak tie personal social network connectivity for residential real estate agents. However, contractual project-based workers in general often need to access social network resources outside of closed social circles, and to access the type of diverse knowledge, which according to (Granovetter, 1973) is only accessible through weak tie connections.

For real estate agents, weak ties support the creation and development of contact lists. In the context of the real estate agent, a primary task supported by weak tie personal social network connectivity is prospecting for buyers and sellers. Prospecting involves the listing and searching stages of the real estate transaction. Agents spend a great deal of their time prospecting for potential clients, either clients who would like to sell a house or clients who would like to buy a house.

Weak tie personal social network connectivity enables the real estate agent to gain referrals. A referral is provided when someone mentions the real estate agent by name to a potential buyer or seller, or when someone suggests the name of a potential buyer or seller to a real estate agent. Prospecting is often achieved through the creation and maintenance of a contact list of former customers, potential future customers, and others who might provide referrals to the agent.

Contact lists for agents are generally made up of large numbers of weak tie contacts. Successful agents tend to have larger contact lists and tend to be better than other agents at increasing the size of their contact lists. Successful agents are also effective at accessing those individuals who are most influential in given communities. Weak ties allow a real estate agent to access information about potential listings, buyers, and sellers, along with contacts to other professionals.

Real estate agents generate leads and prospects by mining their weak tie social networks. Weak ties allow for greater levels of connection in the extended network of the real estate agent. For this reason, weak ties serve as points of access to potential buyers and sellers. The fewer weak tie contacts one has, the more isolated he will be from new or novel information (Granovetter, 1982). In the case of the real estate agent, this would be information about prospects or potential buyers and sellers.

As was done with strong ties, weak ties are differentiated in terms of three criteria (1) frequency of interaction, (2) the function of the connection in terms of the type of information and communication that flows over the connection, and (3) attributes of the individual to which the agent is connected (Granovetter, 1973; Granovetter, 1982; Pickering and King, 1995).

Table 6 provides a more detailed description of the functions of weak ties, the tasks that the real estate agent performs relative to weak ties, and characteristics and attributes of others the agent connects to. This table presents the functions of weak ties in contractual project-based work and the description of those connected by weak ties in the context of the residential real estate agent.

The novel information accessed by real estate is often instrumental in prospecting for work or buyers of services (Kennedy and Jamison, 1989; Nash-Price, 2000; Zeller, 2001). This novel information is in the form of contact information and referrals for potential homebuyers and home sellers. The more "well known" a real estate agent is (that is – the larger his or her network of weak tie connections), the greater the likelihood that he or she will have access to this novel information.

Table 6

Functions, tasks, and characteristics of weak ties.

Weak ties	
Function relative to contractual project-based work	(1) Connecting an individual to other individuals through indirect ties. (2) Connecting an individual to extended networks. (3) Accessing novel information.
Tasks	(1) Prospecting for buyers. (2) Prospecting for sellers.
Description of others the agent is connected to.	(1) Potential buyers. (2) Potential sellers. (3) Other individuals that might refer potential buyers and sellers to the real estate agent. (4) Social clumps or networks that are entirely new connections to the real estate agent's network of connections.

In interviews conducted by (Sawyer, Crowston, and Wigand, 1999), real estate agents reported using weak tie personal social network connectivity to prospect for

potential buyers and sellers. Thus anecdotal evidence from interviewing real estate agents suggests that weak ties might be important in the prospecting work of the residential real estate agent (Sawyer, Crowston, and Wigand, 1999).

When considering economic theory and network approaches, strong ties require more time to maintain than weak ones. Thus the development of strong ties requires a relational overhead not required by weak ties. This would suggest that real estate agents might focus on developing weak ties over strong ties so that they might optimize the return on investment of their communication relative to the overhead incurred to conduct the communication.

2.11   Performance

Performance was used as the outcome measure. There are several key distinctions of the performance variable. Firstly, performance is measured on an individual level. Secondly, the measure of performance is self-reported. Thirdly performance is represented by the individual income of the contractual project-based worker. Performance is the variable that indicates the degree of success of the contractual project-based worker. One purpose of this research was to understand the predictors of high performing contractual project-based workers. Performance is a particularly important outcome variable, especially in the context of this research, in which the unit of study is the individual.

Two studies similar to my study measured performance in different ways. (Eppler, Honeycutt, Ford, and Markowski, 1998a) examined the relationships between overall sales performance and the personal traits of self-monitoring and adaptiveness. In this study annual income was used to measure performance.

Mehra, Kilduff, and Brass (2001) examined how different personality types created and benefited from social networks in organizations. They looked at how self-monitoring and centrality in social networks predicted individuals' work place performance. Mehra, Kilduff, and Brass (2001) relied on supervisory performance ratings as measures of performance. However, their research was conducted within the context of a clearly delineated organization, as opposed to the focus here, which is on personal social networks serving as a surrogate organizational infrastructure.

For the residential real estate agent, the main objective is to sell real estate. Performance represents the degree to which the real estate agent meets the goal of selling real estate. I measure performance using the self-reported income of residential real estate agents. Please see Chapter 3 for further discussion of performance and the operationalization of performance in this study.

2.12   ICT as a predictor of personal social network connectivity

There have been calls for more insight into the importance of individual characteristics (Emirbayer and Goodwin, 1994) in understanding social networks. I focus on two individual characteristics that serve as predictors of the level of social network connectivity. In the next several sections, I describe the two individual differences studied: information and communication technology use and self-monitoring. I then explain why they were selected as variables given their relevance to understanding personal social network connectivity and the work of the contractual project-based worker.

I hypothesize that ICT reduces the costs of coordinating personal social networks and enables greater levels of personal social network connectivity for the contractual project-based worker. The coordination costs assumption of electronic markets theory is used to support this hypothesis. An assertion is made that ICT is being used to support virtual structure of social networks formed around projects in contractual project-based work.

The initial studies upon which this research builds examined how ICT changes the way real estate agents conduct their work (Crowston, Sawyer, and Wigand, 2001; Sawyer, Crowston, Allbritton, and Wigand, 2000a; Sawyer, Crowston, and Wigand, 1999; Sawyer, Crowston, Allbritton, and Wigand, 2000b; Sawyer, Crowston, Wigand, and Allbritton, 2003; Wigand, Crowston, Sawyer, and Allbritton, 2001).

ICT that supports social network connectivity has led to changes in established work practices. ICT use was found to change the manner in which real estate agents conducted their work, and, in some cases, the use of ICT impacted the value chain of transactions in the residential real estate process (Crowston, Sawyer, and Wigand, 2001; Sawyer, Crowston, and Wigand, 1999; Sawyer, Crowston, Allbritton, and Wigand, 2000b; Sawyer, Crowston, Wigand, and Allbritton, 2003; Wigand, Crowston, Sawyer, and Allbritton, 2001). Focusing on ICT use provided a means to relate the work of agents to their roles as intermediaries during the buy / sell transaction.

A series of 14 qualitative interviews suggested that analyzing the real estate agents' social capital, the set of social resources embedded in relationships, provides insight into how real estate agents work and how that work is affected by ICT (Crowston, Sawyer, and Wigand, 1999; Sawyer, Crowston, and Wigand, 1999). Sawyer, Crowston,

Wigand, and Allbritton (2003) found that ICT was used to build and benefit from the

social relationships that underpin the actual transactions, to help guide the process of

closing, and to invoke expertise as needed.

The two studies described above focused on the work of the residential real estate

agent in order to determine if ICT use, in conjunction with ways of conducting work, was

bringing about a change in the work of the real estate agent. These studies also examined

the relational or social impact of the work of real estate agents from a macro-level social

network perspective. Findings from the studies suggested a focus on both ICT and social

networks as predictors in understanding the work of residential real estate agents.

2.13 Coordination cost assumption of electronic markets theory

The coordination costs assumption of electronic markets theory is used here to

explain how ICT reduces coordination costs thereby impacting the level of personal

social network connectivity. Electronic markets theory focuses on how firms and markets

organize the flow of goods and services through their value-added chains (Benjamin and

Wigand, 1995; Malone, Yates, and Benjamin, 1989; Malone, Yates, and Benjamin,

1987).

Coordination costs include the transaction (or governance) costs of all the

information processing necessary to coordinate the work of people and machines that

perform primary processes (Malone, Yates, and Benjamin, 1987). Coordination costs are

the costs of the decision making and communication necessary to coordinate tasks

(Malone, Yates, and Benjamin, 1987). Coordination costs include the costs of gathering

information, negotiating contracts, and protecting against risks. One example of

coordination cost is the time taken to distribute information. Coordination costs also refer to the time and effort spent coordinating work, along with the work that arises from inefficient coordination (Finholt, Sproull, and Kiesler, 1990).

Primary functions of coordination are communication and processing of information. Innovations in information technologies have greatly reduced the time and costs of processing information, and thus lowered coordination costs (Malone, Yates, and Benjamin, 1987). Information technology decreases the costs of communicating and coordinating information (Malone, Yates et al., 1987).

The coordination costs assumption of electronic markets theory suggests that ICT enables the contractual project-based worker to coordinate their work with others through the use of their personal social network connections. Without the use of ICT, coordination of communication might be prohibitive for the contractual project-based worker, given limited access to institutional resources.

The social network of strong and weak ties that the real estate agent uses to coordinate a transaction is a primary coordinating mechanism for the contractual project-based worker. I assert that ICT reduces coordination costs, enabling greater levels of social network connectivity.

Hypothesis: Email, website, and Internet use positively influence strong tie personal social network connectivity.

Through their connectivity with other individuals in their strong tie personal social network such as other agents, buyers, sellers, and providers of services in the real estate transaction, the agent organizes and coordinates the project or real estate transaction. Internet, email, and own website can all be used by the real estate agent to

organize strong tie personal social network connections that support the completion of tasks by service providers in the real estate transaction.

Increased use of email, Internet, and website allow a real estate agent to create and maintain greater levels of social network connectivity, at lower transaction costs, with others in their immediate social network through their direct social ties. Thus ICT supports the coordination of the surrogate organizational structure, or network organization, of the real estate agent or contractual project-based worker.

ICT use also enables greater levels of connectivity. The connectivity enabled by Internet, email, and web site allow for a much greater exchange of communication and information than with traditional methods such as publications, phone, and face to face interactions. The characteristics of Internet, email, and website enable the contractual project-based worker to reach a large number of individuals at less cost than with more conventional means.

Thus the reduced coordination cost and the characteristics of ICT that support greater levels of connectivity suggest that Internet, email, and website would be good predictors of levels of strong tie personal social network connectivity.

Hypothesis: Email, website, and Internet use positively influence weak tie personal social network connectivity.

ICT use facilitates communication and information flow by enabling agents to increase their number of weak tie connections to individuals outside of their immediate network, which builds their extended network. Computer networks make it easier to reach large numbers of people using weak tie contacts (Constant, Sproull, and Kiesler, 1996). ICT use supports the functions of weak tie personal social network connectivity by

enabling an increase in network connectivity (Kilduff and Tsai, 2003). ICT enables an increase in the level of connectivity of weak ties (Monge and Contractor, 2003**)**.

For example, a successful real estate agent generally maintains a contact list of several thousand names. ICT makes it easier for the agent to create, maintain, and make use of this list of contacts. ICT enables the agent to more easily remain in contact with previous clients. These previous clients may wish to sell their home at some point and buy another home, or they may be able to provide referrals to the real estate agent of friends who are interested in buying or selling a home.

The lower transaction cost of using ICT enables the real estate agent to obtain greater levels of weak tie social network connectivity. Characteristics of ICT, such as (1) lower fiscal and social cost of communication and information exchange and (2) transcendence of issues with respects to proximity enable the agent have a greater range of network connectivity. ICT also may allow agents to more strategically position themselves in order to get information about requests for proposals and other opportunities for finding work. Individuals with greater levels of social network connectivity are connected to external networks they would not be connected to otherwise. Thus, there is a complement with respects to weak tie personal social connectivity and the use of ICT in contractual project-based work.

The use of ICT to strategically develop weak tie connectivity with respects to communication and access to information suggest that ICT is used in support of weak tie personal social network connectivity in the work of the contractual project-based worker. The use of ICT to develop greater levels of weak tie personal social network connectivity allows contractual project-based workers to maintain larger and more complex sets of

social network ties. The creation of this extended network contributes to the performance of the contractual project-based worker.

2.14 Self monitoring and personal social network connectivity

Extensive research on self-monitoring has demonstrated that the self-monitoring variable is a predictor of social phenomenon. High self-monitors are more likely to: (1) be more attentive to network formation, (2) develop relations across groups, and (3) have higher levels of weak tie personal social network connectivity. High self-monitors are more likely to cross organizational boundaries and perform well in multiple organizational environments. Self-monitoring deals directly with the access of personal social networks.

Self-monitoring as a predictor of strong ties suggests that self-monitoring (1) increases the range of the strong tie network, (2) increases the reach of the strong tie network, and (3) enables the strategic connection of multiple social networks. Self-monitoring as a predictor of weak ties suggests that self-monitoring (1) increases the range of the weak tie network, (2) increases network heterophily, and enables strategic positioning of the network actor.

The construct of self-monitoring helps to explain the main issue my research addresses, namely accessing personal social networks to benefit the individual in their work. **Self-monitoring** is a psychological construct that refers to the degree to which individuals are willing and able to monitor and control their self-expression in social situations (Barley and Kunda, 2001; Eppler, Honeycutt, Ford, and Markowski, 1998b; Mehra, Kilduff, and Brass, 2001; Snyder 1987b; Snyder and Gangestad, 1986). Self-

monitoring is an individual-level characteristic used in this study as a predictor of levels of weak tie personal social network connectivity and strong tie personal social network connectivity.

The construct of self-monitoring can be used to explain the predisposition of an individual to shape social networks. In a social situation, high self-monitors ask, "Who does this situation want me to be and how can I be that person?" In contrast, low self-monitors ask, "Who am I and how can I be me in this situation?" Self-monitoring theory provides insight into the age-old question of whether behavior is a function of consistent dispositions or strong situational pressures.

Research on self-monitoring suggests that the concept can be effectively used to explain the individual accessing of social worlds (Mehra, Kilduff, and Brass, 2001; Snyder, 1987b). Measures of self-monitoring have been used in studies to explain variation in social outcomes and as moderators and predictors of social-phenomena (Mehra, Kilduff, and Brass, 2001; Moorman and Blakely, 1995; Ramamoorthy and Carroll, 1998; Snyder, 1987a; Snyder and Gangestad, 1986; Wagner, 1995). Mehra (2001) found that self-monitoring is related to the type and level of ties (weak tie or strong tie) possessed by an individual. Multiple studies (Mehra, Kilduff, and Brass, 2001; Snyder, 1987b) have demonstrated that the individual characteristic of self-monitoring explains how individuals shape their social worlds.

High self-monitors (1) tend to occupy positions that span social divides, (2) tend to occupy structurally advantageous positions in social networks, (3) are better at scanning the social world for information about people and their intentions, and (4) are

more likely than low self monitors to notice and remember information concerning others (Mehra, Kilduff, and Brass, 2001; Snyder, 1987b; Snyder and Gangestad, 1986).

(Mehra, Kilduff, and Brass, 2001) used survey design to study a high-technology firm. They measured structural positions, social network connections, and individual characteristics among study participants. Self-monitoring and structural position were found to independently predict performance in organizations. The results also showed that high self-monitors tend to outperform low self-monitors. The difference between the (Mehra, Kilduff, and Brass, 2001) study and the research conducted here should be noted. My research focused on self-monitoring as a predictor of personal social network connectivity, while the (Mehra, 2001) study focused on self-monitoring as a predictor of performance and structural position.

Hypothesis: The level of self-monitoring is positively related to strong tie personal social network connectivity.

Self-monitoring theory suggests that a high self-monitor will have a larger strong tie network. An individual with a high level of self-monitoring is able to directly and indirectly connect with a greater number of individuals. High self-monitors will tend to develop relations across groups, using their flexible identities to play different roles in different groups. According to self-monitoring theory and strength of weak ties theory, a high self-monitor will have a greater amount of social ties in general (Granovetter, 1982; Snyder, 1987b). Furthermore, (Mehra, 2001) demonstrated that self-monitoring theory predicts the type of individual likely to connect previously unconnected networks.

Hypothesis: The level of self-monitoring is positively related to weak tie personal social network connectivity.

Self-monitoring theory suggests that a high self-monitor will have a more extended or far-reaching weak tie network. High self-monitors are attentive to social network formation. High self-monitors are therefore likely to bridge social worlds, acting as connection points through which people exchange information (Snyder, 1987b). Those individuals occupying bridging positions are more likely to be detected by high self-monitors than low self-monitors, given that a high self-monitor will pay more attention to their social environment (Mehra, Kilduff, and Brass, 2001).

Self-monitoring theory asserts that high self-monitors, relative to low self-monitors, tend to develop relations with distinctly different people (increasing the possibility of weak tie connections), while low self-monitors will tend to occupy relatively homogenous social worlds (decreasing the possibility of weak tie connections) (Mehra, Kilduff, and Brass, 2001; Snyder, 1987b). Table 7 below provides a summary of assertions of self-monitoring theory for personal social network connectivity relative to strength of tie.

2.15   Conclusion

This chapter described the development of theory in the present study. The chapter was structured around Figure 5, the conceptual diagram that also indicates the functions of the constructs used in the study. I applied a social network approach in order to understand contractual project-based work and performance, relative to strength of social tie and individual characteristics of contractual project-based workers. Literature on personal social network connectivity and strength of tie was reviewed. The rationales for the inclusion of individual differences of ICT use and self-monitoring in the study

was discussed. Lastly, literature supporting individual hypotheses proposed in the study

was reviewed.

Table 7

Behaviors of self-monitoring relative to strength of tie.

Relative to strength of tie.	Behaviors of high self-monitors.
Self-monitoring as a predictor of ST.	Likely to connect previously unconnected networks. Pay more attention to social environment. Greater network exposure. Bridge social worlds. Develop distinctly different strong tie contacts.
Self-monitoring as a predictor of WT.	Develop relations with distinctly different people. Occupy positions that span social divides. Bridge social positions. Develop relations across groups Play different roles. Maintain flexible identities. Occupy strategically advantageous positions in social networks. Better at scanning the world for information about people. More likely to notice and remember information about others.

3 Chapter Three: Methodology

This methodology section is comprised of four general sections: (1) description of administration of the survey, (2) sample selection, (3) description of the three phases of the study: pre-test, pilot, and survey, (4) measurement development including factor analysis results used to develop the measures in the study, and (5) a discussion measurements for each of the constructs in the study.

Survey methodology was selected as an appropriate method for my research because it: (1) addressed the research problem and research questions, (2) fit with selected measures used in the study, (3) allowed access to study subjects, and (4) allowed for eliciting data from a large population.

Survey researchers are interested in the accurate assessment of the characteristics of whole populations of people. Surveys are distinguished from other research methods in that they have the ability to estimate with precision the percentage of a population that has a particular attribute by obtaining data from only a small fraction of the total population (Dillman, 2000b). In other words, survey method allows for eliciting data from a number of subjects, then generalizing from the subjects to a larger population (Babbie, 1992). Steps were taken to ensure that a representative sample was selected. For a further discussion of this and the stratified sampling that was conducted, please see the discussion of sample selection later in this chapter.

Survey method is the most common method used in social network theory approach (Garton, Haythornthwaite, and Wellman, 1997). Survey research is generally employed to understand not only relations among sociological variables, but what people

think and do and the relations between sociological and psychological variables (Kerlinger, 1986). Survey methodology seemed appropriate for my research given that the design of my study is framed primarily around psychological and sociological variables that address respondent perceptions of psychological and sociological behavior.

Survey instruments have been used extensively as instruments for measuring ICT use (Straub, Limayem, and Karahanna-Evaristo, 1995). In addition, survey methodology has been applied to test strength of weak ties theory and self-monitoring theory (Granovetter 1973; Snyder and Gangestad, 1986). These two theories are applied here to understand contractual project-based work.

Survey method is the most appropriate method for collecting original data to describe a population too large to observe directly (Babbie, 1992). Given that the subjects for this research were individual real estate agents spread throughout the United States, mailed surveys seemed the most appropriate method of survey administration.

3.1 Survey administration

This research followed the (Dillman, 2000a) approach to survey design and administration which frames survey response as being affected by social exchange. Social exchange theory is a theory of human behavior used to explain the development and continuation of human interaction. The social exchange theory addressed survey response rate by focusing on three elements, rewards, costs, and trust. The Tailored Design Method follows the principles of social exchange theory regarding why people do or do not respond to surveys (Dillman, 2000b). According to (Dillman, 2000b) surveys should (1) establish trust, (2) provide rewards, and (3) reduce social costs. These three criteria provide an overarching framework for the administration of surveys.

In my research, credibility was established through the support of the National Association of Realtors, which sponsored the administration of the survey and provided the sampling frame. Trust was addressed by making it clear to respondents that the study was academic and information about individual respondents would not be shared with the National Association of Realtors.

In terms of rewards, respondents were informed that they could access results from the survey via the World Wide Web after the data had been analyzed. Respondents were also made aware that findings from the research would benefit their industry. The goal was to design correspondence and a survey that provided rewards for participation in the survey, reduced the costs that survey respondents incurred for participating in the survey, and instilled a level of trust in the respondents.

This research developed, in part, out of earlier qualitative research focused on how ICT use was changing the work of residential real estate agents, the way in which real estate transactions took place, and changes to the residential real estate industry. Interviews were conducted with real estate agents to learn more about the work of real estate agents and changes in their work as a result of ICT use (Sawyer, Crowston, and Wigand, 1999).

The main goal of survey implementation is to use techniques and methods that secure as high a response rate as possible. In order to secure high response rates, (Dillman, 2000) suggested five needed elements in his Tailored Design method of survey implementation: (1) a respondent friendly questionnaire, (2) up to five contacts with the questionnaire recipient, (3) inclusion of stamped return envelopes, (4) personalized correspondence, and (5) a token financial incentive that is sent with the survey request.

The most effective method of mailing the questionnaires and notifications, the number of contacts, and the effect of including a financial incentive were assessed using the pilot study. I used (Dillman, 2000a) guidelines and then made adjustments to the survey design implementation based on results of the trials in the pilot study.

A brief pre-notification postcard was mailed to respondents via first class mail. (See Appendix E1 for the pre-notification that was sent.) The pre-notification informed the respondents that an important survey would arrive in a few days and that the person's response was greatly appreciated. A week later the survey was delivered.

The questionnaire was mailed with a cover letter (see Appendix D1) explaining why it was important that the respondent fill out the questionnaire. (See Appendix E3 for the survey instrument.) The survey was printed in booklet format, measuring 81/2" x 7" and stapled along the spine. It has been demonstrated that this format increases response rate (Dillman, 2000b). A postage-paid envelope was included with the surveys. These self-administered questionnaires were mailed to residential real estate agents in different areas of the United States. The survey questionnaire consisted of 33 questions with multiple items per question. The majority of the questions were Likert-like items with closed ended scales, measured on a seven-point scale.

A follow-up "thank you" post card (see Appendix E2) was mailed to respondents shortly after the survey was mailed. The post card indicated the World Wide Web site where respondents could download a copy of the survey and mail it in if they had not yet completed the survey. The post card also indicated that respondents could request that a copy of the survey be mailed to them, postage paid, if they called the toll free number indicated.

3.2 Sample selection

In survey methodology, a sample is drawn from a population. A survey population consists of all of the units to which one desires to generalize survey results. Characteristics of the population are inferred from the sample (Kerlinger, 1986). Careful probability sampling produces a group of respondents whose characteristics may be taken to reflect those of a larger population (Babbie, 1992). In other words, from the characteristics of a sample, you can infer the characteristics of a population. The sample selection is critical, as the sampling plan, procedure, and appropriate statistics must all mesh together in order to ensure the value of findings and results.

The sample frame is the list from which a sample is to be drawn in order to represent the survey population. The sampling frame for this research was the membership list for the National Association of Realtors, an industry trade organization of more than 900,000 members. The NAR is composed of members who are involved in residential and commercial real estate such as brokers, salespeople, property managers, appraisers, counselors, and others who are engaged in specialized aspects of the real estate industry.

When conducting research on workers, the most common point of access to the subjects is through organizational structure. However, contractual project-based workers often work independently of formal organizational structures. This difficulty with access presents a difficulty in accessing subjects for study. In my study I accessed subjects for the study through the National Association of Realtors, a professional trade association. The National Association of Realtors (NAR) membership list provided access to the population of residential real estate agents in the United States. The sample was stratified

by zip code to ensure representativeness of different geographic areas throughout the United States. The statistical research staff of the National Association of Realtors conducted the sample stratification.

Since the sampling frame, or mailing list, of the National Association of Realtors included brokers and other types of agents, such as commercial real estate agents, it was necessary to filter out respondents who were not residential real estate agents. This was accomplished through asking respondents to indicate their job functions.

In the survey, respondents were asked whether they worked part time or full time. Part time real estate agents were screened from analysis. Screening part time agents allowed for controlling for individuals who were interested in real estate but not actually buying and selling residential real estate. Screening for part time agents also controlled for individuals who are "trying out" real estate, but not having success in establishing themselves as real estate professionals.

Determining the desired sample size depended on several interrelated factors, which included (1) the variability of the population being sampled, (2) the population parameters to be estimated, (3) the confidence level selected, (4) the precision required in the estimates of population parameters, (5) the sampling method being used, and (6) the estimating procedure or method of statistical analysis to be employed (Grosof and Sardy 1985). Larger samples involve smaller sampling errors and increase the power of the statistical test applied to the data. Given a desired precision, confidence level, universe size, and known variability of a characteristic in the universe, it is possible to calculate the minimum required sample size (Grosof and Sardy, 1985).

3.3 Study phases

This research consisted of three phases: (1) pre-test, (2) pilot, and (3) survey. Both a pre-test and a larger pilot study were conducted. Table 8 below presents the dates in which each phases of the study took place, the sample size, and the response rate.

Table 8

Phases of research study with sample size and response rate.

	Pre-test	**Pilot**	**Survey**
Date	April, 2002	November, 2002	May, 2003
Sample size	30	350	9000
Surveys received	20	53	830
Response rate	40%	13.15%	8.44%

From earlier research, it was discovered that social networks could be a valuable phenomena for study in explaining the work of residential real estate agents. This earlier research also informed the wording for survey item scale development for items used to measure ICT use and personal social network connectivity. Thus the selection of theories, and variables for the study were informed by qualitative research including an examination of the work of the residential real estate agent and interviews with the agents.

3.4 Pre-test phase

Dillman (2000) describes the pre-test phase of survey administration as being comprised of four stages: (1) a review by knowledgeable colleagues and analyst, (2) interviews to evaluate cognitive and motivational qualities, (3) a small pilot study, and (4) a final check. I followed Dillman's guidelines. Both academicians with experience with survey methods and a survey methodology expert reviewed the preliminary copy of

the survey and offered suggestions. In addition, colleagues reviewed the survey for errors or incoherence in wording. Several real estate agents were asked to look at the survey and provide comments.

The survey instrument was pre-tested on thirty real estate agents from two separate regions in the United States: Syracuse, New York and Little Rock Arkansas. The surveys were personally delivered to a regional real estate office in each of the two regions. The surveys were then distributed to agents working at each of the regions mentioned. Real estate agents were presented with a cover letter and the questionnaire and asked to remark on any questions that might be unclear, ambiguous, or interpreted incorrectly. Appendices A2-A5 present the variables and items included in the pre-test listed by construct. See Appendix C for the pre-test survey.

The pre-test was conducted to determine whether the questionnaire was understandable, clearly written, well structured, and free from errors. The other objective of the pre-test was to test newly devised questions related to personal social network connectivity and strength of tie. The pre-test objectives for survey layout and presentation were as follows: (1) assess layout and presentation of the survey, (2) determine proper format of survey questions, (3) detect errors in survey, (4) determine correct wording of instructions, and (5) assess proper wording of survey questions. The pre-test objectives for validity were (1) assess face validity of terms as interpreted by residential real estate agents, and (2) assess proper use of vocabulary relative to the residential real estate industry. Objectives for measuring scales and item measures included analysis of items measuring the following: (1) strong tie personal social network connectivity, (2) weak tie

personal social network connectivity, (3) performance, (4) ICT use, and (5) type of real estate market.

Results from the pre-test indicated that measuring performance with questions other than income might prove too difficult. Assessing how real estate agents receive income for their work was found to be complex, and varied from region to region. Thus, it was necessary to try out several different wordings and formats for questions related to the income and compensation arrangements of real estate agents.

Suggestions from real estate agents were considered and question wording was changed to ensure clarity. Findings helped to ensure that the correct industry standard terms were used in wording of the questions. Factor analysis was performed on items in order to determine more reliable and valid factors for the pilot test. Respondents noted when questions were poorly worded, not clear in wording, or too difficult to answer. One of the most valuable pieces of feedback in the pre-test was the identification of question items that might be consolidated or the elimination of items that were found to be redundant.

The pre-test was the first round of questions that were related to personal social network connectivity. Twenty-seven questions on personal social network connectivity were presented on the pre-test. From the results, the first round of factor analysis was conducted on the data. This analysis confirmed which items were reliable measures of personal social network connectivity. Findings also indicated the need for further refinement of measures of personal social network connectivity.

The pre-test was particularly helpful in creating less confusing wording, wording questions using terminology common to all real estate agents, insuring that survey

instrument creation would take into account differences by region in terms of question wording, and simplifying and qualifying terms so that they would be clearly understood by respondents.

3.5 Pilot phase

The purpose of the pilot study was to further refine (1) survey items used to measure ICT use, (2) performance indicators, and (3) measures of weak tie and strong tie personal social network connectivity. Considerable resources were invested in pilot testing the survey, given it would inform administration of a national level survey. For this reason, it was important to plan in advance to ensure successful administration of the survey.

For the pilot study, surveys were mailed to a total of 350 members of the National Association of Realtors (NAR). The National Association of Realtors provided the names for the pilot test. These names were selected by stratified random sampling. Fifty-three usable surveys were returned, resulting in a 15% response rate. Appendices A2-A5 present the variables and items included in the pilot test, listed by construct. See Appendix D1-D4 for cover letter, pre-notification, follow-up, and pilot survey.

The objectives for the pilot test in terms of survey administration were as follows: (1) determine how the survey should be administered with respect to incentives, type of mailing, and number of follow-ups, and (2) given the response rate, determine an appropriate sample size to achieve adequate statistical power for analysis. Objectives for measuring scales and item measures included analysis of items measuring the following: (1) confirm survey items used to measure ICT use, personal social network connectivity, and performance indices with respects to reliability and validity, (2) further explore the

best approach to measuring performance given the complexities involved in measuring performance.

The pilot test focused on the best way to measure the use of ICT and the types of ICT. One purpose of the questions was to assess the types of ICT the agent was using, the amount of use of ICT, and the degree to which theses types of ICT could be accurately measured. Many questions referred to different features of ICT and even specialized types of ICT used by residential real estate agents. In measuring ICT, items were used to measure both dependence and use of ICT. The objective was to determine what kind of ICT agents were using, and the best way to measure these ICT.

A large part of the focus of the pilot study was determining valid and reliable items and factors to measure ICT. Measuring ICT was looked at in terms of ICT use in general, and the use of ICT with respect to specific types of ICT. Also assessed were other indicators for ICT use, in terms of the dependence or value placed on the ICT that the respondents used in their work.

The main outcomes from the pilot study were the results of the factor analysis of the individual constructs used in the study. Findings from the pilot study suggested that several approaches to measuring ICT use were inadequate. Findings indicated that only a small number of respondents were using ICT specialized for the real estate industry. The number of users for personal digital assistants and pagers was too minimal to warrant retaining the survey questions referring to these technologies. Reported levels of cell phone usage were so high that there was little variation in the variable measuring this type of ICT use.

The pilot was also used to assess the success of different methods of mailing the

surveys and the degree to which including an incentive greatly affected survey response.

Some surveys were sent via bulk mail and others were sent via first class, and some

surveys were sent with a small incentive while others were sent without an incentive. Part

of the pilot study included a test of response rate relative to the type of mailing used –

first class or bulk, and whether or not a $2.00 incentive was included in the survey. Table

9 includes the results of response rate relative to class of mail and incentive. A total of

347 surveys were sent out. It was determined that the class of mail did make a difference

with respects to response rate. This finding was supported by social exchange theory in

survey administration in that a first class mailing reflected a degree of importance that

was perceived by the respondent thus making it more likely that the respondent would

respond to the survey (Dillman, 2000a). Given that the 16% response rate was acceptable,

a decision was made to mail the survey first class without an incentive. The extra 4% in

the response rate achieved through an incentive was not viewed as being worth the

additional cost.

Table 9

Response rate for pilot survey testing mail class and incentives.

	1st Class	Bulk
No incentive	16%	9.6%
Incentive	20%	16%

Much of the pilot focused on refinement of measures of ICT with a focus on

assessing the degree to which understanding the use of specific types of technology

would be fruitful. The pilot study also was used to conduct a second round of factor

analysis on items measuring ICT and personal social network connectivity. Results from

this analysis resulted in a paring down of the number and type of ICT questions. Analysis of results from the pre-test and the pilot test did provide reliable factors to represent strong tie personal social network connectivity and weak tie personal social network connectivity.

An examination of missing values from multiple performance questions suggested that it might be best to measure performance in a simple straightforward manner rather than using multiple measures of performance. With respects to ICT measures, results suggested which specific technologies had high levels of use warranting their inclusion in the final survey. In terms of continuous measures of ICT, a decision was made to focus on the use and dependence of ICT and to focus on basic measures of ICT: email, cell phone, website, and Internet.

3.6 Measurement development and scale creation

Factor analysis was used to analyze multiple iterations of surveys in order to develop measures that were reliable and valid. Factor analysis refers to several methods of analysis that enable the reduction of a large number of variables to a smaller number of variables. Factor analysis is used to determine patterns among the variations in the values of several variables. A cluster of highly correlated variables is a factor. Factor analysis is often used in survey research to determine if a long series of questions can be grouped into shorter sets of questions, each describing a factor of the phenomena being studied (Vogt, 1993).

Factor analysis is a method for linearly transforming a large set of correlated variables into a smaller group of uncorrelated variables. This transformation makes analysis easier, by grouping data into more manageable units and eliminating problems of

multicollinearity (Vogt, 1993). There are three primary reasons for using factor analysis: (1) to study the correlations among a large number of interrelated variables, (2) to interpret the meaning of factors based on the grouping of the variables, and (3) to summarize many variables as a few factors.

I chose to extract factors using principle components extraction technique, which is, strictly speaking, not a factor analysis technique. However, researchers generally equate principal components analysis with factor analysis. Two types of rotations are most often used in factor analysis: orthogonal and oblique. Rotation involves making the large loadings larger and the small loadings smaller so that each variable is associated with a minimal number of factors. With orthogonal rotations, an assumption is made that extracted factors are independent of one another. Oblique rotation does not assume that factors are independent. In my study, oblique rotation was selected, given that factors were not believed to be independent of one another.

Reliability of identified factors was assessed using Cronbach's Alpha as a measure of reliability. Factor and reliability analysis was conducted using the SPSS Statistical Analysis Package. The following were considered when determining the factor loading of survey items: (1) rotation, (2) correlation, (3) percent of variance accounted for, (4) reliability, (5) theoretical justification for the factor, and (6) face validity. In the sections below, I address each construct separately and describe the items used to measure the construct, the index or scale created to measure the construct, and the reliability of the items representing the construct.

3.7 Measurement development for strong tie personal social network connectivity and weak tie personal social network connectivity

It is important to point out that there is a distinction between measuring actual social structure and measuring respondent perception of social networks. This distinction is also discussed further in chapter five, under the heading of methodological contributions. Researching social networks independent of actual structure can be necessary in a context where it is difficult to access all subjects of the study. In addition to the constraint of limited access to all members of an individual's social network, there is also a problem with respect to the respondents' ability to recall all individuals interacted with. As previously mentioned, this research focuses more on accessing of social networks for the benefit of the individual rather than the mapping of the social structure and assessing its effect on norms and collective behavior. For these reasons, the level of perceived social network connectivity is measured rather than actual social network structure.

The use of perceptual data as a basis for the use of social networks as opposed to direct measurement of the personal social networks may also be a concern. However, methodologically and theoretically, perceptual measurements of personal social network connectivity seemed most appropriate given the choice of survey method, level of accessibility to subjects, and the focus on the accessibility of personal social networks.

Factor analysis reported below is from analysis of pilot data. The factor analysis of the pilot data was used to further develop dimensions of strong tie personal social network connectivity and weak tie personal social network connectivity. The factor

identified as strong tie personal social network connectivity accounted for 82.38% of the variance in the factor analysis of all items measuring strong tie personal social network connectivity. The reliability measure for strong tie personal social network connectivity, Cronbach Alpha, was .879. The factor identified for weak tie personal social network connectivity accounted for 66.94% of the variance in the factor analysis of all items measuring weak tie personal social network connectivity. The reliability measure for weak tie personal social network connectivity, Cronbach Alpha, was .833. Table 10 presents the items used to represent factors of strong tie and weak tie personal social network connectivity.

Table 10

Survey items for strong tie personal social network connectivity and weak tie personal

social network connectivity.

Items for strong tie personal social network connectivity.
I've developed enough professional contacts to excel in my job (q27r11). I've developed enough professional contacts so that I usually know most of the participants at a closing (lawyers, etc.)(q27r12). I have worked with the same professionals for many years now (q27r13). Other professionals want to work with me (q27r8). Other real estate professionals (mortgage officers, lawyers, etc.) seek me out for advice q27r9). Most of my real estate colleagues perceive me as a leader on professional topics and issues q27r10).
Items for weak tie personal social network connectivity.
I seek opportunities to meet people (q27r2). I am always looking to add names to my contact list (q27r3). I am in frequent contact with people on my contact list (q27r4). Wherever I go, I meet somebody I know (q27r1). I have lots of friends (q27r5). I have many opportunities to meet new people (q27r6). I am constantly meeting new people (q27r7).

3.8 Measurement development for information and communication technology use

Information and communication technology (ICT) is defined as the hardware and

software components of digital technology, and computer networks, such as the Internet,

that connect the components of digital technology used to collect, process, and exchange

information (Rogers 1986). Measurement development from pre-test and pilot test

suggested difficulty in measuring specific ICT use. Measures of ICT use are difficult to

assess, and often based on several different approaches to measurement (Straub, 1995).

Indicators of ICT use were created using findings from field research consisting of

interviews with residential real estate agents and from previous research on instruments

that measure ICT use. These indicators were then refined through factor analysis of pre-test and pilot test data.

Three different types of ICT were measured: (1) Internet, (2) email, and (3) website. ICT was measured several different ways in the pre-test and pilot in order to discern the most effective way to measure the ICT use. Different methods of measuring ICT included: (1) categorical listings of specific ICT, (2) access to specific types of ICT, (3) listings of specific types of ICT relative to use, (4) listings of specific types of ICT relative to dependence, (5) categorical listings of features of specific types of ICT, (6) quantity of use of specific types of ICT, (7) categorical listings of specific features of the Internet.

The factor analysis from the pilot study indicated the difficulty in creating measures for specific ICT in that the ICT factors were slightly cross loaded with one another. With respects to specific types of ICT, their was either too many missing answers, the response rate was too low, or there was too little variation in the responses. In addition, the categorical questions for ICT use did not lend themselves to structural equation modeling given that measures for the questions were not continuous. For these reasons, I made a decision to use simple straightforward items to measure ICT use. The simple measures provide less granularity of ICT use, but do not face the limitations of more descriptive or detailed measures of ICT discussed above.

Ultimately, ICT use was assessed in two different ways: Firstly, the technologies of email, website, and Internet were assessed according the self-reported frequency of use and the self-reported dependence on the ICT. Frequency and dependence were measured using continuous scales to support the use of inferential statistics in the analysis. ICT use

questions were answered relative to four types of information and communication technology (1) email, (2) cell phone, (3) Internet, and (4) web.

Measurement development from the pre-test and pilot test suggested difficulty in measuring specific ICT use. Email referred to the sending and receiving of email messages, even if this was done through the use of a website or through the use of the Internet. Website referred to the use of a website on the Internet.

Feature items for web presence included a listing of functions that an agent might have integrated into their web site. These functions included categories such as lists of links, having their own web page on the company's website, having their own Internet site with listings information, providing virtual tours or walk-throughs, and having one's own domain name. Items measuring web presence also included listings of different sites where the real estate agent, or respondent in this case, might have posted real estate listings. Internet features included sites providing different real estate related services, as well as popular sites used by real estate agents such as Realtor.com.

Web presence features were measured using a categorical scale that had respondents reply as "Use" or "Don't use." A value of 1 was assigned if respondents used a specific feature and a value of 0 was assigned if the respondents did not use a specific feature and then these were summed. Table 11, below, presents the dimension to be measured, the definition of the dimension, measurement type, and question number in survey. See Appendix A1 for a listing of survey questions from the pilot survey sorted by construct. See Appendix E3 for the pilot survey instrument.

Table 11

Survey items for ICT use.

Dimension	Description	Measurement
ICT frequency (measured for email, cell phone, website, and Internet)	The number of times ICT was used in a stipulated period of time.	Survey question 3. Seven-item scale.
ICT dependence (measured for email, cell phone, website, and Internet)	The need for ICT to be available in order to conduct work.	Survey question 4. Seven-item scale.
Email frequency	The number of times email was used in a stipulated period of time.	Survey question 8. Categorical ordered eight choice question
Internet (features)	The number of different capabilities of Internet technology used.	Survey question 6. Binary question of use or don't use for twelve items.
Web presence (listings)	The number of different web sites on which the agent's listings (descriptions of homes for sale) appear.	Survey question 9. Ten item question. Multiple items could be selected.
Web presence (features)	The number of different World Wide Web presence technologies used by the agent to promote themselves.	Survey question 10. Binary question of use or don't use for five items.

3.9 Self-monitoring

Self-monitoring was measured using the self-monitoring scale (Gangestad and Snyder, 2000; Snyder, 1987b; Snyder and Gangestad, 1986). I used an eighteen item scale for self-monitoring (see question number 28 on the survey Appendix E3) to measure self-monitoring as a psychological construct that refers to the degree to which individuals are willing and able to monitor and control their self-expression in social situations.

The self-monitoring scale deals with both behaviors and characteristics of respondents that represent the monitoring and controlling of self-expression in social situations. Validity and reliability of self-monitoring was first established in 1974 (Snyder, 1974). Research has shown that self-monitoring predicts a range of criterion behaviors that seemingly similar scales do not predict, and that self-monitoring responses are not significantly correlated with responses to those other scales (Snyder, 1979). The self-monitoring scale was not pre-tested given that the scale was a well-established scale with over 20 years of research supporting the validity and reliability of the scale (Snyder, 1987b).

3.10   Performance

Given that real estate agents are independently contracted and the unit of analysis was at an individual level, it seemed appropriate to measure performance on the individual level. The goal was also to create an index of items to measure performance that could be consistent across contexts and real estate markets. Contexts basically referring to the different areas in the united states where the real estate agents were from. The manner in which the real estate transaction was conducted varied given different state and local laws, types of markets, and types of agent. Thus the real estate transaction was conducted differently depending upon many different factors.

Appendix A3 lists the questions used to measure performance in each phase of the research. There were several difficulties in measuring performance. Obtaining objective performance measures for real estate agents was prohibitive, given the number of respondents and the methodology of the survey. Sales data for the real estate agents surveyed was not accessible. Thus the measure of performance was self-reported by the

respondents. Another concern was the difficulty of self-reported performance measures. In surveys, respondents are often unwilling to indicate the salary they make. Many respondents consider income to be sensitive information. However, in the residential real estate industry it is not uncommon for the agent to report income given that level of income is often how they market themselves to potential buyers and sellers of homes. The agent may also use income level to negotiate or bargain the split (share in profits from the sale of a home) they share with the agency he are she is affiliated with.

One way to increase respondents' willingness to answer questions about personal income is to phrase the questions in the form of ordered categories of dollar amounts. However, using ordered categories rather than exact dollar amounts is a drawback in that there is a reduction in the precision of the data and the amount of data collected. Despite this drawback, I made the choice to order the categories in order to improve the probability that respondents would answer the question. Ninety-three percent of respondents answered the income question in the final survey. Findings indicated an increased response rate for performance questions after reframing the question in a categorical manner.

Several different ways of measuring performance were tested in the pre-test and the pilot. Table 12 lists the constructs used to measure performance and the descriptions of those constructs. Performance was measured as sale performance — more specifically, as net annual income. Performance was also measured as net annual income by (Eppler, Honeycutt, Ford, and Markowski, 1998b), who studied self-monitoring and adaptiveness as antecedents to the performance of real estate professionals.

Table 12

Survey items for performance.

Dimension	Descriptions
Income	Total income earned from commissions by the real estate agent in a specified year period.
Net personal income	The total actual income the real estate agent made in a specified year period.
Number of homes sold	Number of homes sold in a specified year period.
Average cost of home sold	In dollar amount.

3.11   Control variables

In order to control for the effect of variables other than strong tie and weak tie personal social network connectivity on performance, several control variables were included in the survey. Control variables included (1) tenure, (2) the type of market (sellers or buyers) (3) age, (4) gender, and (5) education. Table 13, below, provides the item labels and the conceptual descriptions for each of the control variables.

Table 13

Listing of the control variables and descriptions for each of the control variables.

Control variable	Description
Gender	Gender of the respondent
Age	Age of the respondent
Tenure	Number of years the respondent has worked in real estate
Education	Level of education
Type of market	Degree to which the respondent works in a seller's market or a buyer's market

3.12   SEM analysis

In any research there is a trade off between theory, construct, measure, and data. For example, certain decisions had to be made with respect to the selection of items to

include as measures for constructs. These decisions were greatly influenced by the factor analysis. There was also the question of whether the results of the factor analysis contributed towards construct validity. In other words, were the final constructs and measurements selected consistent with the theories used in the study? In the discussions that follow, interpretation of factor analysis and measurement development process is discussed.

In this section, I provide an overview of structural equation modeling, the major type of statistical analysis used in this research. A unique characteristic of structural equation modeling is that the analysis provides explicit estimates of error variance including possible error in independent variables. Structural equation modeling also allows for modeling multivariate relations and for estimating indirect effects.

In simple terms, structural equation modeling allows for estimating the probability that a hypothesized model is representative of a model inferred from data of a population. In statistical terms, structural equation modeling determines the fit between restricted covariance matrix implied by the hypothesized model and the sample covariance matrix from the data.

Structural equation is a statistical methodology that takes a confirmatory (i.e. hypotheses testing) approach to the analysis of a structural theory bearing on some phenomenon. In structural equation modeling (1) causal processes are represented by a series of structural (i.e. regression) equations. The structural equation maps to a hypothesized theoretical model (Byrne, 2001). The pattern of intervariate relations should be specified a priori. To test a model for its fitness to the collected data, there must be

theoretical support and empirical evidence to suggest the structure of the model or the correlation among the components of the model.

A structural equation is an equation representing the strength and type of the hypothesized relations among sets of variables (Vogt, 1993). Structural equation modeling can describe relations among latent and endogenous variables. A latent variable is a variable that represents underlying characteristics that cannot be observed (Vogt, 1993). Latent variables are often called factors. An endogenous variable is a variable that is an inherent part of the system being studied and is determined from within the system. In other words, an endogenous variable is a variable caused by other variables (Vogt, 1993). Structural equation modeling procedures can incorporate both unobserved (latent) and observed (manifest) variables in analysis.

In structural equation modeling, the hypothesized model can be tested statistically in a simultaneous analysis of the entire system of variables to determine the extent to which it is consistent with the data. If goodness of fit is adequate, the model argues for the plausibility of postulated relations among variables; if it is inadequate, the tenability of such relations is rejected (Byrne, 2001).

There are several assumptions that are critical for structural equation modeling: (1) large sample size, (2) multivariate normal distribution, (3) valid hypothesized model, and (4) continuous scale. Different sections in this chapter discuss addressing these assumptions. The purpose of this section was to provide a cursory description of structural equation modeling and present the some of the criteria and assumptions of this type of analysis.

In the following sections, limitations of structural equation modeling analysis are described, and findings from analysis of the initial and revised structural equation models are presented. Acceptance and rejection of models is discussed based on fit indices that provide statistical values reflective of the fit of the proposed models with the data. The initial structural equation model discussed includes all of the constructs and items that were produced from factor analysis.

The revised model is a revision of the initial model created by making certain changes in parameters suggested by statistical fit indices of the initial model. In addition to the support of statistical findings, theoretical and valid reasons must be provided to support changes in the revised model. These justifications with respect to validity and theory are presented in support of suggested changes.

Another limitation of results from structural equation modeling analysis is that SEM results do not have inherent meaning. The meaning of the statistical results must be supported by concept, theory, and previous research. The application of theory with respects to findings is discussed. The conceptual development of the constructs in the study was also examined with respects to findings.

Cross-sectional data were used to assess relationships meaning the phenomenon was studied taking a cross section of it at one time. Thus data is reflective of observations made at one time. Given that the study was cross sectional in design, findings reflect association rather than causal links between constructs.

3.12.1   Justifications for use of SEM analysis

There were several reasons for choosing SEM analysis rather than regression analysis. One distinct advantage of SEM was that the method of analysis accounts for

variance in the entire model measured. While regression analysis only accounts for the variance in the relationship analyzed. SEM analysis provides explicit estimates of error variance for all variables in the model including possible error in independent variables.

SEM analysis also allowed for modeling multivariate relations and for estimating indirect effects. This statistical feature allowed for examining relationships among all variables in the SEM model. Statistical results were presented based on analysis of the entire model proposed.

SEM allows for estimating the probability that a hypothesized model is representative of a model inferred from data of a population. Research findings resulted in a statistically significant model of contractual project-based work in the context of the residential real estate agent.

SEM was also considered appropriate given that the method of analysis takes a confirmatory (i.e. hypotheses testing) approach to the analysis of a structural theory bearing on some phenomenon. SEM allowed for testing the degree to which multiple theories used in the study explained the work of the contractual project-based worker in a model.

The researcher had access to a large sample size to conduct survey research. SEM was selected given that it was a statistical analysis method that would make use of power provided by a large sample size. In addition, SEM analysis was selected given that it is a credible method of analysis in publications in the information science field.

3.12.2 Confirmatory analysis of measurements

The purpose of the research focused on measurement development as well as descriptives and hypotheses testing. The earlier scale development derived from factor

analysis of the pre-test and a pilot test is discussed in chapter 3. Findings discussed here are confirmatory analysis of final measurement models in the form of confirmatory factor analysis and SEM measurement models.

Conceptual, theoretical, and statistical soundness is assessed for each final index or scale used to measure a construct. Explanations are provided in support of the choices made in confirmatory analysis of the measurement scales of constructs used in the study. Results of survey analysis are presented here for each final measurement model.

In deciding upon further adjustments to scales there were several concerns: (1) the regression coefficient for the measure item as a predictor of the construct. (2) reliability of the items, (3) face validity, (4) factor analysis results, (5) variance accounted for, (6) theoretical justification, and (7) conceptual justification. All scales were developed from literature, a pre-test, and a pilot test.

For each scale, a conceptual description is presented and items used to measure the construct are presented. Then results from SEM analysis of items are presented and discussed indicating the factor loading of each item, as well as the significance, variance accounted for, and effect size. A discussion is also provided describing the final measurement derived.

3.13 Conclusion

This chapter provided a brief summary of survey methodology and discussed the fit between the present research and the survey research method. Survey administration was summarized. The sampling procedure was described. Activities in each of the stages in the research were summarized. Measurement development for the variables used in the study was addressed. The development of measures of personal social network

connectivity and information and communication technology was elaborated upon.

Complications were discussed related to the measurement development of personal social

network connectivity and information and communication technology.

4 Chapter Four: Results

4.1 Introduction

In this chapter, the results from the analysis of data are presented in the following order: (1) summary of results, (2) descriptives, (3) factor analysis of survey data for measurements, (4) initial structural equation model, (5) revised structural equation model with hypotheses, and (6) findings grouped by relationship among variables. Figure 7, below, presents the research model for the study. As illustrated in the figure, two types of personal social network connectivity are measured based on the strength of network ties relative to performance. In addition, the use of ICT and self-monitoring were selected as variables that might have an influence on personal social network connectivity.

The model represents the work of the contractual project-based worker, based on personal social network connectivity and individual differences that influence the level of personal social network connectivity. Hypotheses are framed around two model components: (1) personal social network connectivity and its effect on performance, and (2) individual characteristics and their effect on personal social network connectivity. The following is a brief summary of findings from the study.

- Strong tie personal social network connectivity was a predictor of performance of contractual project-based workers.

- Weak tie personal social network connectivity was not a significant predictor of performance.

- Self-monitoring was a predictor of strong and weak tie personal social network connectivity factors.

Figure 7. Research model: Use of individual characteristics and personal social network connectivity (PSNC) in contractual project-based work.
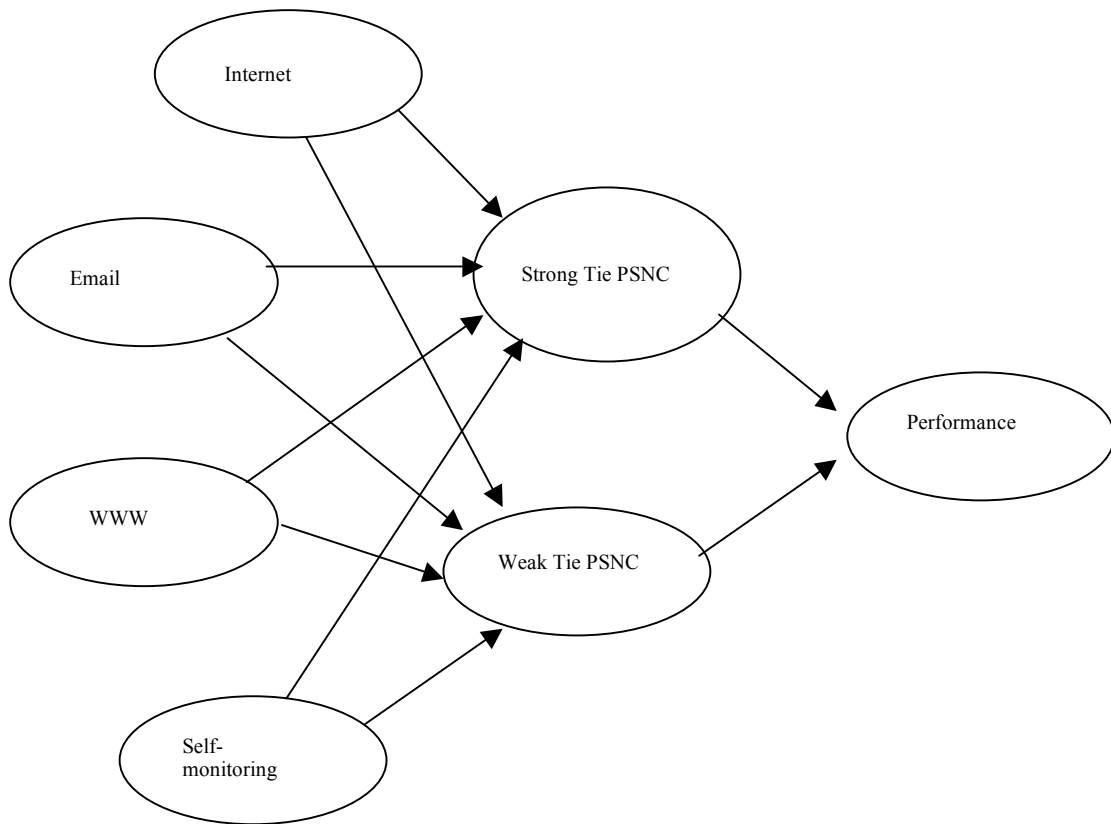
- Self-monitoring was a significant predictor of performance.

- A new factor, the social contact factor, was identified from analysis.

- Internet and website use were both predictors of the social contact factor.

- Website use was the only ICT use variable that was a predictor of performance.

- Internet, website, and email accounted for only small amounts of variance in strong tie and weak tie personal social network connectivity.

- Factor analysis did not support the well-established scale of self-monitoring.

- Due to difficulty in the development of distinct measures for ICT variables, measures of ICT were allowed to covary with one another.

- Due to difficulty in the development of distinct measures of personal social network connectivity relative to strength of tie, measures of personal social network connectivity were allowed to covary with one another.

4.2 Descriptives

Table 14 presents the descriptives for survey respondents. Demographics are presented because they offer a description of the population of the study, residential real estate agents. These demographics and descriptives are also compared with results from a National survey conducted by the National Association of Realtors®.

Results from survey research for the present study indicated that the typical residential real estate agent was a 54-year-old female who had a gross personal income of $35,000-75,000 and had been in the real estate business for 15 years. Roughly 53% of respondents were female and 43% were male.

According to the National Association of Realtors® 2001 member profile, the typical Realtor® was a 52-year-old female who had a gross personal income of $47,700 and was a sales agent who had been in the real estate business for 13 years. Roughly 60% of realtors were female and 40% were male.

Table 15 presents the descriptives for the education level of the respondents. About 75% of the respondents had some level of college education. Over 55% of the respondents held college degrees at some level. Over 17% of respondents held degrees at the graduate level or higher. In the National Association of Realtors® 2001 member profile, 47% of real estate agents had completed some level of college and 25% had completed a bachelors degree.

Table 16 displays the personal income for real estate agents. The income of respondents was fairly evenly distributed, with 36.7% of the respondents earning between $10,000 and $75,000 a year in net personal income. For purposes of comparison, Table 17 presents net personal income from the 2001 National Association of Realtors® Member Profile survey.

The alignment of findings from the NAR member profile with findings for the current research suggest that the sample of this study is representative of residential real estate agents on a national level. Results from the two surveys were roughly comparable for descriptives of salary, gender, age, and level of education.

Table 14

Descriptives for demographics of the sample.

Gender	Male 43.4% Female 53.6% Missing 3.0%				
Age	N 830	Minimum 21.00	Maximum 87.00	Mean 53.3039	Std. Deviation 11.13790
Average yrs worked in real estate	N 803	Minimum 1.0	Maximum 54.0	Mean 15.505	Std. Deviation 10.0717
Average yrs in area	N 790	Minimum 1.0	Maximum 80.0	Mean 26.037	Std. Deviation 16.0677
Education	Education Level	Percent			
	Some High School	.5			
	High School	9.3			
	Some College	33.0			
	Associate's Degree	11.0			
	Bachelor's Degree	24.5			
	Some Graduate School	9.3			
	Master's Degree	8.0			
	Missing	4.6			
	Mean	4.15			
	St. Dev.	1.469			

Table 15

Education level from the 2001 National Association of Realtors® member profile.

Education	
Some High School	1%
High School Graduate	12
Some College / Assoc Degree	47
Bachelor's Degree	25
Graduate Study	7
Graduate Degree and Above	9

Table 16

Net personal income from all real estate activities from survey in present research.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	$5000 or less	54	6.5	7.0	7.0
	$5001-10,000	37	4.5	4.8	11.9
	$10,001-35,000	173	20.8	22.6	34.5
	$35,001-75,000	261	31.4	34.1	68.5
	$75,001-150,000	161	19.4	21.0	89.6
	$150,001-500,00	77	9.3	10.1	99.6
	$500,001-$1 million	3	.4	.4	100.0
	Total	766	92.3	100.0	
Missing	9	19	2.3		
	System	45	5.4		
	Total	64	7.7		
Total		830	100.0		
Mean	3.898				
St. Dev.	1.249				

Table 17

Net personal income from the 2001 National Association of Realtors® member profile.

Gross Income	
Less than $10,000	22%
$10,000 to $24,999	19
$25,000 to $34,999	10
$35,000 to $49,999	13
$50,000 to $74, 999	13
$75,000 to $99,000	8
$100,000 to $149,999	8
$150,000 to $249,999	4
$250,000 or more	3
Median Gross Income	$34,100

ICT Descriptives.

The ICT variables central to this study were measured on a continuous scale.

However, categorical descriptive questions about ICT use were also included in the study

in order to learn more about ICT use and to complement the findings of the ICT variables

measured on a continuous scale. Variables of World Wide Web features, World Wide Web presence, and marketing were measured as categorical variables. These results provide a description of the ICT use of residential real estate agents. Table 18, below, displays results from survey questions 6, 9, and 10 that describe features of the Internet that real estate agents used in their work. For Q9 and Q10, over 30% of responses were missing for each question about web presence and marketing. Given this large number of missing responses, the degree to which findings are representative of the sample is questionable.

Table 19 presents results from the 2001 NAR® Member Profile, which measured ICT in a similar way. As with the demographic variables, the ICT variables are compared with findings from 2001 National Association of Realtors® Member Profile.

In terms of WWW features used in real estate work, more than 70% of real estate agents used Internet sites with sales information, with state or local government information, and to access MLS listings through the World Wide Web. More than half of the real estate agents used the Internet to access search engines, community data, portals, and Realtor.com™ . Over 90% of residential real estate agents used the Web to access MLS listings. In terms of frequency of email use, Table 20 presents the number of email messages received daily by real estate agents. Over 80% of real estate agents received 20 or fewer email messages a day.

According to the 2001 National Association of Realtors® Member Profile: (1) more than three fourths of realtors use email and the Internet for business, (2) four out of ten realtors have a WEBSITE page for business purposes, (3) 87% percent of realtors who specialized in residential real estate have their listings on at least one web site, (4)

76% of real estate agents used email for business, (5) 88% of sales agent's companies had

a web page, (6) 40% of realtors had home pages for business use, and (7) 20% planned to

have home pages for business use in the future.

Table 18

Descriptives for World Wide Web use.

World Wide		% Use	% Don't use	% Missing
Web Features	Search engines.	63.6	32.5	3.9
(q6)	Internet site with community data.	63.6	31.7	4.7
	Portals.	53	41.7	5.3
	On–line real estate calculators.	22	73.5	4.5
	Internet site with sales information.	72.7	24.1	3.3
	Internet site to file closing paperwork.	10.7	84.5	4.8
	Chat rooms or bulletin boards.	4.1	90.2	5.7
	Registration for licensing on Internet site.	31.6	62.7	5.8
	Internet site with real estate coursework.	33	61.6	5.4
	REALTOR.com®.	65.9	29.2	4.9
	Internet site with state or local government information.	74.3	29.2	4.9
	Web access to MLS listings.	90.7	5.4	3.9
World Wide		% Use	% Don't use	% Missing
Web	Don't have web presence.	24	-	75.7
Marketing	Your own personal site.	38.6	19.6	41.8
(q9)	REALTOR.com®.	50.2	12.7	37.1
	Your company's site.	60	6.5	33.5
	Local newspaper site.	19.6	35.5	44.8
	Local REALTOR® Association Site.	38.9	21.6	39.5
	Homeadvisor.	5.7	44.3	50
	Your franchise's site.	24.7	30.8	44.5
	Local real estate magazine site.	33.9	66.1	45.3
	Local community site.	10.8	40.8	48.3
	Other 3rd party site.	32.3	67.7	48.2
World Wide		% Yes	% No	% Missing
Web	Have own page on company Internet site.	47.6	23	29.3
Marketing	Provide list of links on			
(q10)	my Internet site.	43.9	23.4	32.7
	Have own Internet site with			

	42.4	26	31.4
listings information.			
Provide virtual tours or			
walk-throughs on my			
Internet site.	30.4	36.3	33.3
Have own domain name.	40.2	27.1	32.5

Table 19

ICT features from the 2001 National Association of Realtors® Member Profile.

Web sites where Realtors place their listings.	
Realtor.com	65%
HomeAdvisor	5
HomeSeekers	10
Agent's Web Site	22
Company's Web Site	66
Franchise's Web Site	18
Local Newspaper Website	14
Local Real Estate Magazine Web Site	16
Other	10

Table 20

Number of email messages received in a day.

		Frequency	Percent
1	1-10 messages	21	62.65
2	11-20 messages	154	18.55
3	21-30 messages	46	5.54
4	31-40 messages	25	3.01
5	No messages	21	2.53
6	41-50 messages	10	1.20
7	80 or more messages	8	0.96
8	51-79 messages	4	0.48
	Total	788	94.94
	Missing	42	5.06
	Total	830	100
	Mean 2.52		
	Std. Deviation 1.08		

4.3 Scale creation and factor analysis

The sections below present the findings from factor and reliability analysis of the final survey data. The factor analysis presented in chapter three was factor analysis from the pilot survey. For each construct, items used to measure the construct are presented. Then results from factor analysis of items are presented and discussed. The Eigen values and the Cronbach's Alpha are also provided for each factor.

Factor analysis was selected as opposed to confirmatory structural equation analysis to reduce the items to factors. The reason for this decision was the complexity of conducting both an initial structural equation analysis and revised analysis for each construct, which would entail the creation and revision of seven different structural equation models, fourteen SEM models in total. Additionally, applying structural equation modeling analysis to each measure of individual factors was not possible, given the degrees of freedom required to identify the models. For many of the constructs, there were too few indicators to identify the model in order to conduct the confirmatory structural equation analysis of the measurements.

4.4 Personal social network connectivity scales

In this section I describe factor analysis for scale creation of personal social network connectivity relative to strength of tie. Below, Table 21 presents the items used to measure the constructs of strong and weak tie personal social network connectivity. These items were derived from research and theory on social networks, social capital, descriptions of the work of the contractual project-based worker and the pre-test and pilot test iterations. Items were designed to measure the perceived level of personal social network connectivity possessed by residential real estate agents relative to strength of tie.

Table 21

Items for strong tie and weak tie personal social network connectivity.

Measures for weak tie personal social network connectivity.	
q27r1	Wherever I go, I meet somebody I know.
q27r2	I seek opportunities to meet people.
q27r3	I am always looking to add names to my contact list.
q27r4	I am in frequent contact with people on my contact list.
q27r5	I have lots of friends.
q27r6	I have many opportunities to meet new people.
q27r7	I am constantly meeting new people.
Measures for strong tie personal social network connectivity.	
q27r8	Other professionals want to work with me.
q27r9	Other real estate professionals (mortgage officers, lawyers, etc.) seek me out for advice.
q27r10	Most of my real estate colleagues perceive me as a leader on professional topics and issues.
q27r11	I've developed enough professional contacts to excel in my job.
q27r12	I've developed enough professional contacts so that I usually know most of the participants at a closing (lawyers, etc.).
q27r13	I have worked with the same professionals for many years now.

4.4.1 Social Contact Factor

Cross loading between items measuring strong and weak tie personal social network connectivity and the existence of a third factor, named social contact, suggest difficulty in creating distinct measures for strong tie personal social network connectivity and weak tie personal social network connectivity. As result of factor analysis of strength of tie items, a third factor was identified that represents the behavioral activity of the residential real estate agent in developing contact lists. This factor was named the social contact factor. These questions were initially framed as indicators of weak tie personal social network connectivity; however, factor analysis in Table 22 suggests that these items comprise a construct that is distinctly different from both strong tie and weak tie personal social network connectivity even though the factor did cross-load slightly with

strong tie personal social network connectivity and more strongly with weak tie personal social network connectivity. The decision was made to include this emergent factor in the structural equation model for analysis given that it had an impact on the explanatory power of the full model, and there was statistical and theoretical support for a factor representing personal social contacts. Reliability analysis of items for the third factor for personal social network connectivity, social contact, represented by q27r2, 3, 4 resulted in an Cronbach's alpha of .823.

The social contact factor was not originally hypothesized. However, several justifications are provided for retaining the social contact factor: (1) data analysis indicated a distinct factor of personal social network connectivity, (2) the social contact factor had face validity in terms of the items that factored together, (3) anecdotal evidence of contractual project-based work and the use of personal social networks suggests that measuring social network connectivity relative to specific behavior of the contractual project-based worker could be beneficial.

Both factor analysis and SEM analysis of data indicated that the social contact factor factored as a separate factor. Data analysis indicated a factor that was distinctly different from strong and weak tie personal social network connectivity. Face validity suggested that the social contact factor was valuable to retain as it suggested the importance of categorizing social connectivity relative to the type of behavior exhibited in addition to strength of tie. Qualitative field research on the work of real estate agents suggested that studying the behavior of developing social contact factors would be valuable.

Another consideration with respects to retaining the social contact factor was empirical fit of the model with the data. Without the inclusion of all three factors to represent personal social network connectivity, strong and weak ties and the social contact factor, the fit of the SEM model was unacceptable. It is noted that one should not make decisions based on model fit alone when deciding on retaining or omitting a factor. However, given the multiple reasons for inclusion of the social contact factor, there was support for retaining the social contact factor as a measure of personal social network connectivity.

In Table 22 below, all items measuring personal social network connectivity were factored together to assess cross loading between the items representing the factors of strong tie personal social network connectivity and weak tie personal social network connectivity. This served as a way of assessing discriminant validity for the two measures of personal social network connectivity relative to strength of tie. Factor analysis indicated that items representing the factors of strong tie and weak tie personal social network connectivity were cross-loaded with one another.

From an examination of Table 22, it is clear that factor 1 and factor 2, strong tie and weak tie personal social network connectivity, are related to one another. The results also present a third factor identified, which was labeled the social contact factor. This third factor was named the social contact factor given that question items clearly referred to the creation and development of contacts. The percentages of variance in Table 22 refer to the amount of variance each factor accounted for in the measure representing all items for personal social network connectivity.

Table 22 also indicates that three items were cross-loaded (above the .30 level) with items representing different factors. An item for strong tie personal social network connectivity, Q27R8: Other professionals want to work with me, was cross-loaded with items representing the social contact factor. An item for weak tie personal social network connectivity, Q27R7 - I am constantly meeting new people, was cross-loaded with items representing the social contact factor.

Table 22

Factor analysis for strong and weak tie personal social network connectivity.

	Strong Tie Personal Social Network Connectivity.	Weak Tie Personal Social Network Connectivity	Social Contact Factor
Eigenvalues	6.264	1.776	1.028
% of Variance	48.14 %	13.66%	7.90%
Q27R9	**.814**		.245
Q27R10	**.805**		.286
Q27R12	**.790**	.285	
Q27R11	**.788**	.270	
Q27R13	**.737**	.254	
Q27R8	**.628**	.251	.303
Q27R6	.228	**.835**	.288
Q27R7	.200	**.804**	.346
Q27R5	.224	**.740**	
Q27R1	.387	**.620**	
Q27R3			**.870**
Q27R4		.208	**.795**
Q27R2		.407	**.694**

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 5 iterations. Values below .20 are suppressed.

An item for weak tie personal social network connectivity, Q27R1 -Wherever I go, I meet somebody I know, was cross-loaded with items representing the strong tie personal social network connectivity factor. An item for the social contact factor, Q27R2

- I seek opportunities to meet people, was cross-loaded with items representing the weak tie personal social network connectivity factor.

Measurement development was a challenge given that both strong tie and weak tie personal social network connectivity measure a common higher-level construct of social network connectivity. There was no theoretical justification to warrant collapsing the scale. Much of the theory supporting the present study was based on the distinction among the strength of ties in terms of personal social network connectivity. For this reason it was important that a distinction between strength of ties could be made. The manner in which this cross loading was addressed is discussed further for each factor in the sections below.

Although they were slightly cross-loaded with items for weak tie personal social network connectivity, all of the initial items measuring strong tie personal social network connectivity were retained for the initial structural equation model. Reliability analysis for strong tie personal social network connectivity, q27r8-q27r13, was acceptable with an Cronbach's Alpha of .890.

As indicated in Table 22, weak tie personal social network was measured using four items, q27r1,5,6,7. As factor analysis in Table 22 indicates, items q27r2, 3, 4 factored out into a distinct factor separate from the factors of strong tie personal social network connectivity and weak tie personal social network connectivity. For this reason, the measure of weak tie personal social network connectivity was shortened to a four item measure. Reliability for the four-item weak tie personal social network connectivity construct, 27r1, 5, 6, 7 was acceptable with an Cronbach's Alpha of .851.

4.5 Information and communication technology scale

Measurement development for ICT was discussed in Chapter 3. Table 23 presents the items used to measure ICT use. Items measuring different types of ICT use shared variance with one another. Factor analysis in Table 24 indicates that items for email and Internet use factored into one factor. In Appendix G, Table 8, the correlation between Q3r1 and Q3r4 was .608. The correlation between Q4r1 and Q4r4 was .588.

The factor representing Internet and email was also slightly cross-loaded with the factor representing website use. To some degree this was expected, as the technologies overlap with one another in terms of their use and one type of ICT is often used to access other types of ICT. For example, the Internet is used to access email. The Internet is used to access websites. Websites are often used to access email.

Cell phone factored into a separate factor. However, the decision was made not to include the cell phone factor given that the distribution of data for this variable exhibited little variation. Essentially, all real estate agents were heavy users of their cell phones.

Factor analysis suggests that q3r1, q3r4, q4r1, q4r4 factor as a single factor. However, combining the ICT measures into a single factor results in a lack of distinction among different types of ICT. Findings then cannot be stated relative to distinctive types of ICT. Email and Internet were separated into two factors in order to support a good fit in the overall structural equation model. As discussed previously, difficulties with measurement development made it difficult to distinguish between multiple types of ICT. In this case, the decision to favor model fit over the factor analysis was necessary to ensure the interpretation of results. Ultimately, this decision reflected a give and take among theory, method, data, and model.

In addition, the model fit of the structural equation model was greatly enhanced when Internet and email were retained as separate measures. The distinction between Internet and email is explained further in chapter 5. Establishing measurements for ICT were difficult. A decision was made to use measurements of general categories of ICT use given the difficulty of developing measures that represented more detailed use of ICT while allowing for analysis using inferential statistics. The straightforward and simplistic measures of ICT in the form of website, ICT, and Internet limits the interpretation of findings in the study. However, other attempts were made to develop measures of ICT that were reflective of more detailed technology use. As discussed previously, these measures either had high levels of missing values or did not allow for the creation of continuous scales. Collapsing the ICT measures into one measure of ICT was considered; however, there were two drawbacks: (1) loss of the ability to distinguish between the ICT in the data and results, and (2) poor fit of the structural equation model yielding a structural equation model that would not be interpretable. ICT was also measured more specifically using descriptives.

Table 23

Survey questions for ICT use.

q3r1	Frequency of email use
q3r2	Frequency of cell phone use
q3r3	Frequency of your own website use
q3r4	Frequency of Internet use
q4r1	Dependence on email use
q4r2	Dependence on cell phone use
q4r3	Dependence on own website use
q4r4	Dependence on Internet use

Table 24

Rotated component matrix for ICT use variables.

	Factor 1	Factor 2	Factor 3
Eigenvalues	3.708	1.490	1.123
% of Variance	46.351%	18.627%	14.038%
Q3R4	**0.833**		
Q3R1	**0.803**		
Q4R4	**0.779**		
Q4R1	**0.777**	.271	
Q4R3	0.239	**0.915**	
Q3R3	0.233	**0.911**	
Q4R2			**0.929**
Q3R2			**0.925**

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser

Normalization. Rotation converged in 6 iterations. Absolute values less than .20 suppressed.

4.6 Self-monitoring scale

Results of factor analysis for the self-monitoring scale did not reflect the expected

reliability for such a well-established scale. Many items on the self-monitoring scale

either cross-loaded on other items or exhibited weak factor loadings. For 14 of the 18

items, factor loadings were cross-loaded with minimal amounts of variance accounted

for. Four of the 18 measurement items accounted for most of the variance.

Several items for self-monitoring had acceptable factor loadings, yet the factors

they were a part of accounted for only small amounts of variance. Q28r1,5,6,8,10,12

were the strongest indicators of the factor accounting for the largest amount of variance

representing the self-monitoring construct. Table 25, below, presents the items for the full

scale for self-monitoring included in the final survey. As factor analysis indicates in

Table 28, most of the items accounted for very little variance. Items also factored into 5

different factors. Q28r1,5,6,8,10,12 factored into a single factor accounting for 18.9 % of the variance with a slight cross loading with items in factor 2.

As presented in Table 26, four other factors emerged from factor analysis of the self-monitoring scale. Given the small number of indicators for each factor and the low variance accounted for by the factors, a decision was made not to include the remaining four factors in the final structural equation analysis. Each of the remaining four factors only had two indicators that exhibited factor loadings high enough to represent each factor. The percentages of variance in Table 26 refer to the amount of variance each factor accounted for in the measure representing all items for self-monitoring.

Factor analysis suggests a reduced factor to represent self-monitoring. This factor includes Q28r1, 5, 6, 8, 10, 12. These items suggest a single factor to measure self-monitoring that includes 12 less items than the full 18 item pre-established scale. See Table 27 for a listing of the items measuring self-monitoring to be included in the structural equation analysis. The Alpha for self-monitoring, q28r1, 5, 6, 8, 10, 12, was .746.

Table 25

Survey questions for self-monitoring.

q28r1	I would probably make a good actor.
q28r2r	I find it hard to imitate the behavior of other people.
q28r3r	At parties and social gatherings, I do not attempt to do or say things that others will like.
q28r4r	I can only argue for ideas that I already believe.
q28r5	I can make impromptu speeches even on topics about which I have almost no information.
q28r6	I guess I put on a show to impress or entertain people.
q28r7r	In a group of people I am rarely the center of attention.
q28r8	In different situations and with different people, I often act like very different people.
q28r9r	I am not particularly good at making other people like me.

q28r10	I'm not always the person I appear to be.
q28r11r	I would not change my opinions (or the way I do things) in order to please someone else or win their favor.
q28r12	I have considered being an entertainer.
q28r13r	I have never been good at charades or improvisational acting.
q28r14r	I have trouble changing my behavior to suit different people and different situations.
q28r15r	At a party I let others keep the jokes and stories going.
q28r16r	I feel a bit awkward in company and do not show up quite so well as I should.
q28r17	I can look anyone in the eye and tell a lie with a straight face (if for a good end).
q28r18	I may deceive people by being friendly when I really dislike them.

Table 26

Rotated component matrix for self-monitoring scale items.

	Component				
Variance Accounted For	18.98%	12.46%	7.83%	5.91%	5.61%
Eigen value	3.417	2.244	1.409	1.065	1.011
	1	2	3	4	5
Q28R1	**.648**	.315			
Q28R2R				.478	
Q28R3R				.627	.328
Q28R4R				.594	
Q28R5	**.667**				
Q28R6	**.747**				
Q28R7R	.124	.643			
Q28R8	**.552**	-.329	.393	.215	
Q28R9R					.812
Q28R10	**.517**	-.269	.358		-.231
Q28R11R	-.208	.255		.527	
Q28R12	**.679**	.202			
Q28R13R		.379		.206	
Q28R14R		.258	.283	.388	.433
Q28R15R		.675			
Q28R16R		.435			.589
Q28R17			.745		
Q28R18			.798		

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Values less than .20 are suppressed. Rotation converged in 6 iterations.

Table 27

Items selected to represent the self-monitoring scale.

q28r1	I would probably make a good actor.
q28r5	I can make impromptu speeches even on topics about which I have almost no information.
q28r6	I guess I put on a show to impress or entertain people.
q28r8	In different situations and with different people, I often act like very different people.
q28r10	I'm not always the person I appear to be.
q28r12	I have considered being an entertainer.

4.7 Initial structural equation model

In this section, I present results from analysis of the initial structural equation model informed by the factor analysis discussed above. In the next section, I make adjustments to improve the fit of the model taking into consideration issues of theory, method, model and data.

Fit indices, which are key components in the analysis of an initial structural model, are statistics that enable interpretation of the degree to which the proposed model fits the data. Areas where adjustments might be made in order to achieve a more acceptable model fit are explored. However, adjustments are not made to the model unless they can be defended conceptually and theoretically.

Figure 8, below, presents the initial structural equation model derived from the proposed hypotheses and refined measurement scales. See Appendix H for full statistical results from analysis of this model, including means, standard deviations, correlations, and covariance matrices. Appendix F presents a detailed description of interpreting structural equation model fit indices.

Table 28 presents structural equation analysis results of the initial model. The x/df value suggests the degree to which the model fits, controlling for the bias of large sample sizes. The x/df statistic was 9.18, well above the recommended upper limit of 3.0 and above the upper limit of 5 that is allowed for a liberal fit of the model. In other words, the initial structural equation model did not adequately fit the data.

Figure 8. Initial structural equation showing measurement items.
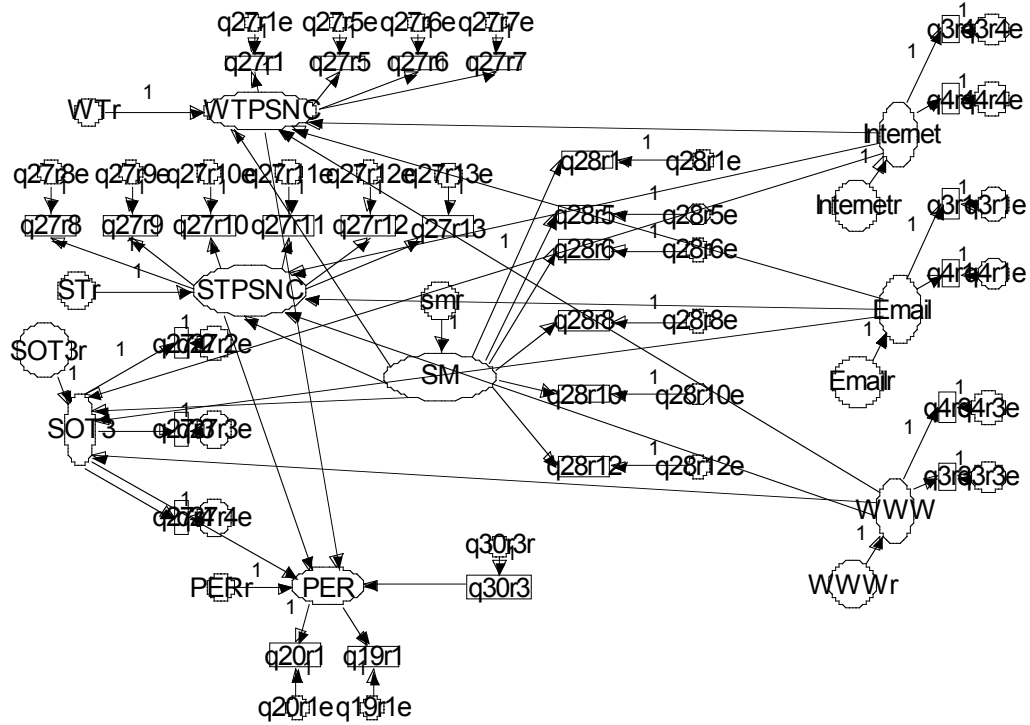
Table 28

Initial structural equation model.

	Initial Model	Desired Levels
x2	3078.423	smaller
df	335	-
x/df	9.189	<3.0 conservative fit <5.0 for a liberal fit
Probability	.0000	> 0.000
GFI	.781	> .9
AGFI	.734	> .8
RMSEA	.099	.05-.08
NFI	.753	>.90
CFI	.773	>.90

As indicated in Table 28, fit indices for the initial structural equation model were unacceptable. In order to achieve a better fit of the model, relationships between variables were examined. Consideration was given to the theoretical and conceptual justification when deciding whether or not to allow co-variation in the revised structural equation model, to collapse multiple factors into one factor, or to remove items form the model. The next section describes the revision of the initial model.

4.8 Revised structural equation model

In SEM model revision, the researcher makes decisions about the fit of the model. Decisions might be made to drop items from the model, collapse items together, or to leave items as they stand. In addition to model fit statistics, adjustments or changes to the model must be supported or justified on the levels of concept, theory, data, and method.

In model generating, the researcher proceeds to modify and re-estimate the model. The re-specification of the model is both theory and data driven. The goal is to find a model that is meaningful and that fits the data well. The M.I. index is a statistic for assessing where the model might best be revised specific to certain variables.

In my research, in order to determine areas where adjustments might be made to achieve better model fit, the modification indices were examined. See Appendix F for an explanation of modification indices and the interpretation of these indices. Discrepancies in model fit for each dimension were isolated and identified using the M. I. Statistic. This piece-wise model fitting approach helps to identify the part of the model with poor fit.

The modification indices (M.I.) indicate where allowing certain variables to covary would result in a better model fit. If the suggested modifications could be justified, the variables were allowed to covary. The goal with respect to revising the

structural equation model was to locate the source of misfit and explain why that misfit occurs relative to the hypothesized model.

Due to psychometric characteristics of measures in my research, there were difficulties in achieving good model fit. In model revision, the trade-off between having a greater number of indicators for each measure was not as important as achieving a good model fit. Limiting the number of indicators was necessary to ensure interpretable results. This limitation was accepted for two reasons: (1) the measures were fairly straightforward, and (2) retaining a larger number of measures for each measure heavily impacted the fit of the model. In other words, a measure with multi-faceted items is of little value if the overall model of which the measure is a part is not interpretable. It was necessary to allow for covariation among residuals in the revised structural equation model in order to achieve a liberal fit with the data.

My choices, in terms of dealing with the model fit of personal social connectivity factors, was threefold: (1) collapse the measures into one construct, (2) remove the factors from the analysis, or (3) allow covariation among the factors. Collapsing the two factors for personal social network connectivity into one factor no longer allowed for differentiation among different types of ICT in findings. Considering the two factors as one factor representing social network connectivity also resulted in poorer model fit than when the factors were kept separate and allowed to covary.

Tenure was removed from the revised structural equation model due to its high correlation with two measures of strong tie personal social network connectivity, q27r12: I've developed enough professional contacts so that I usually know most of the participants at a closing (lawyers, etc.), and q27r13: I have worked with the same

professionals for many years now. Table 29 presents the change made, the diagnostic

used to inform the change, and the rationale supporting the change.

Table 29

Removal of tenure.

Item	Change	Diagnostic	Rationale
Tenure Q30r3	Removed from SEM model	Highly correlated with Q27r13 and Q27r12. The M.I. value was 83.11.	Contributed to poor model fit. Q30r3 and Q27r13 shared face-validity.

The correlation between q30r3 and q27r13 resulted in poor model fit. In addition,

the face validity of q30r3 and q27r13 was similar. It made conceptual sense that if a

person has worked for a long time as a real estate agent in their area, then their strong tie

personal social network is more likely to be further developed, and vice versa.

Q20r1, net personal income, was removed as an indicator of performance.

Structural equation model fit in terms of CMIN/df statistic was worse by .50 if q20 was

used instead of q19 as a single item measuring performance. Table 30 presents details for

the removal of q20r1. Table 31 presents the descriptives and correlations for Q19r1and

Q20r1.

Table 30

Removal of q20r1.

Item	Change	Diagnostic	Rationale
Q20r1	Removed from SEM model	Standard error for the variance for performance as a multi-dimensional construct was 3.776. Standard error for most items was below 1.0.	Inclusion of both Q20r1 and Q19r1 greatly affected model fit. Q20r1 and 2019r1 were considered to be redundant as they were highly correlated with one another.

Table 31

Descriptives for performance items: Q19r1 and Q20r1.

	Mean	St. Dev.	Correlation
Q19r1	4.14	3.4	.80
Q20r1	3.89	1.30	.80

Q27r13, a measure for strong tie personal social capital, was removed. As discussed earlier, there was some cross loading between items representing the factors of strong tie and weak tie items. Q27r13 was removed given that the item cross-loaded with items representing two other distinct constructs in the structural equation model. Table 32 presents details of the removal of q27r13.

Table 32

Removal of q27r13.

Item	Change	Diagnostic	Rationale
Q27r13	Removed from SEM model	Q27r13 cross-loaded heavily with q27r1, a measure for weak tie personal social network connectivity. Q27r13 correlated highly with tenure, q30r3.	Produced cross loading between strong tie and weak tie items. Redundant item with measure of strong tie personal social network connectivity.

Item q27r10 measuring strong tie personal social network connectivity was removed. Correlation between q27r10 and q27r9 was .590. See Appendix G, Tables 6-7. The decision to remove q27r10 was a case of the empirical findings warranting a correction at the level of the construct. Removal of q27r10 reduced the number of items for the strong tie personal social connectivity measure, but contributed to a better fit of the overall structural equation model. Table 33 presents details of the removal of q27r10.

Table 33

Removal of q27r10.

Item	Change	Diagnostic	Rationale
q27r10	Removed from SEM model	Q27r10 highly correlated with q27r9. Cross-loaded with social contact factor	Contributed to better fit of the overall model. Redundant with q27r9.

Q27r1, a measure of weak tie personal social network connectivity was removed because the item was cross-loaded with strong tie personal social network connectivity. In addition, the item was considered to be redundant in measuring weak tie personal social network connectivity. Table 34 presents details of the removal of q27r1.

Table 34

Removal of q27r1.

Item	Change	Diagnostic	Rationale
Q27r1	Removed from SEM model	Item cross-loaded with strong tie personal social network connectivity.	Redundant with other measures of weak tie personal social network connectivity.

4.9 Results from SEM analysis for final measurement models

This section presents SEM statistics for final measures. Table 35 indicates the findings from structural equation analysis for the strong tie personal social network connectivity measure. Statistics in the table include (1) the regression coefficient for each item as a predictor of the overall measure, (2) the critical ratio, which is an indicator of statistical significance of the item in structural equation modeling (>1.96 is significant),

and (3) the squared multiple correlations which are indicators of the amount of variance predicted by the item for the overall measurement. Table 36 presents the survey items for the measure of strong tie personal social network connectivity.

Table 35

Structural equation modeling analysis for strong tie personal social network connectivity items.

	Standardized Regression	Critical Ratio	Squared Multiple Correlations
q27r9 <----------- strong tie	0.741	22.636	0.549
q27r12 <---------- strong tie	0.801	24.605	0.641
q27r11 <---------- strong tie	0.856	22.636	0.733

Table 36

Questions for strong tie personal social network connectivity.

q27r9	Other real estate professionals (mortgage officers, lawyers, etc.) seek me out for advice
q27r12	I've developed enough professional contacts so that I usually know most of the participants at a closing (lawyers, etc.)
q27r11	I've developed enough professional contacts to excel in my job

Table 37, below, presents structural equation model analysis results for the items used for weak tie personal social network connectivity. Table 38 presents the survey items for the measure of weak tie personal social network connectivity.

Table 37

Weak tie personal social network connectivity.

	Standardized Regression	Critical Ratio	Squared Multiple Correlations
q27r5 <----------- weak tie	0.639	21.644	0.408
q27r6 <---------- weak tie	0.943	21.644	0.889
q27r7 <---------- weak tie	0.920	21.503	0.846

Table 38

Questions for weak tie personal social network connectivity.

q27r5	I have lots of friends.
q27r6	I have many opportunities to meet new people.
q27r7	I am constantly meeting new people.

Table 39, below, presents structural equation model analysis results for the items used for

the social contact factor of personal social network connectivity. The social contact factor

was identified in earlier factor analysis and was discussed in further detail in Chapter 4.

The social contact factor was related to the weak tie personal social network connectivity

factor. Table 40, below, lists the items that comprised the newly identified social contact

factor for personal social network connectivity.

Table 39

Social contact factor for personal social network connectivity.

	Standardized Regression	Critical Ratio	Squared Multiple Correlations
q27r2 <-----------SOT	0.753	20.66	.567
q27r3 <---------- SOT	0.846	22.24	.716
q27r4 <---------- SOT	0.760	20.66	.578

Table 40

Questions representing the emergent social contact factor.

q27r2	I seek opportunities to meet people.
q27r3	I am always looking to add names to my contact list.
q27r4	I am in frequent contact with people on my contact list.

The ICT measures for Internet, email, and website were correlated with one another, and M.I. indicators in the structural equation analysis indicated that allowing for covariation contributed to a substantially better fit in the overall model. (See Appendix G, Table 8 for correlation table of ICT items.) Conceptually, allowing covariation among the residuals for the three types of ICT was partly justified given that each of the technologies is often used in order to access the other. As described previously, Internet is accessed in order to access email, and many users access email through the use of the website. The items represent a larger level construct of Internet information and communication technologies. Initial factor analysis also suggests the factors share covariance. Table 41, below, presents structural equation model analysis results for the items used for ICT use. Table 42, below, presents the individual items used to measure ICT use.

Table 41

Structural equation modeling analysis results for Internet, email, and website.

ICT Use	Standardized Regression	Critical Ratio	Squared Multiple Correlation
q3r4 <------- Internet	0.834	21.283	0.695
q4r4 <------- Internet	0.800	21.283	0.640
q3r1 <------- Email	0.796	22.316	0.634
q4r1 <-------Email	0.858	22.316	0.737
q3r3 <------- website	0.867	21.821	0.752
q4r3 <------- website	0.916	21.821	0.839

Table 42

Survey questions for ICT use.

q3r1	Frequency of email use
q3r2	Frequency of cell phone use
q3r3	Frequency of your own website use
q3r4	Frequency of Internet use
q4r1	Dependence on email use
q4r2	Dependence on cell phone use
q4r3	Dependence on own website use
q4r4	Dependence on Internet use

Table 43, below, presents structural equation model analysis results for the items used to

measure self-monitoring. Table 44 presents the items used to measure self-monitoring.

Table 43

Structural equation modeling analysis results for self-monitoring scale items.

	Standardized Regression	Critical Ratio	Squared Multiple Correlations
q28r6 <----------- SM	0.877	9.181	0.769
q28r5 <----------- SM	0.593	9.181	0.352
q28r8 <----------- SM	0.435	10.230	0.190

Table 44

Survey questions for self-monitoring.

q28r6	I guess I put on a show to impress or entertain people.
q28r5	I can make impromptu speeches even on topics about which I have almost no information.
q28r8	In different situations and with different people, I often act like very different people.

Problems with measurement development created an increase in measurement

error that heavily impacted covariance in the structural equation model. The covariance

among ICT factors and among personal social network connectivity factors affects the reporting of findings. Regression analysis presupposes independent variables. Allowing covariation of variables in the structural equation model suggests that the variables are not independent of one another. For this reason, when regression results are mentioned, the reader is reminded of the allowed covariation among variables.

The M.I. index indicated that an improvement in model fit could be achieved by allowing co-variation between strong tie personal social network connectivity, weak tie personal social network connectivity, and the social contact factor for personal social network connectivity. This was also confirmed by factor analysis results presented earlier in this chapter. Given that the three measures are measures of a higher-level construct of personal social network connectivity, it is arguable that they share covariance.

Table 45 below presents the reliability and overall variance extracted for each factor. Table 46 presents the correlations among factors.

Table 45

Reliability and variance extracted for dimensions.

Dimension	# items	Composite Reliability	Variance Extracted	Eigenvalue	N
SCF	3	.823	74.000	2.220	830
ST	3	.837	75.708	2.271	830
WT	3	.862	79.003	2.370	830
SM	3	.644	59.052	1.772	830
WEBSITE	2	.884	89.715	1.794	830
Internet	2	.800	83.354	1.667	830
Email	2	.8116	84.159	1.683	830

Table 46

Correlations among factors.

	PER	SCF	ST	WT	WEBSITE	INTER	EMAIL	SM
PER	1							
SCF	0.125*	1						
ST	0.478*	0.456*	1					
WT	0.196*	0.633*	0.552*	1				
WEBSITE	0.249*	0.272*	0.197*	0.146	1			
INTER	0.053	0.312*	0.191*	0.147	0.470*	1		
EMAIL	0.156*	0.306*	0.223*	0.205*	0.523*	0.788*	1	
SM	0.112*	0.182*	0.109*	0.130*	0.007	0.038	0.083	1

* Test statistic is the critical ratio (c.r.). Values $>\pm$ 1.96 indicate significance at the .05 level.

4.10 Revised structural equation model results

Figure 9, below, presents the revised structural equation model. The variables that were allowed to covary are graphically depicted in the figure by the use of lines with double arrows. See Appendix I for full statistical results from analysis of this model.

Table 47 presents the model fit indices for the revised model. Also included for comparison are the fit indices for the initial model. (Hair, Anderson, Tatham, and Black, 1998) state that appropriate values for the normed X^2 should exceed one and should be less than three in a conservative test, or less than five in a more liberal test. The 4.96 value for x/df is above the suggested value for a conservative test, 3.0, but below the suggested value for liberal test, 5.0. A conservative level of fit was not achieved for the model. Published research on structural equation modeling analysis often does not apply the strict interpretation of the x2/df test.

Figure 10 presents the overall findings from the analysis of the revised structural equation modeling in a graphic format. Dashed lines represent relationships that are not

significant. In the following sections, I discuss hypotheses and statistical results of

structural equation modeling analysis for relationships among variables.

Figure 9. Revised structural equation model.
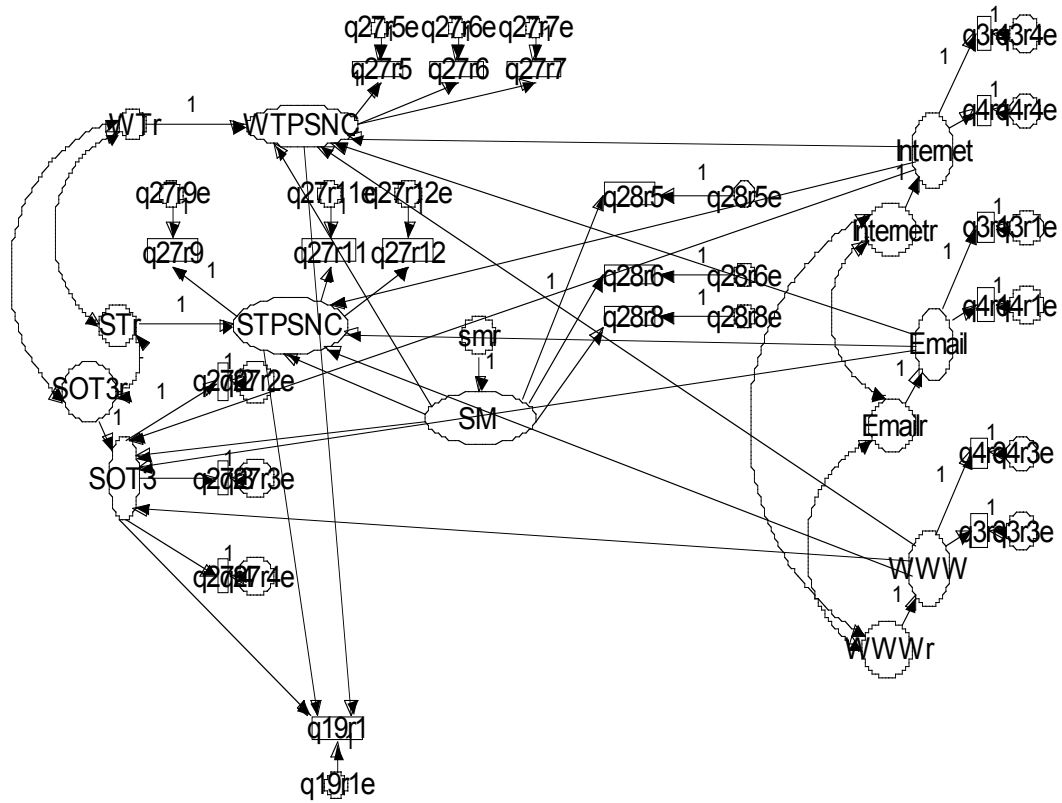
Table 47

Revised structural equation model.

	Initial Model	Revised Model	Desired Levels
x2	3078.42	610.36	smaller
df	335	128	-
x/df	9.18	4.768	<3.0 conservative fit, <5.0 for a liberal fit
Probability	.0000	.0000	> 0.000
GFI	.78	.926	> .9
AGFI	.73	.890	> .8
RMSEA	.09	.067	.05-.08
NFI	.75	.923	>.90
CFI	.77	.938	>.90

Figure 10. Findings for revised structural equation model.
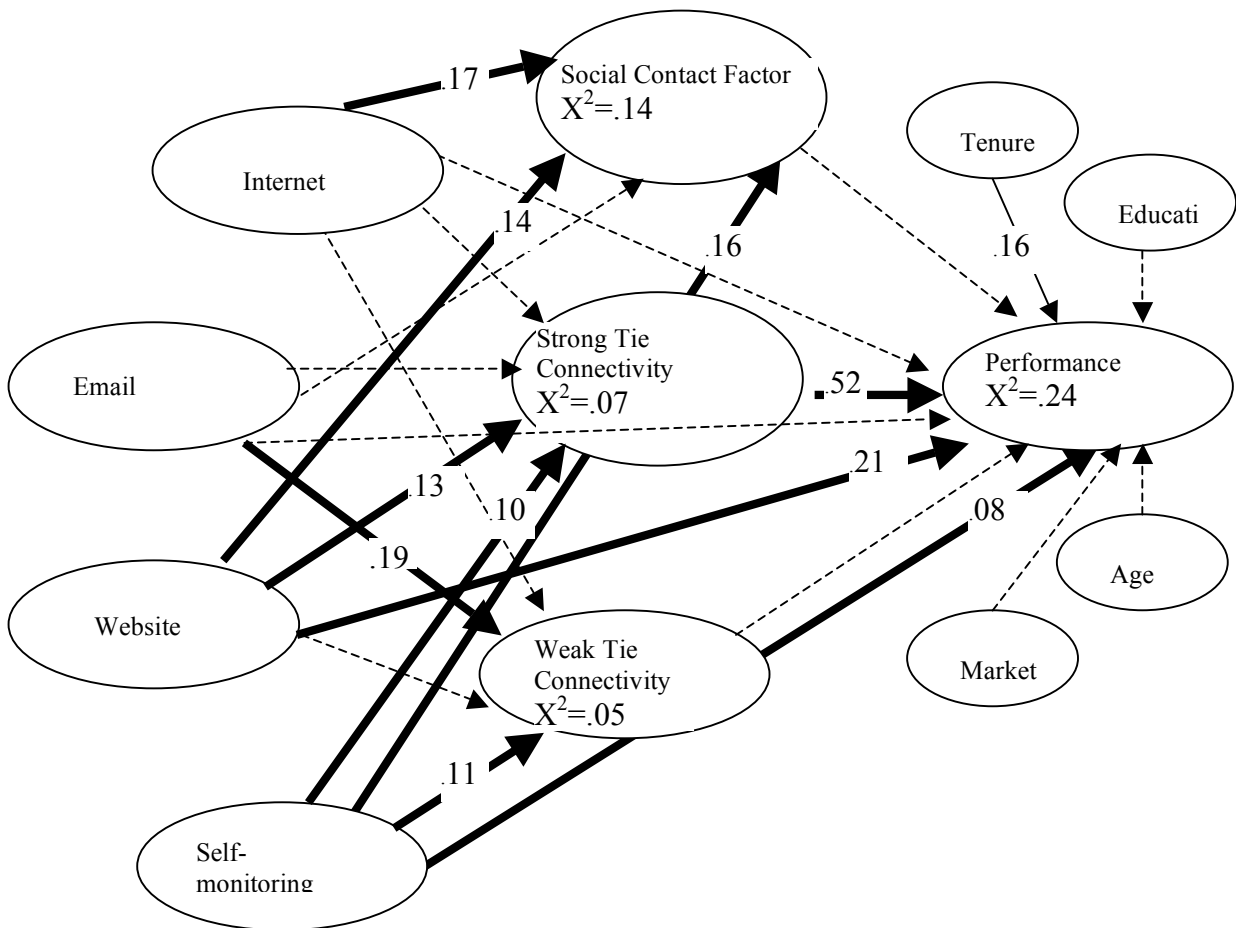
The X^2 values indicate the amount of variance accounted for by predictors of the variable. All values indicated outside of the ellipses indicate the standardized regression coefficient for predicting variables. * $p < .05$, ** $p < .01$. All R^2 values are significant at $p < .01$. Non-significant paths in model are indicated with dashed lines.

4.11 Estimates and confidence intervals

In this section I report the unstandardized regression estimates and the standardized confidence intervals for relevant findings from the research. Unstandardized regression coefficients allow for an interpretation of what happens to the value of the dependent variable when you have a one-unit change in the independent variable. Independent variables that cause a bigger change in the dependent variable can be considered more important. The value of the unstandardized estimate is that it can be compared directly to the units of measurement used in the original question items. Findings can be interpreted in the same units in which the research might be applied.

Another advantage of unstandardized structural (path) coefficients is that the unstandardized estimates are based on raw data or covariance matrixes. This allows for comparing across groups when indicators may have different variances, as may latent variables, measurement error terms, and disturbance terms. When groups have different variances, unstandardized comparisons are preferred.

Effect size is a measure of the strength of a relation. Thus the effect size is an estimate of the degree to which a phenomenon is present in a population and/or the extent to which the null hypotheses are false. Effect size allows for an understanding of the magnitude of the significance of the effect of one variable upon another rather than simply interpreting the effect as being significant or nonsignificant. Effect sizes provide a

value that indicates by how much a relation is significantly larger than zero in tests of the null hypotheses.

In addition, effect sizes allow for an interpretation of whether or not the significance might be called substantive – substantially significant. The size of the effect can be interpreted as strong, weak, or not decidable.

Tables 48-53 below present the standardized and unstandardized estimates and the unstandardized and standardized confidence intervals for variable relationships in the model. Statistics below do not include ICT as predictors of strong and weak tie personal social network connectivity given that the variance accounted for in measures of personal social network connectivity was less than 7%. This low level of variance accounted for limits the impact of results of the different forms of ICT as predictors of strong and weak tie personal social network connectivity.

Table 48

Estimates and confidence interval for strong tie personal social network connectivity as a predictor of performance.

Estimates	Est.	Std. Est.	S.E.	C.R.*
q19r1 <----------- STPSNC	4.741	0.523	0.416	11.383
Confidence interval values q19r1 <----------- STPSNC	Lower	Upper		p
Confidence interval	3.804	5.521		0.007
Standardized confidence interval	0.425	0.614		0.005

*Critical ratio is an indicator of statistical significance of the item in structural equation modeling (>1.96 is significant) is equivalent to .05 level of probability. Confidence intervals are at 95%.

Table 49

Estimates and confidence interval for weak tie personal social network connectivity as a

predictor of performance.

Estimates	Est.	Std. Est.	S.E.		C.R.*
q19r1 <----------- WTPSNC	-0.649	-0.047	0.564		-1.151
Confidence interval values q19r1 <----------- WTPSNC	Lower		Upper		p
Confidence interval	-1.737		0.639		0.431
Standardized confidence interval	-0.166		0.050		0.372

*Critical ratio is an indicator of statistical significance of the item in structural equation modeling (>1.96 is

significant) is equivalent to .05 level of probability. Confidence intervals are at 95%.

Table 50

Estimates and confidence intervals for website and Internet as predictors of personal

social network connectivity.

Estimates	Est.	Std. Est.	S.E.		C.R.*
SCF <--------------- Website	0.087	0.144	0.029		3.028
SCF <---------- Internet	0.123	0.178	0.057		2.145
SCF <--------------- Website	Lower	Upper		p	
Confidence interval	0.033	0.150		0.005	
Standardized confidence interval	0.043	0.240		0.008	
SCF <---------- Internet					
Confidence interval	0.013	0.262		0.022	
Standardized confidence interval	0.025	0.406		0.023	

*Critical ratio is an indicator of statistical significance of the item in structural equation modeling (>1.96 is

significant) is equivalent to .05 level of probability. Confidence interval at 95%.

Table 51

Estimates and confidence interval for self-monitoring as a predictor of personal social

contact factor.

Estimates	Est.	Std. Est.	S.E.		C.R.*
SCF <--------------- Self-monitoring	0.558	0.162	0.142		3.935
Standardized confidence interval	Lower	Upper		p	

SCF <--------------- Self-monitoring			
Confidence interval	0.263	0.919	0.004
Standardized confidence interval	0.004	0.203	0.040

*Critical ratio is an indicator of statistical significance of the item in structural equation modeling (>1.96 is significant) is equivalent to .05 level of probability. Confidence interval at 95%.

Table 52

Estimates and confidence interval for self-monitoring as a predictor of performance.

Estimates	Est.	Std. Est.	S.E.	C.R.*
Q19r1<--------------- Self-monitoring	2.871	0.083	1.216	2.361
Standardized confidence interval	Lower	Upper	p	
Q19r1<--------------- Self-monitoring	0.008	0.154	0.039	

*Critical ratio is an indicator of statistical significance of the item in structural equation modeling (>1.96 is significant) is equivalent to .05 level of probability. Confidence interval at 95%.

Table 53

Estimates and confidence interval for information and communication technology

variables as predictors of performance.

Estimates	Est.	Std. Est.	S.E.	C.R.*
Q19r1<--------------- Internet	-1.473	-0.212	0.507	-2.904
Q19r1<--------------- Email	3.754	0.138	2.024	1.855
Q19r1<--------------- Website	1.319	0.217	0.251	5.256
Standardized confidence interval	Lower	Upper	p	
Q19r1<--------------- Internet	-0.369	-0.065	0.004	
Q19r1<--------------- Email	-0.010	0.291	0.064	
Q19r1<--------------- Website	0.134	0.290	0.008	

*Critical ratio is an indicator of statistical significance of the item in structural equation modeling (>1.96 is significant) is equivalent to .05 level of probability. Confidence interval at 95%.

Control variables

The effects of control variables on performance were examined to determine the effect of variables other than weak tie personal social network connectivity and strong tie personal social network connectivity on performance. Market, education, and age were non-significant as predictors of performance.

Tenure as a predictor of performance was significant. When tenure was included as a predictor of performance in the structural equation model, the squared multiple correlation increased from .24 to .28. This suggests that tenure accounted for 5% of the variance in performance.

Tenure was not included in the revised structural equation model due to the high correlation of tenure with Q27r13 and Q27r12. Variables with non-significant relationships were not included in the structural equation model.

4.12 Conclusion

In this chapter I have presented findings from factor analysis and scale development. I then discussed decisions made with respect to measurement development for items in the initial structural equation model. The revised structural equation model was presented and changes made to the SEM model were described and justified. Difficulties of measurement development and the effect of shared covariance on statistical results were discussed. Findings for the study were presented using the revised SEM model. In addition, standardized and unstandardized regression coefficients and standardized confidence intervals were presented as indicators of effect size. In the following chapter I interpret these findings in light of theory and research discussed so far.

5 Chapter Five: Discussion

5.1 Introduction

As discussed previously, this study addresses two contextual questions with respect to the work of contractual project-based workers. (1)To what degree does the personal social network connectivity of the residential real estate agent contribute to performance? (2) To what degree do the individual characteristics of the real estate agent contribute to personal social network connectivity?

In this chapter, I discuss findings, interpret the findings in light of theory, provide a description of the post-investigative state of the problem, and discuss the implications of findings. Findings for the development of the scales in the present study are discussed: (1) strong tie personal social network connectivity, (2) weak tie personal social network connectivity, (3) social contact factor, (4) information and communication technology, and (5) self-monitoring. Next major findings are discussed and interpreted. Finally, findings are discussed relative to methods, and implications for future research and professional practice.

5.2 Covariation of ICT and personal social network connectivity measures

Structural equation modeling analysis indicated that allowing covariation among ICT variables and among personal social network connectivity variables was necessary in order to achieve an acceptable level of model fit. However, conceptual and theoretical arguments also support the allowed covariation between the two sets of variables. In

terms of theoretical justification, measuring specific strengths of ties has been

demonstrated to be difficult. The strength of a tie may vary depending on the temporal

use of the tie or the specific function of the tie. At a given time a tie between one

individual and another may be strong or weak in its attribute. For example, when a

contractual project-based worker is working with others on the same project, the ties

among them might be strong; however, when they are no longer working on the same

project, the ties connecting them may be weak. In addition, the ties to other individuals

may be strong or weak depending upon the functions of the interaction.

Therefore, covariation was allowed given the preference for model fit over

distinctiveness of measures. However, in turn, interpretation of results was affected by

the need to allow co variation among variables measuring social connectivity and co

variation among variables measuring information and communication technology.

Allowing covariation among variables violates the assumption of regression

analysis that variables be independent of one another. Therefore, interpretation of

findings of personal social network connectivity and information and communication

technology use relative to regression analysis is limited. When discussing the results and

findings concerning ICT and personal social network connectivity as predictors, I point

out that the allowed covariance influences the statistical accuracy of these variables as

predictors.

There were several possible methods of addressing the situation of covariation:

(1) retain questionable items and factors reducing the fit of the model, (2) remove items

the were reflective of poor model fit, (3) remove factors that did not contribute to the fit

of the model, (4) leave factors and items in model even though they greatly affect model fit in order to retain distinction among measures.

The model is fitted but measures are not as distinct as desired. Choosing more distinct measures, but a weaker model fit is a questionable approach given that if the model fit is not acceptable then all findings are questionable.

All three personal social connectivity measures are representative of the overarching concept of personal social network connectivity. In the case of ICT, all three measures are also representative of the overarching concept, Internet ICT use. Both factor analysis and correlation analysis indicated that the measures of personal social network connectivity relative to strength of tie were not independent of one another. Therefore, as was the case with the ICT measures, when mentioning the effects of SOT variables on performance, it is important to point out that the variables were allowed to covary.

5.3 Strong tie personal social network connectivity as a predictor of performance

This research proposed that strong tie personal social network connectivity was a strong predictor of performance in the context of the contractual project-based worker. Statistical findings confirmed the hypotheses. Moreover, strong tie personal social network connectivity accounted for roughly a quarter of the variance in performance. This finding suggests that strong tie personal social network connectivity is an explanatory variable with respects to performance. However, it is important to note that a small amount of variance in performance was also explained by website and self-monitoring variables.

The standardized confidence interval for strong tie personal social network connectivity as a predictor of performance was (95% CI=0.425-0.614) with a p value of .005. Unstandardized confidence interval was (95% CI=3.804-5.521) with a p value of .007.

Findings that strong ties have a significant and impactful effect on performance were supported by theories and research discussed in Chapter 2. Strong ties were described as the surrogate organizational structure used by contractual project-based workers to access resources and conduct work. Strong ties were used to connect the real estate agent to other professionals. Through his or her relationship with other professionals, the real estate agent conducted the real estate transaction. This surrogate organizational structure of strong ties is described by (Powell, 1990) as a network organization. Similarly, (Nardi, Whittaker, and Schwarz, 2002) noted the critical nature of strong tie networks and (Granovetter 1973; Weenig, 1993) noted the function of strong ties in support of individuals who work together.

Granovetter (1973) describes strong ties as those ties that connect co-workers or close friends to one another. Compared to weak ties, strong ties have greater motivation to be of assistance and are typically more easily available. Findings supported the function of strong ties as described by Strength of Weak Ties Theory (Granovetter, 1973; Granovetter, 1982), that strong ties connect individuals who work together or interact frequently with one another.

Network Organization Theory (Powell, 1990) suggests that strong tie personal social networks serve as surrogate organizational infrastructures. Network organization theory describes social networks as primary tools through which work is conducted

(Powell, 1990). Nardi, Whittaker, and Schwarz (2002) describe social networks as the mechanisms through which work is conducted and personal resources are accessed. According to (Powell, 1990), organizational practices and arrangements that are network-like in form share the following common characteristics: (1) make use of lateral patterns of exchange, are (2) are flexible and dynamic, (3) support interdependent flows of resources, and (4) make use of reciprocal lines of communication. These characteristics point to the importance of strong ties in conducting contractual project-based work.

In the context of the contractual project-based worker, the organizational structure that supports completion of the project is composed primarily of strong ties. The network of strong ties serves as the surrogate organizational structure through which the contractual project-based worker conducts their work. Findings of strong tie personal social network connectivity as a predictor of performance agree with research and descriptions of the work of the residential real estate agent as an exemplar of the contractual project-based worker. These descriptions and research suggest that strong ties connect the real estate agent to other entities providing services in the real estate process (Sawyer, Crowston, and Wigand, 1999; Sawyer, Crowston, Allbritton, and Wigand, 2000b; Sawyer, Crowston, Wigand, and Allbritton, 2003; Wigand, Crowston, Sawyer, and Allbritton, 2001).

The impact of strong tie personal social network connectivity on performance is also in line with findings from qualitative studies on the central role of social networks in contractual project-based work (Nardi, Whittaker, and Schwarz, 2002). As discussed in Chapter 2, (Nardi, Whittaker, and Schwarz, 2002) found that work activities are accomplished through the deliberate activation of the worker's networks.

The strongest predictor of performance in the present study was strong tie personal social network connectivity. The importance of strong ties in the performance of the contractual project-based worker supports the call for continued research to address a gap in social network research by focusing on accessing personal social networks. These findings suggest that it is fruitful to focus on strong tie social networks and strong tie social network connectivity in order to gain greater understanding of contractual project-based work.

It is important to note that there might also be indirect effects of the personal social network connectivity factors on performance. Exploring indirect and possible curvilinear effects might provide more explanatory power with respects to the social contact factor and ICT as predictor variables. One possible scenario for a curvilinear effect would be the nature of ties as reflective of temporary states. In other words there is a movement between strong tie and weak tie on a continuum. The direction of impact is also of importance here. A question remains as to the to degree to which performance affects the level of strong tie personal social network connectivity instead of the inverse.

5.4 Weak tie personal social network connectivity as a predictor of performance

Hypothesis H1b was not supported. The path from weak tie personal social network connectivity to performance (path=-.047, C.R.=-0.964, ns) was negative and not significant. This finding was contrary to expectations, given (1) the functions of weak ties to enable greater levels of connectivity and access to novel information (Granovetter, 1973; Granovetter, 1982), and (2) the reported importance of weak ties in the work of real estate agents (Crowston, Sawyer, and Wigand, 2001; Sawyer, Crowston, and

Wigand, 1999; Sawyer, Crowston, Allbritton, and Wigand, 2000b; Sawyer, Crowston, Wigand, and Allbritton, 2003).

Strength of Weak Ties Theory, as applied to social network connectivity, presented these two assertions: (1) Weak ties are enablers of greater levels of connectivity by enabling the bridging of social distance, through greater levels of indirect connections and connections to greater numbers of extended networks (Granovetter, 1973; Granovetter 1982). (2) Weak tie personal social network connections allow for accessing novel information that would otherwise not be accessible through strong tie personal social network connections (Granovetter, 1973; Granovetter, 1982).

The hypothesis of weak tie personal social network connectivity as a predictor of performance was not supported. Following are some possible explanations: (1) real estate agents are accomplishing the functions of weak tie personal social network connectivity through other means, (2) there is a point of diminishing returns with respect to weak tie personal social network connectivity, and (3) there is difficulty measuring weak tie personal social network connectivity as a distinct construct separate form strong tie connectivity.

Could the real estate agent be accessing new information about potential buyers and sellers through a method other than the use of weak tie personal social network connectivity? Strength of weak ties theory and heterophily theory suggest that it would be unlikely that agents could accomplish these functions through the use of strong tie personal social network connectivity (Granovetter, 1973; Granovetter, 1982). Strength of weak ties theory posits that strong ties are not adequate to access the novel information in the form of contacts to potential buyers and sellers of real estate. Chapter 2 provides a

discussion of this in terms of the heterophily hypothesis as applied to the strength of weak ties.

An examination of bivariate plots of items measuring weak tie personal social network connectivity and performance do not suggest a nonlinear relationship or a "point of diminishing returns" on weak tie personal social network connectivity. The bivariate scatterplots are listed in Appendix N. The difficulties with respects to measurement development and the emergence of a separate factor perhaps offer an explanation, in part, for the lack of significance in the relationship between weak tie personal social network connectivity and performance.

Strength of weak tie theory (Granovetter, 1973; Granovetter, 1982) and descriptions of the work of residential real estate agents suggest that weak ties would be essential in the work of the residential real estate agent. Weak ties support the process of prospecting for potential buyers and sellers of homes and provide access to novel information about those considering putting their homes up for sale and those considering putting themselves in the market to buy a home.

Perhaps weak tie personal social network connectivity, as it is developed here, is not measuring the personal social network connectivity that is accessing the novel information essential to the real estate agent. The social contact factor which was identified in factor analysis is related to weak tie personal social network connectivity. Items for the social contact factor were initially intended as items for the weak tie personal social network connectivity factor. The social contact factor also serves the function of accessing novel information. However, as discussed in the next section, the social contact factor was also not a significant predictor of performance.

5.5 Social contact factor as a predictor of performance

The results also present a third factor identified, which was labeled the social contact factor. The factor was named the social contact factor given that question items clearly referred to the creation and development of contacts. Thus the construct validity of the factor suggested the name given to the factor. The following items were used to measure the social contact factor. (1) q27r2: I seek opportunities to meet people, (2) q27r3: I am always looking to add names to my contact list, and (3) q27r4:I am in frequent contact with people on my contact list. The social contact factor was identified from factor analysis of survey results. The social contact factor was highly correlated with the factor representing weak tie personal social network connectivity suggesting that the social contact factor is also representative of the functions of weak tie personal social network connectivity. However, the social contact factor focuses specifically on the development of a contact list in the work of the residential real estate agent.

This factor was named the "social contact" factor given that the items for the question referred specifically to development of social contacts or the social contact list that the real estate agent maintains. Questions for the social contact factor included: (1) I seek opportunities to meet people, (2) I am always looking to add names to my contact list, and (3) I am in frequent contact with people on my contact list.

The social contact factor addresses the development and maintenance of the real estate agent's contact list. Social contact question items were originally devised as items measuring weak tie personal social network connectivity. However, factor analysis and SEM analysis of survey data suggested that the items comprised a factor of personal

social network connectivity distinct from strong tie and weak tie personal social network connectivity.

The social contact factor was not found to be a significant predictor of performance. This finding was surprising given that real estate agents expressed that their social contacts were of great importance in work. In addition, descriptions of the work of the real estate agent and "prospecting" suggest the social contact factor as a predictor of performance. Interpretations of the social contact factor are limited, as the factor was not originally hypothesized from research.

In terms of both weak ties and the social contact factor, it is puzzling that the two were not significant predictors of performance. Strength or weak ties theory (Granovetter, 1973; Granovetter, 1982), descriptions of contractual project-based work, and descriptions of the work of the residential real estate agent suggest that the two measures would be predictors of performance. Could the social contact factor be essential to the work of the real estate agent but not directly related to performance? Findings from my research raise a question as to how the social contact factor fits within the work of the contractual project-based worker. In other words, weak tie personal social network connectivity is fundamental to the work of the contractual project-based worker; however, the factor is not a predictor of performance.

5.6 Information and communication technology as predictors of personal social network connectivity

The effect of ICT on strength of tie factors was small but significant. However, as noted previously, information and communication technology and self-monitoring

variables accounted for 7% and 5% of the variance in strong tie personal social network connectivity and weak tie personal social network connectivity respectively.

In light of this fact, the discussion of the effect of ICT on personal social connectivity factors is limited. Although Email was a predictor of weak tie personal social network connectivity and website was a predictor of strong tie personal social network connectivity, these variables extracted too little variance to warrant a lengthy discussion of these findings. Therefore, the combination of allowed covariation, small regression values and low variance accounted for suggests that the effect of ICT on weak and strong tie personal social network connectivity was negligible.

The hypothesized function of ICT was to (1) reduce coordination costs and (2) enable greater levels of social network connectivity. The coordination costs assumption of electronic markets theory suggests that ICT enables reduced coordination costs of the real estate transaction. The supposition of this research was that increased use of ICT allows for the creation and maintenance of greater levels of personal social network connectivity with lower transaction costs (Malone, Yates, and Benjamin, 1989). In addition, through the use of ICT in accessing social ties, the contractual project-based worker is able to strategically position themselves in their network.

Why do the ICT and self-monitoring variables account for so little of the variance in strong tie and weak tie personal social network connectivity variables? Measurement difficulties with respects to ICT and personal social network connectivity suggest a possible partial explanation. Another possibility is that contractual project-based workers used mainly conventional and face-to-face methods of communicating rather than Internet technologies.

The contractual project-based worker does not have access to the same level of organizational resources as an internal employee. Descriptions of the context of contractual project-based work suggest that ICT use and personal social network connectivity support surrogate organizational structure allowing for access to resources.

5.7 Internet and website as predictors of the social contact factor

Website and Internet were both predictors of the personal social contact factor. The variance for the social contact factor was 14%, twice that of the variance accounted for in strong and weak tie personal social network connectivity. Findings suggest that Internet and Website were used to support the development of social contacts.

The regression values for Internet and website as predictors of the social contact factor were .17 and .14 respectively. The standardized confidence interval for Internet as a predictor of the social contact factor was (95% CI=0.222-0.409) with a p value of .022. Unstandardized confidence interval was (95% CI=0.013-0.262) with a p value of .023. The standardized confidence interval for Website as a predictor of the social contact factor was (95% CI=0.048-0.242) with a p value of .007. Unstandardized confidence interval was (95% CI=0.033-0.150) with a p value of .005.

It is interesting to note that while the social contact factor is related to the weak tie personal social network connectivity factor, the ICT that were predictors of the social contact factor were different from the ICT that were predictors of weak tie personal social network connectivity. Also, the social contact factor was not a direct predictor of the performance of the contractual project-based worker. Given that the social contact factor was identified in analysis; theory and research on the effect of Internet and website on the

social contact factor was not hypothesized. More research is required to discern the manner in which ICT such as Internet and Websites serve as predictors of the social contact factor. In terms of patterns of findings, it is important to note that website was a predictor of the social contact factor as well as strong tie personal social network connectivity and performance.

5.8 Lack of variance accounted for in social connectivity factors

As discussed, measurements for ICT and self-monitoring did not account for high levels of variance in the measures of personal social network connectivity. This low level of variance accounted for limited the interpretation of findings referring to ICT and self-monitoring as predictors of strong and weak tie personal social network connectivity. The difficulty in development of measures for both ICT and personal social network connectivity may partly explain the low levels of variance accounted for. An important question is the degree to which personal social network development is developed through the use of more conventional ICT such as cell phone and through face-face-interaction. It would be valuable to be able to discern the types of ICT in general that serve as good predictors of personal social network connectivity factors.

5.9 Self-monitoring as a predictor of personal social network connectivity

Self-monitoring was a significant predictor of all three types of personal social network connectivity. However, more variance was accounted for in the social contact

factor that in the factors representing strong and weak tie personal social network connectivity.

Given the low amount of variance accounted for in the strong and weak tie personal social network connectivity factors, the impact of findings with respect to self-monitoring as a predictor of personal social network connectivity is limited. Difficulties with measurement development for self-monitoring and personal social network connectivity provide an explanation, in part, for the low variance accounted for in the factors of personal social network connectivity. Self-monitoring along with Internet, Email, and Website did not account for acceptable amounts of variance in strong tie and weak tie personal social network connectivity factors. However, the larger amount of variance, 14% was accounted for in the social contact factor.

A finding of note in this research is the lack of confirmation for the self-monitoring scale. The scale was not confirmed and factor analysis suggested a revision of the self-monitoring scale. The adjusted self-monitoring scale was a significant predictor of all three types of personal social network connectivity.

The standardized confidence interval for self-monitoring as a predictor of the social contact factor was (95% CI=0.063-0.267) with a p value of .006. Unstandardized confidence interval was (95% CI=0.263-0.919) with a p value of .004.

Self-monitoring was selected as an individual characteristic that predicts personal social network connectivity and provides insight into the characteristics of high performing contractual project-based workers. The variable of self-monitoring was also selected, given that it deals directly with accessing social networks.

Self-monitoring theory states that high self-monitors are more likely to develop connections with others through strong and weak tie connections. High self-monitors are more likely to (1) be more attentive to social network formation, (2) develop relations across groups, and (3) have higher levels of weak tie personal social network connectivity. High self-monitors are therefore likely to bridge social worlds, acting as connection points through which people exchange information (Snyder, 1987).

It was hypothesized that the level of self-monitoring was a predictor of accessing personal social networks. By assessing the predictive ability of a personality variable such as self-monitoring, more can be understood about the type of contractual project-based workers who are successful in accessing personal social networks. As discussed in chapter two, the characteristics of self-monitoring suggest that a high self-monitor is an individual who is more likely to possess greater levels of personal social network connectivity.

Self-monitoring theory asserts that high self-monitors, relative to low self-monitors, tend to develop relations with distinctly different people (increased possibility of weak tie connections) (Snyder 1987; Mehra, Kilduff et al., 2001). Weak tie personal social network connectivity requires boundary spanning and meeting new and different people, which high self-monitors are supposedly very good at (Snyder, 1987). Low self-monitors tend to occupy relatively homogenous social worlds (decreased possibility of weak tie connections) (Snyder 1987; Mehra, Kilduff et al., 2001).

This relationship between self-monitoring and the social contact factor had the highest magnitude for self-monitoring as a predictor of factors of personal social network connectivity. As mentioned previously, the social contact factor represents the

development of personal social contacts. Questions for the social contact factor included: (1) I seek opportunities to meet people, (2) I am always looking to add names to my contact list, and (3) I am in frequent contact with people on my contact list. This suggests that high self-monitors are effective at social contact development.

5.10   Self-monitoring as a predictor of performance

There was a positive and significant relationship between self-monitoring and performance. However, the value for the regression coefficient was very low, .08.

The standardized confidence interval for self-monitoring as a predictor of performance was (95% CI=0.008-0.154) with a p value of .039. Unstandardized confidence interval was (95% CI=0.025-5.100) with a p value of .047.

In a study somewhat similar to this one, (Mehra, Kilduff et al., 2001) found that self-monitoring contributed to performance. In addition, studies conducted by (Snyder 1987b; Snyder and Gangestad, 1986) demonstrated that self-monitoring was a predictor of performance. Performance was measured in a slightly different ways in these studies. Findings from these research studies and the present study support the selection of self-monitoring as an explanatory variable with respects to access to personal social networks as a predictor of performance. The level of self-monitoring allows for identification of those individuals with a predisposition towards accessing their personal social networks. High self-monitors have a greater amount of strong ties and higher levels of weak ties.

5.11   Scale creation

Personal social network connectivity scale

As discussed in chapter 3, measures were developed for the personal social network connectivity scale through research on social network and social capital

perspectives, initial qualitative fieldwork, and through factor analysis of pre-test and pilot test data. Despite this work in measurement development, the researcher was not able to obtain independent measures of social network connectivity relative to strength of tie. The nature of the phenomena of personal social network connectivity also contributed to the difficulty with measurement development. This is discussed in greater detail in chapter 3. This difficulty with measurement development is not unusual in scientific research, but unfortunate. In this case, the researcher acknowledged the limitations with respects to the measurement development and then moved on to report findings from the study and interpret them.

The immature status of strength of tie scales for personal social network connectivity affected both findings and fitting of the structural equation model. In chapter 2, I discussed the conceptual development of strength of tie measures, and in chapter 3 I discussed the development of these measures. Results in chapter four suggest a difficulty in measuring social network connectivity relative to strength of tie. Items for the factors of weak tie personal social network connectivity and strong tie personal social network connectivity were cross-loaded with one another, and the items cross-loaded slightly with measures for the social contact factor of personal social network connectivity. Table 22 in Chapter 4 presented the factor analysis results for items measuring personal social network connectivity. Further research is needed to develop multi-faceted measurement instruments of personal social network connectivity with good psychometric properties and satisfactory levels of convergent and discriminant validity.

Another possibility is that it is not possible to create independent measures for strong and weak tie personal social network connectivity. A better approach may be to

create a measure of personal social network connectivity that is not based on the distinction of strength of tie. Nardi, Whittaker, and Schwarz (2002) found it difficult to operationalize strong ties and weak ties in the workplace. They found that strengths of ties are not so much stable properties of a network as they are variable manifestations of ongoing processes of network adaptation. Thus ties to specific individuals may alternate between levels of being weak or strong and vary in intensity.

The identified social contact factor for personal social network connectivity indicates that an alternate way of conceptualizing measures for personal social network connectivity might be by task or function of the work. For example, the items measuring the social contact factor actually describe behaviors that the real estate agent exhibits in their work.

I experimented with collapsing the measures of personal social network connectivity into one factor to determine how this contributed to the overall model fit. However, I decided not to collapse the measures for personal social network connectivity due to a negligible effect on the fit of the overall model, and the loss of findings on the effect of three specific types of ICT. Study of social network ties informs theories of work and descriptions of work. With greater numbers of workers actually working outside of the confines of formal organizational boundaries, there is a need for more research on variables measuring surrogate structures in terms of social ties or other organizing principles.

Information and communication technology scale

All three ICT measures were based on Internet technologies. With respects to the ICT variables, the separate measures of ICT were not distinct in terms of use. In many

cases one type of ICT was required in order to access another. ICT was measured in terms of both dependence and frequency of use. These conceptual issues with respects to ICT use were discussed in detail in Chapter 2.

Despite the work in measurement development, the researcher was not able to obtain independent measures of information and communication technology use. Measurement development of ICT measures was a continual challenge. In addition, the measures of ICT were all referring to the overarching concept of Internet ICT. Chapter 3 presents the multiple iterations of surveys and factor analysis that were used to develop measures of ICT use for this study. The measures for the constructs of Internet and email were cross-loaded with one another. To a degree, this was not surprising given that users often use the Internet to access email.

Constructs for ICT use were measured using only two dimensions for each measure, representing frequency of use and dependency of use. However, given that these measures were straightforward measures, two item measures were more acceptable than they would be otherwise. Perhaps more multi-faceted measures of ICT would provide a greater level of insight with respects to the affect of ICT on personal social network connectivity.

Self-monitoring scale

Factor analysis of survey data indicated that the self-monitoring scale was not confirmed. This finding was unexpected as the self-monitoring scale is a well established scale (Gangestad and Snyder, 2000; Snyder, 1987b; Snyder and Gangestad, 1986). Perhaps the context of this study is distinctively different from the context of the numerous other studies used in the development of the self-monitoring scale. In other

words, the special characteristics and contexts of contractual project-based workers are not reflective of the general population with respect to findings from earlier research using the self-monitoring scale. Findings from this study suggest that effective use of the self-monitoring scale may be more dependent on context than previously thought. Further testing of the self-monitoring scale across different types of work might serve to address this problem.

ICT variables as predictors of performance

The strongest regression coefficient in the model, aside from strong tie personal social network connectivity as a predictor of performance, represented the relationship between website and performance. Website was the only ICT variable that was a significant predictor of performance.

The standardized confidence interval for website use as a predictor of performance was (95% CI=0.134-0.290) with a p value of .008. Unstandardized confidence interval was (95% CI=0.816-1.789) with a p value of .006.

The coordination costs assumption of electronic markets theory would suggest a positive and significant relationship between measures of ICT and performance. In others words, contractual project-based workers would make extensive use of email, Internet, and website in order to reduce the coordination costs of communication thereby leading to greater levels of performance.

While ICT was not hypothesized as a predictor of performance, the characteristics of ICT, reduced coordination costs and greater levels of social network connectivity, suggest that all ICT would be significant predictors of performance. Thus findings indicate that the use and dependence on websites serves as predictor of performance. In

terms of patterns of findings, website was both a predictor of the social contact factor and performance. The relationships between website and strong ties and the effect of strong ties on performance provides insight into a model of successful contractual project-based work. This pattern is discussed in the next section.

5.12   Overall patterns and summary of findings

Two patterns of relationships emerged in the analysis and interpretation of findings. The first pattern focuses on the newly identified social contact factor. Self-monitoring was a strong predictor of the social contact factor. The social contact factor was also the personal social connectivity factor most predicted by different types of ICT use. This suggest a path in the model highlighting the affect of Internet and email on the social contact factor, self-monitoring as a predictor of the social contact factor, and self-monitoring as a predictor of performance.

The second pattern of findings in the model was the path of website as a predictor of strong tie personal social network connectivity and strong tie personal social network connectivity as a predictor of performance. Website was also a direct predictor of performance.

A summary of findings:

- **Strong tie personal social network connectivity was a strong predictor of performance.**

- **Website, self-monitoring, and strong tie personal social network connectivity were predictors of performance.**

- **ICT and self-monitoring accounted for small amounts of variance as predictors of strong and weak tie personal social network connectivity factors.**

- **A social contact factor of personal social network connectivity was identified.**

- **Weak tie personal social network connectivity was not a significant predictor of performance.**

- **The self-monitoring scale was not confirmed.**

5.13   Causation.

In the structural equation model of contractual project-based work, strong and weak tie personal social network connectivity are presented as predictors of performance. Theories of strength of ties, personal social network connectivity, and contractual project-based work suggest this directionality of causation. However, there is also the possibility of reverse causation whereby the level of performance is a predictor of strong tie and weak tie personal social network connectivity.

Statistical regression cannot prove causation. Therefore, there is a need to discuss causation and explanations for possible alternate causes for high performance. In this research, the variables chosen for the structural equation model are not purported to be the sole predictors for the variables indicated.

Structural equation models only imply preconceived causal ordering. Thus relationships are not causal but associative in nature. Despite its advantages, structural equation modeling does not provide evidence of causality, and it does not "prove" the superiority of one model over all possible alternative models. Any argument for causality is conceptually and theoretically based.

A possible explanation for the relationship between strong ties and performance is that the level of strong ties could be a result of attraction of the amount of business conducted by the real estate agent, as indicated by higher levels of performance. Other agents want to work with agents that do a lot of business. Rather than performance being caused by higher levels of strong tie contacts, performance is increased in that real estate who conducts a great deal of business is more attractive to other agents and to potential buyers and sellers of homes.

Future studies might assess the directionality of causality by conducting an experiment or a longitudinal study to assess time order. However, even in the case of the longitudinal study there might be a third variable creating a spurious correlation.

Higher income (performance) could serve as a cause for strong tie personal social network connectivity. Those individuals who have higher income may have more resources in terms of money and personnel to develop the size of their strong tie personal social network. Thus high performers may be more likely to have more developed strong tie personal social networks.

5.14   Method and findings

Social network methods have focused largely on structure and measuring the effect of social networks at the macro or collective level. In other words, social network research has focused mainly on assessing collective structure rather than the manner in which individuals shape social structure and the characteristics of those individuals who are able to most effectively shape social structure (Burt, 1992; Mehra, Kilduff, and Brass, 2001; Nardi, Whittaker, and Schwarz, 2002). The methodological approaches for measuring the degree of access to social networks are not well developed. It is hoped that

findings from this research will contribute to the further development of methods to study social networks on the individual or micro level of use.

In the present research, focus was placed on measuring the social networks through assessing the individual perception of social network formation rather than measuring the social structure itself. There is a particular advantage to this approach when studying the effects and use of social networks by contractual project-based workers. It is feasible to study the actual social network structure within the confines of a formal organizational structure; however, studying actual structure becomes much more difficult with project-based social networks when the social network consists of social network connections created through agreements between multiple organizations and independent contractors.

The existing body of social network methods focuses primarily on measuring specific structure. The social structure is recreated based on respondents' perception of structure. There is a memory bias with respect to measurement, in that it is often difficult for people to remember who is in their specific network and each time they connect with them. Both measurement of perceived structure and measurement of perceived levels of personal social network connectivity have advantages and disadvantages. However, the measurement of perceived structure is the predominant approach in social network analysis. There is a need for a complementary approach to the study of social networks.

5.15   Mutual adaptation of personal and organizational social networks

This research focused on the individual level while social network analysis generally focuses on structure at the level of the organization or the collective. An

interesting question might be phrased in terms of a discussion about the application of findings from the present study. How is the individual focus of the personal social network perspective changing the structural (organizational) ways of doing things and vise versa?

Findings from this research might inform a process of "mutual adaptation" between individual and organizational levels of social network use. Contractual project-based workers might best be described as making use of social networks on both the individual and the organizational level. In other words, in the context of contractual project-based work, there is a mutual adaptation between individual and organizational use of social networks.

Both organizations and the way in which work is conducted are changing. Furthermore, there is a movement from primarily organizational structures to a greater level of individual level social network structures. There is a "dance" between the conventional way of using social networks in an organizational environment and the use of personal social network connectivity in the context of the contractual project-based worker.

A focus on the individual level use of social network resources in complement with the knowledge of organizational level social network use might provide insight into how contractual project-based workers make use of social network resources on both an individual and an organizational level. (Benjamin and Levinson, 1993) suggests a useful lens for understanding this process of mutual adaptation in the form of a model of equilibrium. The equilibrium model suggests that (1) technology, (2) business process, and (3) organization and culture must be adapted to each other for change to be effective.

Change causes a shift from an old state of relative equilibrium to a new one. Through examining the interaction, integration, and equilibrium states of these fundamental components, an understanding of the change that is taking place in the context can be achieved. The methodological and phenomenological approach of my research informs the movement between these states of equilibrium. This, in turn, provides for a more varied understanding of contractual project-based work. How is the accessing of personal social networks affecting the use of social networks on the organizational level? There is a need for mutual adaptation of both the individual and the organizational use of personal social networks.

This research is guided, in part, by the work of (Granovetter, 1973) whose work focuses on the analysis of processes in interpersonal networks providing a micro-macro bridge. (Granovetter, 1973) posits that it is through these interpersonal networks that small-scale interaction becomes translated into large-scale patterns, and that these, in turn, feed back into small groups. Like Granovettor, the present research focuses on small scale interaction and strength of interpersonal ties (Granovetter, 1973), but on an even more micro level by focusing on personal social network connectivity relative to strength of tie.

5.16   Implications for researchers

The main contributions of this study with respect to theory are (1) the further development of social network theory as it is applied at the micro level, (2) the use of multiple theories in understanding personal social network use, (3) the application of social network theory to the specific context of the contractual project-based worker, and (4) the development of theory that explains the nature of contractual project-based work.

Chapter 2 provided a review of both the macro and the micro-based perspective of social networks. Theory with respect to accessing social networks at the micro level is largely undeveloped, whereas theory at the macro level is well developed. Findings from this research contribute to the development of micro level theories of social network use.

This study's findings contribute to the further development of a theoretical understanding of social networks through the use of multiple theories. Few social network studies actually make use of theories, much less multiple theoretical perspectives. In this study, theories of social network analysis, strength of weak ties theory, and network organization theory were used.

There is value in applying the social network perspective to types of work other than contractual project-based work. Network Organization Theory, strength of weak ties theory, and research focusing on NetWORK provide a possible framework upon which to build a multi-theoretical approach to understanding different types of work.

If organizational structure is viewed as the pattern that emerges from real interactions among people, it is possible to link shifts in work practices directly to changes in organizational structure by examining properties of social networks (Barley and Kunda, 2001). Thus by examining the social networks specific to work practices or work context, we can gain an understanding of the organizational structure of specific work practices such as contractual project-based work.

Barley and Kunda (2001) call for more organization studies on the actual work that is done within the organization, as opposed to theories about organizations. This is particularly relevant given that more and more of the work force is being comprised of contracted or contractual project-based workers. The structural equation model in my

research provides a model for contractual project-based work that can be further developed through other research initiatives focused around the description, organization, and context of contractual project-based work. Findings from this study can be built upon in the further study of contractual project-based work.

Another area of possible theoretical contribution is the area of theories about the characteristics of those individuals who are most likely to be high performing contractual project-based workers. More complete descriptions of the role of personal social networks in contractual project-based work might be researched further. Research could be further developed to identify those individuals that are more likely to be effective contractual project-based workers. The present research contributes to the body of research on organizational phenomena that is based on the context of work. The focus is on a specific type of work rather than taking the stance that theories apply equally to all organizational contexts.

Perhaps the validity of organizational theories may change as, to some degree, a shift in organizational environment takes place — in other words, the shift from large organizations with internal employees to much greater numbers of freelance workers, outsourcing, and contractual project-based workers. Increasingly, people outside the formal organizational boundaries do a larger amount of the work. Therefore, it is becoming important for researchers to study the worker as well as the organization.

The fact that such a well-developed scale as the self-monitoring scale was not confirmed suggests that those using the scale in the future might be wary of applying the scale regardless of the context of their study. The population in a specific context may have different characteristics than the populations accessed in the development of the

self-monitoring scale. My findings suggest further testing of self-monitoring theory and the self-monitoring scale in different contexts relative to specific types of work.

5.17　　Future research

My research builds, in part, on the work of (Powell, 1990) who seeks to identify a coherent set of factors that make it meaningful to talk about networks as a distinctive form of coordinating economic activity. These ideas can be further employed to generate a greater understanding of the frequency, durability, and limitations of social networks.

Further research may look more specifically at how ICT and personal social network connectivity are used to support contractual project-based work, specifically in terms of coordination of strong tie networks and the enabling of larger weak tie networks. Future studies might focus on more specific applications of ICT and measure more specific types of ICT. For instance, being able to isolate specific types of ICT and where ICT is used in the work of the contractual project-based worker could be very valuable.

It is important to note that access to resources through the use of personal social networks and value extraction through the use of these networks are distinctive phenomena. Value is created through building and maintaining social networks. Value is extracted through activating and using nodes in the social network. This research focused on the perception of levels of access an individual had to his or her personal social networks that were continually built and maintained. There is a need for research that also focuses on understanding the activation of selected nodes at the time the work is to be done. Research on how these social network nodes are activated and how the individual extracts value from the social network would serve as a nice complement to this research.

One of the most interesting findings of this study was the relative unimportance of large amounts of weak tie personal social network connectivity. Future research might focus on understanding how much weak tie personal social network connectivity is necessary. To what degree are the findings of weak tie personal social network distinctive of residential real estate agents? To what degree can findings be generalized to the population of contractual project-based workers in general?

Future research might look at the categorization of contractual project-based workers in terms of the amount of access to personal social networks needed in order to conduct work. In the context of this research the personal social network of the contractual project-based worker was critical. From the description of the work of the residential real estate agent it is clear that, like the general contractor in the construction example, a large part of their work involves use of their personal social network.

The degree to which organizational theories can be accurately applied to varied organizational environments and contexts is an important topic for further research. This kind of contextual focus suggests the importance of studying specific types of work and not adopting a one-size-fits-all approach when applying organizational theories to different organizational environments. Personal social network connectivity could also be researched relative to the specific parts of the work process of contractual project-based work, or to specific tasks and job goals.

Studies that measure both actual structure and perceived social ties would be valuable to conduct. These studies could assess the association between measures of perceived social network connectivity and measures of specific structure. It would also be fruitful if further research focused on other individual characteristics that might be

predictors of strong tie and weak tie personal social network development in contractual project-based work. Lastly, there is a need for more research on the work of the contractual project-based worker. The use of personal social networks as surrogate organizational forms by contractual project-based workers could be an important emerging area of study.

5.18   Limitations

The proposed model of this study was predictive in nature, not causal. I argue that the present model has some explanatory power. The intent of this research was not to attempt to explain all of the variance accounted for, but rather to explore theoretical propositions that suggest that personal social network connectivity is an important contributing factor to the success of contractual project-based workers, and that individual characteristics affect the accessing of social networks.

Within the confines of this study, it was only possible to address a few of the individual characteristics of the contractual project-based worker that contribute to the development of personal social networks. Findings from other studies complement this study in developing theoretical understandings of the accessing of personal social networks by contractual project-based workers.

Given the selected methodology and the phenomena of study, choices were made with respects to the specificity of the phenomena studied. Given that this study was conducted in an underdeveloped area of inquiry — perceived levels of personal social network connectivity — a decision was made to begin at a more general level. As other studies are conducted and theory is further developed, more specific aspects of the phenomena of study can be addressed. For example specific functions of personal social

network connectivity might be researched. The measures of strong and weak tie personal social network connectivity and the social contact factor might be further developed. Other measures of personal social network connectivity might be also be developed.

While real estate agents serve as exemplars of distributed contractual project-based workers, there are limits to the generalizability of residential real estate workers to other types of contractual project-based workers. For instance, the work of some contractual project-based workers may not be as sales-based as that of the residential real estate agents. In addition, the degree to which the contractual project-based work is distributed may vary depending upon the specific context of the contractual project-based work.

Another limitation is that this research focused solely on social network connectivity in order to gain insight into the work of contractual project-based workers. There are many other approaches that can be taken in researching contractual project-based work. One example is a focus on the specific models of organization that contractual project-based workers use in their work, given the distinctiveness of their work context.

5.19 Implications for professional practice

Results from this research can inform real estate agencies on how to best support the contractual project-based workers that are part of their organizations. Results from this study suggest that the use of strong tie personal social networks is foundational to the work of the contractual project-based worker. ICT that support the social connectivity factors were also identified. Findings suggest that organizations that retain large numbers

of contractual project-based workers should devote resources to supporting the development of those workers' strong tie personal social networks.

One of the greatest costs to real estate agencies is the cost of the support they provide to their agents. Findings indicate that the strong tie social network resources of the agent are one of the main contributors to the agent's success. Agencies and agents might be more successful if agencies allocate resources and support to agents so that they might more effectively develop strong tie personal social networks.

A strategy for supporting the strong tie personal social network development of contractual project-based workers appears to be foundational to the success of residential real estate agencies. This is the case in terms of the residential real estate agent and the agencies that support the residential real estate agent. What kind of infrastructure would interface between the individual agent and the agency?

Perhaps agencies can seek to find the right kind of employees who not only have experience in the real estate industry, but also have the propensity to be effective contractual project-based workers. Findings from this research suggest the creation of a profile of the type of individuals who are likely to be successful contractual project-based workers. This could be used in selection, training, and allocation of resources to contractual project-based workers.

APPENDICES

APPENDICES

Appendix A1: Constructs and items for survey

(Construct) / Dimension	Survey item
ICT use Frequency	3. How often do you use each of these kinds of information or communication technologies in a typical work week? Email Cell phone Your own website Internet 8. How many email messages do you receive in a typical work day?
ICT use Perceived dependence on ICT	4. How much do you depend on the following technologies in your day-to-day real estate activities? Email Cell phone Your own website Internet
ICT Use Features	9. On which Web sites do your listings appear? (list of websites) 6. Which of the following features of the Internet do you personally use regularly for your professional real estate work?
Weak Ties	27R1.Wherever I go, I meet somebody I know. 27R2. I seek opportunities to meet people. 27R3. I am always looking to add names to my contact list. 27R4. I am in frequent contact with people on my contact list. 27R5. I have lots of friends. 27R6. I have many opportunities to meet new people. 27R7. I am constantly meeting new people.
Strong ties	27R8. Other professionals want to work with me. 27R9. Other real estate professionals (mortgage officers, CORRECTIOJN 27R10. lawyers, etc.) seek me out for advice. 27R11. Most of my real estate colleagues perceive me as a leader on professional topics and issues. 27R12. I've developed enough professional contacts to excel in my job. 27R13. I've developed enough professional contacts so that I usually know most of the participants at a closing (lawyers, etc.). 27R14. I have worked with the same professionals for many years now.
Success / Performance	19. What was your TOTAL income earned from commissions in 2002 (Jan 1 to Dec 31)? 20. What was your NET PERSONAL income from all real estate

	activities in 2002 (Jan 1 to Dec 31)? 21. How much were your real estate–related expenses in 2002 (Jan 1 to Dec 31)? 22. Please tell us the kind of sales compensation arrangement you have with your company at present. 23. How many existing single-family homes did you sell in 2002 (please count only sales with a closing date of Jan 1 to Dec 31, 2002)? 24. What is the current agency/agent split for the half of the commission received for handling on a purchase or sale? 25. How much do you pay as a desk fee? 26. Please indicate who pays for the following. If the cost is shared, please check both.
Self-monitoring	28R1. I would probably make a good actor. 28R2. I find it hard to imitate the behavior of other people. 28R3. At parties and social gatherings, I do not attempt to do or say things that others will like. 28R4. I can only argue for ideas that I already believe. 28R5. I can make impromptu speeches even on topics about which I have almost no information. 28R6. I guess I put on a show to impress or entertain people. 28R7. In a group of people I am rarely the center of attention. 28R8. In different situations and with different people, I often act like very different people. 28R9. I am not particularly good at making other people like me. 28R10. I'm not always the person I appear to be. 28R11. I would not change my opinions (or the way I do things) in order to please someone else or win their favor. 28R12. I have considered being an entertainer. 28R13. I have never been good at charades or improvisational acting. 28R14. I have trouble changing my behavior to suit different people and different situations. 28R15. At a party I let others keep the jokes and stories going. 28R16. I feel a bit awkward in company and do not show up quite so well as I should. 28R17. I can look anyone in the eye and tell a lie with a straight face (if for a good end). 28R18. I may deceive people by being friendly when I really dislike them.
Demographics	30R1. What year were you born? 30R2. What is your gender? 30R3. How long have you worked in real estate? 30R4. How long have you lived in your current area? 31. What are your current affiliations, memberships, and professional designations? 32. What is the highest level of education you have completed?

Appendix A2: ICT use questions for each survey phase

Pre-test	web presence
Pilot	What type of access do you have to a computer?
	How often do you use each of these kinds of information or communication technologies in a typical WORK WEEK? For each technology, please circle the number that best represents your answer.
	How much do you depend on the following in your day-to-day real estate activities?
	What is the MINIMUM that someone would have to pay you per month to NOT use the following at all in your real estate activities?
	Which of the following features of your pager do you personally use regularly?
	Which of the following features of your PDA do you personally use regularly?
	Which of the following features of eKEY (i.e., PDA for access to listed properties) do you personally use regularly?
	Which of the following features of your cell phone do you personally use regularly?
	Approximately, how many minutes of use per month are included in your cell phone subscription plans?
	Approximately, how many total minutes of cell phone use appeared on your most recent monthly bills?
	How much, on average, do you pay per month for your cell phone (including any additional charges)?
	Please circle the number which best indicates your level of agreement with the following statements.
	What is the MAXIMUM amount you would be willing to pay per month for a cell phone subscription, assuming your current level of usage stayed the same?
	What Internet access speed do you use most often?
	Which of the following features of the Internet do you personally use regularly for your professional real estate work?
	How many email messages do you receive in a typical work day?
	How frequently do you communicate with buyers and sellers via email?
	Which of the following features of email do you personally use regularly?
	What percentage of your current BUYERS AND SELLERS do you interact with at all using Email?
	What percentage of your current BUYERS AND SELLERS do you interact with via email nearly all the time?
	What percentage of REAL ESTATE PROFESSIONALS do you interact with using email nearly all the time?
	This question concerns your personal Web presence (i.e., your own Web page or information about you as a real estate agent posted on other Web pages).
	On which Web sites do your listings appear? Please check all that apply.

	Please circle the number which best indicates your level of agreement with the following statements. Which of the following features are included in your Web presence? Please check all that apply.

Appendix A3: Performance questions for each survey phase

Pre-test	What kind of sales compensation arrangement did you have with your company since the beginning of the year 2002? This question asks about commissions and sales. Please answer these questions for the time period beginning 2002 until present. What was your typical commission as a percentage of the sale? What is your commission (dollar amount) on an average sale? How many listings did you have during time? How many sides did you have during time? What was your gross income since the beginning of 2002 from all real estate activities? What was your gross income earned from commissions since the beginning of 2002? What were your real estate–related expenses since the beginning of 2002?
Pilot	Please tell us the kind of sales compensation arrangement you have with your company at present. What is the typical total percentage real estate agent commission on a property in your area? What is your current agency/agent split for your half of the commission? What was your income earned from commissions since January 1, 2002? What was your NET PERSONAL income from all real estate activities since January 1, 2002? How much were your real estate–related expenses since January 1, 2002?

Appendix A4: Weak tie personal social capital questions for each survey phase

Pre-test	I have lots of friends.
	Wherever I go, I meet somebody I know.
	Lots of people know I am a real estate agent.
	Lots of people ask me about real estate.
	I have many opportunities to meet new people.
	Every one I meet is a potential client.
	It is easy for me to meet new people.
	I find that people I have just met do a lot for me.
	I am constantly meeting new people in my day to day work.
	I have many acquaintances from my previous career.
	The one thing I have is a large base of contacts.
	I have many acquaintances outside of my real estate work.
	People frequently ask me real estate questions.
	Everyone I meet is a potential client.
	In my day to day life, I am constantly meeting new people.
	I often find that I can do a lot for people I just met.
	Many of my acquaintances are not real estate professionals.
Pilot	Wherever I go, I meet somebody I know.
	Other real estate agents envy me because of the way I use my contact list.
	I wish I had a larger base of contacts.
	In my day to day life, I am constantly meeting new people.
	I seek opportunities to meet people.
	I am always looking to add names to my contact list.
	I am in frequent contact with people on my contact list.
	Use of my contact list is one of my biggest assets.
	I have lots of friends.
	I have many opportunities to meet new people.
	Every one I meet is a potential client.
	It is easy for me to meet new people.
	I am constantly meeting new people.
	I make use of acquaintances to meet new professionals that work in real estate.

Appendix A5: Strong tie personal social capital questions for each survey phase

Pre-test	Talking with people is the most critical part of my job.
	I seek opportunities to meet people.
	Keeping in touch with the people in my contact list is not a good use of my time.
	I am always looking to add names to my contact list.
	Attending the local REALTOR™ meetings is a good use of my time.
	It is critical to me to have a good working relationship with a few key professionals (lawyers, appraisers, etc).
	When a professional is needed, it is unimportant who it is, as long the person is competent.
	I've developed enough professional contacts to excel in my job.
	I've developed enough professional contacts so that I usually know most of the participants at a closing (lawyers, etc).
	It's hard to find other professionals that I'd like to work with.
	I am constantly seeking other professionals that I can rely on to do a good job.
	Other real estate agents envy me because of the way I use my contact list?
	Use of my contact list is one of my biggest assets.
	I am in frequent contact with people on my contact list (e.g., mass mailing cards).
	I find that I talk with the same small group of other real estate professionals nearly every week.
	I find that I work with the same professionals repeatedly.
	In every transaction I meet a new group of professionals.
	I have worked with the same professionals (building inspector, lawyer, etc.) for many years now.
	I am viewed as an essential member in my professional network.
	I find that many other professionals want to work with me.
	Other real estate professionals seek me out for advice.
	Most of my real estate colleagues perceive me as a leader on professional topics and issues.
	Other professionals want to work with me.
	Most of my business comes from referrals.
	It's important to me to have a network of other professionals I can rely on.
	I am successful because of my connections to other professionals.
	I can use my mobile communications to connect parties more quickly.
Pilot	Other professionals want to work with me.
	Other real estate professionals (mortgage officers, lawyers, etc.) seek me out for advice.

	Most of my real estate colleagues perceive me as a leader on professional topics and issues.
	Most of my business comes from referrals (previous customers and business base).
	It's important to me to have a network of other professionals I can rely on.
	I've developed enough professional contacts to excel in my job.
	I've developed enough professional contacts so that I usually know most of the participants at a closing (lawyers, etc.).
	I have worked with the same professionals for many years now.

Appendix B1: A Cover letter for pre-test

Insert date here

Towards Friction-free Work:
A Multi-method Study of the Use of Information Technology in the Real-estate Industry.
A Study Conducted for the National Science Foundation.

Dear Agent:

We are studying how the use of information and communication technologies in the real estate industry are affecting your industry. All realtors in Syracuse, both independent and affiliated are participating. Completing this questionnaire should take about 25 minutes of your time. Your response will insure a more accurate description of how those in your industry use information technology. This is a large scale, professionally conducted, <u>research</u> project and we are willing to share our findings with you in return for your participation in the survey.

All of your responses will remain confidential. Your and others' responses will be aggregated together for analysis and there is no way for any person to ever relate your personal responses to you. The aggregated responses to the questionnaire will provide us with a better understanding of information and communication technology use in the real estate industry. After completing the survey, please return it in the self-addressed, pre-paid envelope included. No one other than our research team will see the individual responses to the survey questions. As we said above, no results will be reported at an individual level and none of the participating organizations have access to the raw data.

By returning a questionnaire, you are acknowledging that you have read and agreed to this Statement of Informed Consent, that you are participating in this study voluntarily, and that you are at least 18 years old. If you have any questions or concerns, feel free to call Marcel Allbritton at (315) 443-1675 or email at mmallbri@syr.edu.

Your participation is very important for the successful completion of this research! Please take the time needed to complete the questionnaire and return it in the envelope provided.

Thank you in advance for your cooperation! Your effort in support of this study is invaluable!

Sincerely yours,

Rolf Wigand, Ph.D.
Kevin Crowston, Ph.D.
Steven Sawyer, Ph.D.
Marcel Albritton, Doctoral Student

IF YOU WOULD LIKE TO RECEIVE A REPORT OF FINDINGS FROM THIS STUDY, PLEASE PRINT YOUR NAME AND ADDRESS BELOW AND FAX THIS PAGE TO (315) 443-5806.

Appendix B2: Follow-up letter for pre-test

Insert date here

Towards Friction-free Work:
A Multi-method Study of the Use of Information Technology in the Real-estate Industry.
A Study Conducted for the National Science Foundation.

Dear Agent:

We are studying how the use of information and communication technologies in the real estate industry are affecting your industry. With permission and assistance of the GSAR, we are surveying all members. in Syracuse, both independent and affiliated. About a week ago we sent you a survey and asked for your participation in our research project. This is a reminder that your responses are very important to the success of this study. Your participation ensures a more accurate understanding of the use of information and communication technologies in the real estate industry.

If you have not done so already, please complete the survey and return it to us in the pre-paid envelope.

As stated previously, all of your responses will remain confidential. Yours and others' responses will be aggregated together for analysis and there is no way for any person to ever relate your personal responses to you. No results will be reported at an individual level and none of the participating organizations have access to the raw data.

Your participation is very important for the successful completion of this research. Please take the few minutes needed to complete the questionnaire mailed to you last week and return it in the envelope provided.

If you did not receive the questionnaire or if it was misplaced, please call Marcel Allbritton at (315) 443-1675 or e-mail him at mmallbri@syr.edu. We will mail another copy of the survey to you.

Thank you in advance for your cooperation!

Sincerely yours,

Rolf Wigand, Ph.D.
Kevin Crowston, Ph.D.
Steven Sawyer, Ph.D.
Marcel Albritton, Doctoral Student

Appendix C: Pretest survey

A 2002 SURVEY OF **W**ORK **E**NVIRONMENT AND
INFORMATION AND **C**OMMUNICATION **T**ECHNOLOGY **U**SE
OF **R**ESIDENTIAL **R**EAL **E**STATE **A**GENTS

Please START HERE.

If you are unable to answer any of the following questions, please check either DK, don't know or NA, not applicable.

The questions in this section ask about your views on real estate as a profession.

Please circle the number that best indicates your level of agreement or disagreement with the following statements.

	Strongly disagree	*Strongly agree*		
Recent developments on the Internet may make it possible for the seller and buyer of houses to find each other without the use of a real estate agent.	1….2….3….4….5….6….7		O DK	O NA
Buyers are using the Internet instead of an agent.	1….2….3….4….5….6….7		O DK	O NA
Sellers are using the Internet instead of an agent.	1….2….3….4….5….6….7		O DK	O NA
My clients strongly expect me to use the Internet in the real estate buying and selling process.	1….2….3….4….5….6….7		O DK	O NA
My clients believe that they can get the information they need from the Internet.	1….2….3….4….5….6….7		O DK	O NA
It is getting harder to make a decent living as a real estate agent.	1….2….3….4….5….6….7		O DK	O NA
I would recommend real estate as a career.	1….2….3….4….5….6….7		O DK	O NA
If I were starting out today, I would go into real estate again.	1….2….3….4….5….6….7		O DK	O NA
Real estate agents will have to rethink their job.	1….2….3….4….5….6….7		O DK	O NA
The structure of the profession will have to change to accommodate technology.	1….2….3….4….5….6….7		O DK	O NA
It is obvious that the real estate agent profession is a dying profession.	1….2….3….4….5….6….7		O DK	O NA

2. Please circle the number that best indicates your level of agreement or disagreement with the following statements.

	Strongly disagree	*Strongly agree*		
Prospecting for clients costs me money.	1….2….3….4….5….6….7		O DK	O NA
I know the best way to prospect for clients in my area.	1….2….3….4….5….6….7		O DK	O NA

	Strongly disagree	Strongly agree		
Prospecting for clients costs me money.	1….2….3….4….5….6….7		O DK	O NA
Getting listings is time-consuming for me.	1….2….3….4….5….6….7		O DK	O NA
Getting listings costs me money.	1….2….3….4….5….6….7		O DK	O NA
I know the best ways to get listings in my area.	1….2….3….4….5….6….7		O DK	O NA
Searching for homes for a buyer is time-consuming for me.	1….2….3….4….5….6….7		O DK	O NA
Searching for homes for a buyer costs me money.	1….2….3….4….5….6….7		O DK	O NA
I know how best to search for homes for a buyer.	1….2….3….4….5….6….7		O DK	O NA
Searching for buyers for a listing is time-consuming for me.	1….2….3….4….5….6….7		O DK	O NA
Searching for buyers for a listing costs me money.	1….2….3….4….5….6….7		O DK	O NA
I know how best to search for buyers for a listing.	1….2….3….4….5….6….7		O DK	O NA
Preparing for closing meetings is time-consuming for me.	1….2….3….4….5….6….7		O DK	O NA
Preparing for closing meetings costs me money.	1….2….3….4….5….6….7		O DK	O NA
I know how best to prepare for a closing meeting.	1….2….3….4….5….6….7		O DK	O NA

3. Please circle the number that best indicates your level of agreement or disagreement with the following statements.

	Strongly disagree	Strongly agree		
I save my clients time.	1….2….3….4….5….6….7		O DK	O NA
I save my clients money.	1….2….3….4….5….6….7		O DK	O NA
I help clients get the most value for their money.	1….2….3….4….5….6….7		O DK	O NA
I help reduce the uncertainty of a real estate transaction for my client.	1….2….3….4….5….6….7		O DK	O NA
I provide high value to clients for the money they pay me.	1….2….3….4….5….6….7		O DK	O NA
A buyer could not easily find the information I provide.	1….2….3….4….5….6….7		O DK	O NA
A seller could not easily find the information I provide.	1….2….3….4….5….6….7		O DK	O NA

4. Please circle the number that best indicates your level of agreement or disagreement with the following statements.

	Strongly disagree	Strongly agree		
My use of information and communication technologies makes it possible to find more	1….2….3….4….5….6….7		O DK	O NA

properties that are appropriate for a buyer.			
When clients use the Internet to search for available properties, it saves me money.	1….2….3….4….5….6….7	O DK	O NA
When clients use the Internet to search for available properties, it allows me to be successful.	1….2….3….4….5….6….7	O DK	O NA
My use of information and communication technologies makes it possible to find more properties that are appropriate for a buyer.	1….2….3….4….5….6….7	O DK	O NA
My use of information and communication technologies makes it possible to find more buyers for a property.	1….2….3….4….5….6….7	O DK	O NA
My use of information and communication technologies reduces the chance of surprises at a closing.	1….2….3….4….5….6….7	O DK	O NA
Customers are searching real estate listings themselves to find houses.	1….2….3….4….5….6….7	O DK	O NA

The questions in this section ask your views on the nature of your relations with others that you work with.

5. Please circle the number that best indicates your level of agreement or disagreement with the following statements.

	Strongly disagree Strongly agree		
Talking with people is the most critical part of my job.	1….2….3….4….5….6….7	O DK	O NA
I seek opportunities to meet people.	1….2….3….4….5….6….7	O DK	O NA
Keeping in touch with the people in my contact list is not a good use of my time.	1….2….3….4….5….6….7	O DK	O NA
I am always looking to add names to my contact list.	1….2….3….4….5….6….7	O DK	O NA
Attending the local REALTOR™ meetings is a good use of my time.	1….2….3….4….5….6….7	O DK	O NA
It is critical to me to have a good working relationship with a few key professionals (lawyers, appraisers, etc).	1….2….3….4….5….6….7	O DK	O NA
When a professional is needed, it is unimportant who it is, as long the person is competent.	1….2….3….4….5….6….7	O DK	O NA
I've developed enough professional contacts to excel in my job.	1….2….3….4….5….6….7	O DK	O NA
I've developed enough professional contacts so that I usually know most of the participants at a closing (lawyers, etc).	1….2….3….4….5….6….7	O DK	O NA
It's hard to find other professionals that I'd like to work with.	1….2….3….4….5….6….7	O DK	O NA
I am constantly seeking other professionals	1….2….3….4….5….6….7	O DK	O NA

that I can rely on to do a good job.			
Other real estate agents envy me because of the way I use my contact list?	1….2….3….4….5….6….7	O DK	O NA
Use of my contact list is one of my biggest assets.	1….2….3….4….5….6….7	O DK	O NA
I am in frequent contact with people on my contact list (e.g., mass mailing cards).	1….2….3….4….5….6….7	O DK	O NA
I find that I talk with the same small group of other real estate professionals nearly every week.	1….2….3….4….5….6….7	O DK	O NA
I find that I work with the same professionals repeatedly.	1….2….3….4….5….6….7	O DK	O NA
In every transaction I meet a new group of professionals.	1….2….3….4….5….6….7	O DK	O NA

6. Please circle the number that best indicates your level of agreement or disagreement with the following statements.

	Strongly disagree *Strongly agree*		
I have worked with the same professionals (building inspector, lawyer, etc.) for many years now.	1….2….3….4….5….6….7	O DK	O NA
I am viewed as an essential member in my professional network.	1….2….3….4….5….6….7	O DK	O NA
I find that many other professionals want to work with me.	1….2….3….4….5….6….7	O DK	O NA
Other real estate professionals seek me out for advice.	1….2….3….4….5….6….7	O DK	O NA
Most of my real estate colleagues perceive me as a leader on professional topics and issues.	1….2….3….4….5….6….7	O DK	O NA
Other professionals want to work with me.	1….2….3….4….5….6….7	O DK	O NA
Most of my business comes from referrals.	1….2….3….4….5….6….7	O DK	O NA
It's important to me to have a network of other professionals I can rely on.	1….2….3….4….5….6….7	O DK	O NA
I am successful because of my connections to other professionals.	1….2….3….4….5….6….7	O DK	O NA
I can use my mobile communications to connect parties more quickly.	1….2….3….4….5….6….7	O DK	O NA

This question asks about your views on the real estate transaction.

7. Please circle the number that indicates your level of agreement or disagreement with each of the statements below.

	Strongly disagree Strongly agree		
Sellers always get the asking price for their sales.	1….2….3….4….5….6….7	O DK	O NA
The market is a seller's market.	1….2….3….4….5….6….7	O DK	O NA
Buyers often offer more than the asking price.	1….2….3….4….5….6….7	O DK	O NA
An overpriced house will get no offers.	1….2….3….4….5….6….7	O DK	O NA
It is common for a seller to receive multiple bids.	1….2….3….4….5….6….7	O DK	O NA
Buyers often offer more than the asking price.	1….2….3….4….5….6….7	O DK	O NA

This question asks about your use of the world wide web (WWW).

8. On which Web sites do your listings appear? Please check all that apply.

Your company's site	O Yes	O No	Homeadvisor™	O Yes	O No
REALTOR.com™	O Yes	O No	Your franchise's site	O Yes	O No
Your own personal site	O Yes	O No	Local real estate magazine site	O Yes	O No
Local newspaper site	O Yes	O No	Local Community site	O Yes	O No

O Others: _____ (please write in the URLs)

The questions in this section ask about your views of your relations with others you interact with on a professional level.

9. Please circle the number that indicates your level of agreement or disagreement with each of the statements below.

	Strongly disagree Strongly agree		
The people I interact with in my work are more productive when they do what they want to do rather than what others they work with want them to do.	1….2….3….4….5….6….7	O DK	O NA
The people I interact with in my work are most efficient when they do what they think is best, rather than what others they interact with in their work want them to do.	1….2….3….4….5….6….7	O DK	O NA
The people I interact with in my work are more productive when they follow their own interests and concerns.	1….2….3….4….5….6….7	O DK	O NA
I prefer to work with others rather than working alone.	1….2….3….4….5….6….7	O DK	O NA
Given the choice, I would prefer to do a job where I can work alone rather than do a job where I have to work with others.	1….2….3….4….5….6….7	O DK	O NA
Working with others is better than working alone.	1….2….3….4….5….6….7	O DK	O NA

10. Please circle the number that indicates your level of agreement or disagreement with each of the statements below.

	Strongly disagree Strongly agree		
The people I interact with in my work should be made aware that if they are going to be involved in part of the process, they are sometimes going to have to do things they don't want to do.	1….2….3….4….5….6….7	O DK	O NA
The people I interact with in my work should realize that they are not always going to get what they personally want.	1….2….3….4….5….6….7	O DK	O NA
The people I interact with in my work should realize that they sometimes are going to have to make sacrifices for the sake of everyone working together.	1….2….3….4….5….6….7	O DK	O NA
The people I interact with in my work should be willing to make sacrifices for the sake of the well being of everyone working together.	1….2….3….4….5….6….7	O DK	O NA
People I interact with in my work should do their best to cooperate with each other instead of trying to work things out on their own.	1….2….3….4….5….6….7	O DK	O NA

11. Please circle the number that indicates your level of agreement or disagreement with each of the statements below.

	Strongly disagree Strongly agree		
People that I interact with in my work should allow others to select whether they want to work together or alone.	1….2….3….4….5….6….7	O DK	O NA
I am able to persuade the people I interact with in my work to either work together or work alone.	1….2….3….4….5….6….7	O DK	O NA

The questions in this section ask your views on the nature of your relations with others.

12. Please circle the number that indicates your level of agreement or disagreement with each of the statements below.

	Strongly disagree Strongly agree		
I have lots of friends.	1….2….3….4….5….6….7	O DK	O NA
Wherever I go, I meet somebody I know.	1….2….3….4….5….6….7	O DK	O NA
Lots of people know I am a real estate agent.	1….2….3….4….5….6….7	O DK	O NA
Lots of people ask me about real estate.	1….2….3….4….5….6….7	O DK	O NA
I have many opportunities to meet new people.	1….2….3….4….5….6….7	O DK	O NA
Every one I meet is a potential client.	1….2….3….4….5….6….7	O DK	O NA
It is easy for me to meet new people.	1….2….3….4….5….6….7	O DK	O NA
I find that people I have just met do a lot for me.	1….2….3….4….5….6….7	O DK	O NA
I am constantly meeting new people in my day to day	1….2….3….4….5….6….7	O	O

		DK	NA
work.			

	Strongly disagree Strongly agree		
I have many acquaintances from my previous career.	1….2….3….4….5….6….7	O DK	O NA
The one thing I have is a large base of contacts.	1….2….3….4….5….6….7	O DK	O NA
I have many acquaintances outside of my real estate work.	1….2….3….4….5….6….7	O DK	O NA
People frequently ask me real estate questions.	1….2….3….4….5….6….7	O DK	O NA
Everyone I meet is a potential client.	1….2….3….4….5….6….7	O DK	O NA
In my day to day life, I am constantly meeting new people.	1….2….3….4….5….6….7	O DK	O NA
I often find that I can do a lot for people I just met.	1….2….3….4….5….6….7	O DK	O NA
Many of my acquaintances are not real estate professionals.	1….2….3….4….5….6….7	O DK	O NA

The questions in this section ask about your demographics and sales in the real estate industry.

13. List zip codes for the areas in which you work in descending order of volume of your sales.

Zip code (most sales)	Zip code (4th most sales)
Zip code (2nd most sales)	Zip code (5th most sales)
Zip code (3rd most sales)	Zip code (6th most sales)

14. To help us better understand your responses, please provide the following demographic information. Be assured that your responses are treated in strict scientific confidence. No one outside the research team will see this data. All reporting of data will be at a summary, aggregate level.

What year were you born?	_____
What is your gender?	O Male O Female
How long have you worked in real estate?	_____ years in the industry
How long have you lived in your current area?	_____ years

15. What are your current affiliations, memberships, and professional designations? Please check all that apply.

CIREI	O Yes	O No	SIOR	O Yes	O No	RNMI	O Yes	O No
IREM	O Yes	O No	CRE	O Yes	O No	WCR	O Yes	O No
RLI	O Yes	O No	REBAC	O Yes	O No	ERC	O Yes	O No

ABR	O Yes	O No	GRI	O Yes	O No	CIPS	O Yes	O No
RCE	O Yes	O No	CRE	O Yes	O No	CCIM	O Yes	O No
GAA	O Yes	O No	CRB	O Yes	O No	RAA	O Yes	O No
e–PRO	O Yes	O No	ALC	O Yes	O No	LTG	O Yes	O No
CPM	O Yes	O No	SIOR	O Yes	O No	CRS	O Yes	O No

O Others: _____ (please specify)

16. What is the highest level of education you have completed (please check only one)?

O Some High School	O Associate's Degree	O Master's Degree
O High School		O MBA or Law Degree
O Some college		O Doctorate

school

The questions in this section are about your compensation arrangements with your company. Please answer these questions for the time period beginning 2002 until present.

17.	What kind of sales compensation arrangement did you have with your company since the beginning of the year 2002? Please check all that apply.

O Salary	
O 100% commission	Commission rate: %
O Share of profits	Your share: %
O Commission split	Your share: %

O Other:	(please describe)

18.	This question asks about commissions and sales. Please answer these questions for the time period beginning 2002 until present.

What was your typical commission as a percentage of the sale?	_____% commission
What is your commission (dollar amount) on an average sale?	$ _____ commission
How many listings did you have during time?	_____ listings
How many sides did you have during time?	_____ sides

19. What was your gross income since the beginning of 2002 from all real estate activities?

O $5,000 or less	O $35,001–75,000	O $500,001–$1 million
O $5,001–10,000	O $75,001–150,000	O More than $1 million
O $10,001–35,000	O $150,001–500,000	O Don't know

20. What was your gross income earned from commissions since the beginning of 2002?

O $5,000 or less	O $35,001–75,000	O $500,001–$1 million
O $5,001–10,000	O $75,001–150,000	O More than $1 million
O $10,001–35,000	O $150,001–500,000	O Don't know

21. What were your real estate–related expenses since the beginning of 2002?

O None	O $1001–5,000	O $20,001–30,000
O $500 or less	O $5,001–10,000	O More than $30,000
O $501–1,000	O $10,001–20,000	O Don't know

22. What were your relative level of expenses in the following areas since the beginning of 2002?

	No expenses High expenses		
Promotion	1….2….3….4….5….6….7	O DK	O NA
Marketing	1….2….3….4….5….6….7	O DK	O NA
Professional	1….2….3….4….5….6….7	O DK	O NA
Development	1….2….3….4….5….6….7	O DK	O NA
Administrative	1….2….3….4….5….6….7	O DK	O NA
Technology	1….2….3….4….5….6….7	O DK	O NA
Affinity/referral	1….2….3….4….5….6….7	O DK	O NA
Relationships	1….2….3….4….5….6….7	O DK	O NA

23. The following questions are related to your technology expenses.

Do you pay for information technology yourself?	O Yes	O No
Does your company pay for your information technology?	O Yes	O No
Does your firm charge a technology fee (as part of transaction/monthly/ flat rate…)?	O Yes	O No

24. If you have any comments or suggestions, we would love to hear from you. Please use the space below to share your thoughts. Please feel free to write on the back of this page if you need more space.

Contact information:

Marcel Allbritton / Kevin Crowston
School of Information Studies
Syracuse University
4-116 Center for Science and Technology
Syracuse, NY   13244

Telephone: 315-443-2911
FAX: 315-443-5806/5673
E-mail: mmallbri@syr.edu

For more information about this research project, please visit us on the WWW (http://crowston.syr.edu/real-estate/   ).

Appendix D1: Pilot test cover letter

A National Survey of

Residential Real Estate Agents

National Association of REALTORS®

Our study, *Your* help   We ask for your help in a national study focused on the working environment of, and information technology uses by, residential real estate agents. This study is being conducted by a research team from the **School of Information Studies at Syracuse University, School of Information Sciences and Technology at the Pennsylvania State University and the Department of Information Science at the University of Arkansas at Little Rock.** With support from both the **National Science Foundation**[1] and the **National Association of REALTORS®**, we would like to ask you to participate by completing a survey.

Why you?   We are especially interested in the views of actual residential real estate agents such as yourself. We are contacting a random sample of residential real estate agents who are members of the National Association of REALTORS®. We are interested in how you carry out your work, your use of information and communication technology, and changes that have occurred in the residential real estate industry.

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[1]. The National Science Foundation, an agency of the United States Government, provided us funding through Grants IIS-9732799 and IIS-0000178.

Letter continued on other side

The study's value   Findings will provide for a better understanding about the nature of your work, uses of information and communication technology, and changes in your industry. Scientific results will also be published in academic journals. We will make these findings available to you via the Web. Aggregated results from the survey will also be used by the National Association of REALTORS® to better understand and serve its members.

Confidentiality   This survey is voluntary. And, your answers are completely confidential and will be released only as summaries in which no individual's answers can be identified. Your name will never be connected to your answers in any way. So, when you return your questionnaire, we will remove any and all identifying details. By returning the questionnaire, you are agreeing to voluntarily participate in this study, and that you are at least 18 years old.

Any questions?   If you have any questions or comments, we would be happy to talk with you.

Contact information: Marcel Allbritton / Kevin Crowston
School of Information Studies
Syracuse University
320 Hinds Hall
Syracuse, NY 13244-1676
Telephone: 315 443-1676
FAX: 315 443-5806/5673
E-mail: mmallbri@syr.edu

For more information about this research project, please visit us on the WWW (http://crowston.syr.edu/real-estate/).

Thank you.   Thank you very much for helping us with this important study.

Sincerely yours,

Rolf Wigand, (rwigand@syr.edu)
Kevin Crowston, (crowston@syr.edu)
Steve Sawyer, (sawyer@ist.psu.edu)
Marcel Allbritton, (mmallbri@syr.edu)

Appendix D2: Pre-notification postcard for pilot

Syracuse University
Marcel M. Allbritton
School of Information Studies
4-116 Center for Science and Technology
Syracuse, NY 13244-4100

<insert address here>

Appendix D2: Pre-notification postcard for pilot *continued*

<insert address here>

<insert title here>

<insert salutation and name here>

Would you like to know how real estate agents across the U.S. use technology? Please help us with our research and we will fill you in.

A few days from now you will receive in the mail a request to fill out a questionnaire for an important research project being conducted by researchers from the *School of Information Studies at Syracuse University*, the *School of Information Sciences and Technology at the Pennsylvania State University* and the *Department of Information Science at the University of Arkansas at Little Rock*, with support from both the *National Science Foundation* and the *National Association of REALTORS®*.

We write now to both alert you to the arrival of the survey in the mail next week and to ask for your help in completing it! The survey will ask about your experiences as a real estate professional and your use of information technology. If you have any questions or concerns, please feel free to call or email us. Again, thank you for your time and consideration.

It is only with generous help of people like you that our research can be successful.

Sincerely,

Marcel Allbritton, (mmallbri@syr.edu)
Rolf Wigand, (rtwigand@ualr.edu)
Kevin Crowston, (crowston@syr.edu)
Steve Sawyer, (sawyer@ist.psu.edu)

Contact Information:

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Appendix D3: Follow-up postcard for pilot

Follow up postcard appears identical to the previous postcard in appendices with text below inserted as body text for the postcard.

About a week ago a questionnaire was mailed to you asking about your experiences as a real estate professional and your use of information technology.

Your name was selected randomly from the membership list of the National Association of REALTORS®. If you have already completed and returned the questionnaire to us, please accept our sincere thanks. I not, please do so today. We are especially grateful for your help because it is only by asking people like you to share experiences that we can understand the work processes and information technology use of residential real estate agents.

If you did not receive a questionnaire, or if it was misplaced, you can download a printable version at http://crowston.syr.edu/real-estate/survey2002.pdf. You may also call us at the phone number below and we will get another survey in the mail to you today.

Appendix D4: Pilot survey

A 2002 SURVEY OF WORK ENVIRONMENT AND
INFORMATION AND COMMUNICATION TECHNOLOGY USE
OF RESIDENTIAL REAL ESTATE AGENTS

PLEASE START HERE.

**If you mostly handle business or corporate sales, please go no further.
Instead, return this survey in the postage paid envelope.
It is important that you return the uncompleted survey to us so that we know the
survey was not applicable in your case!** 🛑 STOP

For the questions below, please circle the number that best represents your answer. If you are unable to answer any of the following questions, please check either DK, don't know, or NA, not applicable.

1. **What is your job title? If you have multiple job titles, please check the ○ in front of the ONE title that best describes your work.**

○ Broker-Owner (with some selling)	○ Broker-owner (no selling)
○ Associate Broker (with selling)	○ Development/Relocation (no selling)
○ Manager (with some selling)	○ Manager (no selling)
○ Personal Assistant (with some selling)	○ Personal Assistant (no selling)
○ Sales Agent (with some selling)	○ Other (no selling)
○ Other (with some selling)	🛑 STOP
If you checked a title in the column above (with some selling), **please continue**.	If you checked a title in the column above (no selling), **please go no further**. Instead, return this survey in the postage paid envelope.

2. **What type of access do you have to a computer? Please check the ○ for all that apply.**

○ Don't have access to a computer. Please skip to the next question.

Own my own computer	○ Yes	○ No	Have private computer at the office	○ Yes	○ No
Have a desktop computer at home	○ Yes	○ No	Have access to a shared computer at the office	○ Yes	○ No
Have a laptop	○ Yes	○ No			

3. How often do you use each of these kinds of information or communication technologies in a typical WORK WEEK? For each technology, please circle the number that best represents your answer.

Technology	Never						Several times a day		
Pager	1	2	3	4	5	6	7	DK	NA
PDA (e.g., Palm™)	1	2	3	4	5	6	7	DK	NA
Wireless email (e.g., Blackberry™)	1	2	3	4	5	6	7	DK	NA
Email	1	2	3	4	5	6	7	DK	NA
eKEY™	1	2	3	4	5	6	7	DK	NA
Cell phone	1	2	3	4	5	6	7	DK	NA

4. How much do you depend on the following in your day-to-day real estate activities?

Technology	Not at all						Totally		
Pager	1	2	3	4	5	6	7	DK	NA
PDA (e.g., Palm™)	1	2	3	4	5	6	7	DK	NA
Wireless email (e.g., Blackberry™)	1	2	3	4	5	6	7	DK	NA
Email	1	2	3	4	5	6	7	DK	NA
eKEY™	1	2	3	4	5	6	7	DK	NA
Cell phone	1	2	3	4	5	6	7	DK	NA

5. What is the MINIMUM that someone would have to pay you per month to NOT use the following at all in your real estate activities? Please circle your answer.

Pager	$3	$10	$30	$100	$300	My monthly salary	NA
PDA (e.g., Palm™)	$3	$10	$30	$100	$300	My monthly salary	NA
Wireless email (e.g., Blackberry™)	$3	$10	$30	$100	$300	My monthly salary	NA
Email	$3	$10	$30	$100	$300	My monthly salary	NA
eKEY™	$3	$10	$30	$100	$300	My monthly salary	NA
Cell phone	$3	$10	$30	$100	$300	My monthly salary	NA
Pager	$3	$10	$30	$100	$300	My monthly salary	NA

6. Which of the following features of your pager do you personally use regularly?

O Don't have a pager. Please skip to the next question.

Receiving a numeric page	O Use O Don't use	Sending a page from a pager	O Use O Don't use
Receiving a text page	O Use O Don't use	Answering a page using pager	O Use O Don't use
Receiving an audio page	O Use O Don't use		

7. Which of the following features of your PDA do you personally use regularly?

O Don't have a PDA. Please skip to the next question.

Calendar and to do list	O Use	O Don't use	Pictures	O Use	O Don't use
Address book	O Use	O Don't use	Downloaded MLS listings	O Use	O Don't use
Internet access	O Use	O Don't use			

8. Which of the following features of eKEY™ (i.e., PDA for access to listed properties) do you personally use regularly?

O The local MLS does not offer eKEY™. Please skip to the next question.

O Don't use eKEY™. Please skip to the next question.

Physical access to properties	O Use	O Don't use	Send messages and feedback to other agents	O Use	O Don't use
MLS database on PDA	O Use	O Don't use	View maps	O Use	O Don't use
Search roster of agents	O Use	O Don't use			

9. Which of the following features of your cell phone do you personally use regularly?

O Don't have a cell phone. Please skip to question 15.

Placing and receiving calls	O Use	O Don't use	Instant messaging	O Use	O Don't use
Internet access	O Use	O Don't use	Integrated PDA or address book	O Use	O Don't use
Voice mail	O Use	O Don't use			

10. Approximately, how many minutes of use per month are included in your cell phone subscription plans (what are the monthly limits on your cell-phone subscription plan -not including free weekend or evening minutes)?

O No minutes included in plan	O 1–50 minutes	O 501–1000 minutes
O Pay per minute	O 51–100 minutes	O More than 1000 minutes
O Pre-pay	O 201–500 minutes	O Don't know

11. Approximately, how many total minutes of cell phone use appeared on your most recent monthly bills?

O No minutes	O 101–200 minutes	O More than 1000 minutes
O 1–50 minutes	O 201–500 minutes	O Don't know
O 51–100 minutes	O 501–1000 minutes	

12. How much, on average, do you pay per month for your cell phone (including any additional charges)?

O Nothing (e.g., pre-pay)	O $101 – $150	O $251 – $300
O Less than $50	O $151– $200	O More than $300
O $51 - $100	O $201– $250	O Don't know

13. Please circle the number which best indicates your level of agreement with the following statements.

Using my cell phone …	Strongly Disagree					Strongly Agree			
Saves me money.	1	2	3	4	5	6	7	DK	NA
Saves me time.	1	2	3	4	5	6	7	DK	NA
Reduces surprises.	1	2	3	4	5	6	7	DK	NA
Enables me to do more business.	1	2	3	4	5	6	7	DK	NA
Makes me more successful.	1	2	3	4	5	6	7	DK	NA

14. What is the MAXIMUM amount you would be willing to pay per month for a cell phone subscription, assuming your current level of usage stayed the same?

O Nothing	O $100–$149.99	O $250–$299.99
O Less than $50	O $150–$199.99	O More than $300
O $50–$99.99	O $200–$249.99	O Don't know

15. What Internet access speed do you use most often?

O Don't use the Internet at all. Please skip to question 18.

O Modem (dial up at less than 56 kbps)	O Modem (dialup at 56 kbps)
O Satellite access	O Cable modem
O DSL	O Don't know

16. Which of the following features of the Internet do you personally use regularly for your professional real estate work?

Search engines (e.g.,Google™,Altavista™)	O Use	O Don't use	Chat rooms or bulletin boards	O Use	O Don't use
Internet site with community data	O Use	O Don't use	Registration for licensing on a Internet site	O Use	O Don't use
Portals (web links you start from, e.g., Yahoo)	O Use	O Don't use	Internet site with real estate coursework	O Use	O Don't use
On–line real estate calculators	O Use	O Don't use	REALTOR.com™	O Use	O Don't use
Internet site with sales information	O Use	O Don't use	Internet site with state or local government information	O Use	O Don't use
Internet site to file closing paperwork	O Use	O Don't use	Web access to MLS listings	O Use	O Don't use

17. Please circle the number which best indicates your level of agreement with the following statements.

Using the Internet …	Strongly Disagree						Strongly Agree		
Saves me money.	1	2	3	4	5	6	7	DK	NA
Saves me time.	1	2	3	4	5	6	7	DK	NA
Reduces surprises.	1	2	3	4	5	6	7	DK	NA
Enables me to do more business.	1	2	3	4	5	6	7	DK	NA
Makes me more successful.	1	2	3	4	5	6	7	DK	NA
Helps me stay in touch with other professionals.	1	2	3	4	5	6	7	DK	NA

18. How many email messages do you receive in a typical work day?

O Don't use email. Please skip to question 25.

O No messages	O 21–30 messages	O 51-79 messages
O 1–10 messages	O 31–40 messages	O 80 or more messages
O 11–20 messages	O 41–50 messages	O Don't know

19. How frequently do you communicate with buyers and sellers via email?

Never						Always		
1	2	3	4	5	6	7	DK	NA

20. Which of the following features of email do you personally use regularly?

Send and receive email to/from colleagues or office	O Use O Don't use		Send and receive email with attached documents or pictures	O Use O Don't use	
Send and receive email to/from buyers and sellers	O Use O Don't use		Mass email to potential customers/clients	O Use O Don't use	
Send or receive email from a listserv or mailing list	O Use O Don't use				

21. What percentage of your current BUYERS AND SELLERS do you interact with at all using Email?

O None	O 26–33%	O 68–75%
O 10% or less	O 34–50%	O More than 75%
O 11–25%	O 51–67%	O Don't know

22. What percentage of your current BUYERS AND SELLERS do you interact with via email nearly all the time?

O None	O 26–33%	O 68–75%
O 10% or less	O 34–50%	O More than 75%
O 11–25%	O 51–67%	O Don't know

23. What percentage of REAL ESTATE PROFESSIONALS do you interact with using email nearly all the time?

O None	O 26–33%	O 68–75%
O 10% or less	O 34–50%	O More than 75%
O 11–25%	O 51–67%	O Don't know

24. Please circle the number which best indicates your level of agreement with the following statements.

	Strongly Disagree						Strongly Agree		
Staying in touch with buyers and sellers by email saves me money.	1	2	3	4	5	6	7	DK	NA
Staying in touch with buyers and sellers by email saves me time.	1	2	3	4	5	6	7	DK	NA
Staying in touch with buyers and sellers by email reduces surprises.	1	2	3	4	5	6	7	DK	NA
Because I use email, I am able to do more business.	1	2	3	4	5	6	7	DK	NA
I often use email for quick questions to other real estate professionals.	1	2	3	4	5	6	7	DK	NA
I force other professionals to use email.	1	2	3	4	5	6	7	DK	NA

25. This question concerns your personal Web presence (i.e., your own Web page or information about you as a real estate agent posted on other Web pages). On which Web sites do your listings appear? Please check all that apply.

O Don't have my own Web presence. Please skip to question 31.

Your own personal site	O Yes	O No	Homeadvisor™	O Yes	O No
REALTOR.com™	O Yes	O No	Your franchise's site	O Yes	O No
Your company's site	O Yes	O No	Local real estate magazine site	O Yes	O No
Local newspaper site	O Yes	O No	Local community site	O Yes	O No
Local REALTOR™ Association Site	O Yes	O No	Other 3rd party site	O Yes	O No

O Others: (please write in the URLs)

26. Please circle the number which best indicates your level of agreement with the following statements.

Having a Web presence . . .	Strongly Disagree						Strongly Agree		
Saves me money.	1	2	3	4	5	6	7	DK	NA
Saves me time.	1	2	3	4	5	6	7	DK	NA
Reduces surprises.	1	2	3	4	5	6	7	DK	NA
Enables me to do more business.	1	2	3	4	5	6	7	DK	NA
Brings me customers I would not see otherwise.	1	2	3	4	5	6	7	DK	NA
Makes me more successful.	1	2	3	4	5	6	7	DK	NA

27. Which of the following features are included in your Web presence? Please check all that apply.

Have own page on company Internet site	⭘ Yes ⭘ No		Provide virtual tours or walk-throughs on my Internet site	⭘ Yes ⭘ No	
Provide list of links on my Internet site	⭘ Yes ⭘ No		Have own domain name	⭘ Yes ⭘ No	
Have own Internet site with listings information	⭘ Yes ⭘ No				

28. Approximately, how many inquiries since January 1, 2002 did you receive as a direct result of people having seen your Web presence?

⭘ None	⭘ 21–30 customers	⭘ 50 or more customers
⭘ 1–10 customers	⭘ 31–40 customers	⭘ Don't know
⭘ 11–20 customers	⭘ 41–50 customers	

29. What percentage of your sales volume since January 1, 2002 did you generate from real estate Web sites other than your personal Web site (e. g., your company's or REALTOR.com™)?

⭘ None	⭘ 26–33%	⭘ 67–75%
⭘ 10% or less	⭘ 34–50%	⭘ More than 75%
⭘ 11–25%	⭘ 51–67%	⭘ Don't know

30. What percentage of your sales volume since January 1, 2002 did you generate from your own real estate Web site?

⭘ None	⭘ 26–33%	⭘ 67–75%
⭘ 10% or less	⭘ 34–50%	⭘ More than 75%
⭘ 11–25%	⭘ 51–67%	⭘ Don't know

31. On average, how many days does it take for completion of each of the following processes?

Sell a home, from listing to contract acceptance   _____ days

Find a house for a buyer, from initial contact to contract acceptance   _____ days

To get from an offer acceptance to closing   _____ days

32. How much EFFORT do you EXPEND on the following tasks?

Task	No effort					A great deal of effort			
Prospecting for sellers	1	2	3	4	5	6	7	DK	NA
Prospecting for buyers	1	2	3	4	5	6	7	DK	NA
Getting a new listing	1	2	3	4	5	6	7	DK	NA
Marketing a listing	1	2	3	4	5	6	7	DK	NA
Finding a house for a buyer	1	2	3	4	5	6	7	DK	NA
Helping a buyer select a house	1	2	3	4	5	6	7	DK	NA
Negotiating a contract to purchase	1	2	3	4	5	6	7	DK	NA
Removing contract contingencies	1	2	3	4	5	6	7	DK	NA
Closing on sale of a house	1	2	3	4	5	6	7	DK	NA

33. On which of the following tasks do you FOCUS your EFFORTS?

Task	Not focused					Main Focus			
Prospecting for sellers	1	2	3	4	5	6	7	DK	NA
Prospecting for buyers	1	2	3	4	5	6	7	DK	NA
Getting a new listing	1	2	3	4	5	6	7	DK	NA
Marketing a listing	1	2	3	4	5	6	7	DK	NA
Finding a house for a buyer	1	2	3	4	5	6	7	DK	NA
Helping a buyer select a house	1	2	3	4	5	6	7	DK	NA
Negotiating a contract to purchase	1	2	3	4	5	6	7	DK	NA
Removing contract contingencies	1	2	3	4	5	6	7	DK	NA
Closing on sale of a house	1	2	3	4	5	6	7	DK	NA

34. On which of the following tasks do you SPEND the most TIME?

Task	No time					All time			
Prospecting for sellers	1	2	3	4	5	6	7	DK	NA
Prospecting for buyers	1	2	3	4	5	6	7	DK	NA
Getting a new listing	1	2	3	4	5	6	7	DK	NA
Marketing a listing	1	2	3	4	5	6	7	DK	NA
Finding a house for a buyer	1	2	3	4	5	6	7	DK	NA
Helping a buyer select a house	1	2	3	4	5	6	7	DK	NA
Negotiating a contract to purchase	1	2	3	4	5	6	7	DK	NA
Removing contract contingencies	1	2	3	4	5	6	7	DK	NA
Closing on sale of a house	1	2	3	4	5	6	7	DK	NA

The questions in this section are about your use of personal assistants. If you have no personal assistants, please skip to question 39.

35. How many regularly assigned personal assistants do you use in your real estate business activities?

Number: _____   If 0, please skip to question 39.

36. Which of the following activities do you regularly delegate to an assistant?

Activity	No delegation						Full Delegation		
Showing houses	1	2	3	4	5	6	7	DK	NA
Handling purchase negotiations	1	2	3	4	5	6	7	DK	NA
Managing closing documents	1	2	3	4	5	6	7	DK	NA
Working with a buyer on financing	1	2	3	4	5	6	7	DK	NA
Managing listing information	1	2	3	4	5	6	7	DK	NA
Searching the MLS	1	2	3	4	5	6	7	DK	NA
Handling interactions with third–parties	1	2	3	4	5	6	7	DK	NA

37. Please check the ○ by all statements that describe your assistant(s). Please check all that apply.

○ Licensed real estate agents	○ Unlicensed
○ Paid by you	○ Paid by your company
○ Part–time	○ Full–time
○ Yours exclusively	○ Shared with others
○ Independent contractors	○ Employees
○ Hoping to work as a real estate agent	

38. On average how much do you pay your personal assistant(s) per year? Check all that apply?

○ $5,000 or less	○ $25,001–35,000	○ $75,001–100,000
○ $5,001–10,000	○ $35,001–50,000	○ $100,001–150,000
○ $10,001–25,000	○ $50,001–75,000	○ $150,001 or more

39. How many offers do you receive for a typical listing

_____ # of offers

40. Please circle the number that best indicates your level of agreement with each of the statements below.

	Strongly Disagree						Strongly Agree		
Sellers always get the asking price.	1	2	3	4	5	6	7	DK	NA
The market is a seller's market.	1	2	3	4	5	6	7	DK	NA
Buyers often offer more than the asking price.	1	2	3	4	5	6	7	DK	NA
An overpriced house will get no offers.	1	2	3	4	5	6	7	DK	NA
It is common for a seller to receive multiple bids.	1	2	3	4	5	6	7	DK	NA
Buyers often offer more than the asking price.	1	2	3	4	5	6	7	DK	NA

41. Where does your business come from? Please circle the number that best represents your answer.

	No business						All of my business		
Cold calls	1	2	3	4	5	6	7	DK	NA
Walk ins	1	2	3	4	5	6	7	DK	NA
Previous customer referrals (word of mouth)	1	2	3	4	5	6	7	DK	NA
My own contacts	1	2	3	4	5	6	7	DK	NA
My broker	1	2	3	4	5	6	7	DK	NA
Advertisement other than on the Internet.	1	2	3	4	5	6	7	DK	NA
Referrals from other agents	1	2	3	4	5	6	7	DK	NA
Repeat customers	1	2	3	4	5	6	7	DK	NA
My own Internet site	1	2	3	4	5	6	7	DK	NA
Internet company or agency site	1	2	3	4	5	6	7	DK	NA
Other local Internet site	1	2	3	4	5	6	7	DK	NA
National Internet site	1	2	3	4	5	6	7	DK	NA

*The questions in this section are about your income and the compensation arrangements made with your company. **Be assured that your responses are treated in strict confidence. No one outside the research team will see this data. All reporting of data will be only at a summary, aggregate level.***

42. Please tell us the kind of sales compensation arrangement you have with your company at present.

○ Share of agency profits   ○ Commission on 100% of property selling price   ○ Commission on less than 100% of property selling price

○ Other: (please describe)

43. What is the typical total percentage real estate agent commission on a property in your area?

_____ %

44. What is your current agency/agent split for your half of the commission?

○ Not on commission. Please skip to question 46.

_____% to agency /_____% to agent split

45. What percentage of YOUR share of the commission, if any, is allocated as a desk fee.
○ No Desk Fee

_____percentage of commission

46. Please indicate who pays for the following technology. If the cost is shared, please check both.

Cell phone	○ Agent	○ Agency	Internet connection	○ Agent	○ Agency
Web Page	○ Agent	○ Agency	Advertisement for homes	○ Agent	○ Agency
Land phone (office phone)	○ Agent	○ Agency	Advertisement for open houses	○ Agent	○ Agency
Technology fees	○ Agent	○ Agency	Personal promotion	○ Agent	○ Agency

47. What was your income earned from commissions since January 1, 2002?

○ $5,000 or less	○ $35,001–75,000	○ $500,001–$1 million
○ $5,001–10,000	○ $75,001–150,000	○ More than $1 million
○ $10,001–35,000	○ $150,001–500,000	○ Don't know

48. What was your NET PERSONAL income from all real estate activities since January 1, 2002?

○ $5,000 or less	○ $35,001–75,000	○ $500,001–$1 million
○ $5,001–10,000	○ $75,001–150,000	○ More than $1 million
○ $10,001–35,000	○ $150,001–500,000	○ Don't know

49. How much were your real estate–related expenses since January 1, 2002?

○ $2,500 or less	○ $15,001–35,500	○ $250,001–500,000
○ $2,501–5,000	○ $35,501–75,000	○ More than $500,000
○ $5,001–15,000	○ $75,001-250,000	○ Don't know

50. On average, how many real estate agents, other than yourself, work in your real estate agency? If you are not affiliated with an agency, please answer 0 and continue.

Number of real estate agents _____.

51. This question is about your access to the resources in your work. Please circle the number that best indicates your level of agreement with each of the statements below. If you are not affiliated with an agency, please skip to the next question.

	Strongly Disagree					Strongly Agree			
The agency I work for provides the resources I need in my work.	1	2	3	4	5	6	7	DK	NA
The agency I work for serves as a link to a network of connections to others that I need reach.	1	2	3	4	5	6	7	DK	NA
I use the networks developed by my agency in order to develop contacts with other business professionals.	1	2	3	4	5	6	7	DK	NA
Even though I work for an agency, I have to provide my own resources.	1	2	3	4	5	6	7	DK	NA
The resources I use in my work come from sources other than the agency I work for.	1	2	3	4	5	6	7	DK	NA
I often find myself having to look to sources external to my agency.	1	2	3	4	5	6	7	DK	NA
I am often physically present in the offices of my agency.	1	2	3	4	5	6	7	DK	NA

52. This question is about your view of the real estate industry and your use of information technology. Please circle the number that best indicates your level of agreement with each of the statements below.

	Strongly Disagree					Strongly Agree			
The structure of the profession will have to change to accommodate technology.	1	2	3	4	5	6	7	DK	NA
Recent developments on the Internet may make it possible for the seller and buyer of houses to find each other without the use of a real estate agent.	1	2	3	4	5	6	7	DK	NA
Buyers are using the Internet instead of an agent.	1	2	3	4	5	6	7	DK	NA
Sellers are using the Internet instead of an agent.	1	2	3	4	5	6	7	DK	NA
Real estate agents will have to rethink their job.	1	2	3	4	5	6	7	DK	NA

53. This question is about the time and money you expend in your work. Please circle the number that best indicates your level of agreement with each of the statements below.

	Strongly Disagree					Strongly Agree			
My biggest limitation is a lack of time.	1	2	3	4	5	6	7	DK	NA
It's most important to me to save time when working on a sale.	1	2	3	4	5	6	7	DK	NA
Saving time is my greatest concern.	1	2	3	4	5	6	7	DK	NA
I worry about how much time I spend on a client.	1	2	3	4	5	6	7	DK	NA
Saving effort is my greatest concern.	1	2	3	4	5	6	7	DK	NA
It's most important to me to save effort when working on a sale.	1	2	3	4	5	6	7	DK	NA
It's most important to me to eliminate surprises when working on a sale.	1	2	3	4	5	6	7	DK	NA
My use of information and communication technologies makes it possible to find more properties that are appropriate for a buyer.	1	2	3	4	5	6	7	DK	NA
My use of information and communication technologies makes it possible to find more buyers for a property.	1	2	3	4	5	6	7	DK	NA
My use of information and communication technologies reduces the chance of surprises during the sales process.	1	2	3	4	5	6	7	DK	NA

The questions in this section are about your interactions with others.

54. Please circle the number that best indicates your level of agreement with each of the statements below.

	Strongly Disagree					Strongly Agree			
Wherever I go, I meet somebody I know.	1	2	3	4	5	6	7	DK	NA
Other real estate agents envy me because of the way I use my contact list.	1	2	3	4	5	6	7	DK	NA
I wish I had a larger base of contacts.	1	2	3	4	5	6	7	DK	NA
In my day to day life, I am constantly meeting new people.	1	2	3	4	5	6	7	DK	NA
I seek opportunities to meet people.	1	2	3	4	5	6	7	DK	NA
I am always looking to add names to my contact list.	1	2	3	4	5	6	7	DK	NA
I am in frequent contact with people on my contact list.	1	2	3	4	5	6	7	DK	NA
Use of my contact list is one of my biggest assets.	1	2	3	4	5	6	7	DK	NA
I have lots of friends.	1	2	3	4	5	6	7	DK	NA
I have many opportunities to meet new people.	1	2	3	4	5	6	7	DK	NA
Every one I meet is a potential client.	1	2	3	4	5	6	7	DK	NA

	Strongly Disagree					Strongly Agree			
It is easy for me to meet new people.	1	2	3	4	5	6	7	DK	NA
I am constantly meeting new people.	1	2	3	4	5	6	7	DK	NA
I make use of acquaintances to meet new professionals that work in real estate.	1	2	3	4	5	6	7	DK	NA

55. Please circle the number that best indicates your level of agreement with each of the statements below.

	Strongly Disagree					Strongly Agree			
Other professionals want to work with me.	1	2	3	4	5	6	7	DK	NA
Other real estate professionals (mortgage officers, lawyers, etc.) seek me out for advice.	1	2	3	4	5	6	7	DK	NA
Most of my real estate colleagues perceive me as a leader on professional topics and issues.	1	2	3	4	5	6	7	DK	NA
Most of my business comes from referrals (previous customers and business base).	1	2	3	4	5	6	7	DK	NA
It's important to me to have a network of other professionals I can rely on.	1	2	3	4	5	6	7	DK	NA
I've developed enough professional contacts to excel in my job.	1	2	3	4	5	6	7	DK	NA
I've developed enough professional contacts so that I usually know most of the participants at a closing (lawyers, etc.).	1	2	3	4	5	6	7	DK	NA
I have worked with the same professionals for many years now.	1	2	3	4	5	6	7	DK	NA

56. This question is about your perceptions of working with others. The term "group" refers to the group of individuals you work with on a given sale. Please circle the number that best indicates your level of agreement with each of the statements below.

	Strongly Disagree					Strongly Agree			
I prefer to work with others in a group rather than working alone.	1	2	3	4	5	6	7	DK	NA
Given the choice, I would rather do a job where I can work alone rather than doing a job where I have to work with others in a group.	1	2	3	4	5	6	7	DK	NA
Working with a group is better than working alone.	1	2	3	4	5	6	7	DK	NA
People should be made aware that if they are going to be a part of a group then they are sometimes going to have to do things they don't want to.	1	2	3	4	5	6	7	DK	NA
People who belong to a group should realize that they're not always going to get what	1	2	3	4	5	6	7	DK	NA

	Strongly Disagree						Strongly Agree		
they personally want.									
People in a group should realize that they sometimes are going to have to make sacrifices for the sake of the group as a whole.	1	2	3	4	5	6	7	DK	NA
People in a group should be willing to make sacrifices for the sake of the group's well-being.	1	2	3	4	5	6	7	DK	NA
A group is more productive when its members do what they want to do rather than what the group wants them to do.	1	2	3	4	5	6	7	DK	NA
A group is most efficient when its members do what they think is best rather than doing what the group wants them to do.	1	2	3	4	5	6	7	DK	NA
A group is more productive when its members follow their own interests and concerns.	1	2	3	4	5	6	7	DK	NA

57. This question is about how you see yourself in your interaction with others. Please circle the number that best indicates your level of agreement with each of the statements below.

	Strongly Disagree						Strongly Agree		
I would probably make a good actor.	1	2	3	4	5	6	7	DK	NA
I find it hard to imitate the behavior of other people.	1	2	3	4	5	6	7	DK	NA
At parties and social gatherings, I do not attempt to do or say things that others will like.	1	2	3	4	5	6	7	DK	NA
I can only argue for ideas that I already believe.	1	2	3	4	5	6	7	DK	NA
I can make impromptu speeches even on topics about which I have almost no information.	1	2	3	4	5	6	7	DK	NA
I guess I put on a show to impress or entertain people.	1	2	3	4	5	6	7	DK	NA
In a group of people I am rarely the center of attention.	1	2	3	4	5	6	7	DK	NA
In different situations and with different people, I often act like very different people.	1	2	3	4	5	6	7	DK	NA
I am not particularly good at making other people like me.	1	2	3	4	5	6	7	DK	NA
I'm not always the person I appear to be.	1	2	3	4	5	6	7	DK	NA
I would not change my opinions (or the way I do things) in order to please someone else or win their favor.	1	2	3	4	5	6	7	DK	NA
I have considered being an entertainer.	1	2	3	4	5	6	7	DK	NA

I have never been good at charades or improvisational acting.	1	2	3	4	5	6	7	DK	NA
I have trouble changing my behavior to suit different people and different situations.	1	2	3	4	5	6	7	DK	NA
At a party I let others keep the jokes and stories going.	1	2	3	4	5	6	7	DK	NA
I feel a bit awkward in company and do not show up quite so well as I should.	1	2	3	4	5	6	7	DK	NA

58. List zip codes for the areas in which you work in descending order of volume of your sales.

_____Zip code (1st most sales)   _____Zip code (4th most sales)
_____Zip code (2nd most sales)   _____Zip code (5th most sales)
_____Zip code (3rd most sales)   _____Zip code (6th most sales)

59. To help us better understand your responses, please provide the following demographic information. Be assured that your responses are treated in strict confidence.

What year were you born?

_____year born

What is your gender?

O Male   O Female

How long have you worked in real estate?

_____years in the industry

How long have you lived in your current area?

_____years lived in the area

60. What are your current affiliations, memberships, and professional designations? Please check all that apply.

O ABR   O GRI   O NAR
O CRS   O CBR   O RMM

O Others: (please specify)

61. What is the highest level of education you have completed (please check only one)?

O Some High School	O Associate's Degree	O Master's Degree
O High School	O Bachelor's Degree	O MBA or Law Degree
O Some college	O Some graduate school	O Doctorate

If you have any comments or suggestions, we'd love to hear from you. Please use the space below and on the next page to share your thoughts.

Please continue with your comments or suggestions in the space below.

THANK YOU!

PLEASE RETURN YOUR COMPLETED QUESTIONNAIRE IN THE PRE-ADDRESSED,
POSTAGE-PAID ENVELOPE.

If you have questions, comments, or concerns about this study, please feel free to contact us.

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For more information about this research project, please see the WWW address below:
http://crowston.syr.edu/real-estate/

Appendix E1: Pre-notification postcard for survey

Text for notification.

LOGOS GO HERE

Would you like to know how real estate agents across the U.S. use technology? Please help us with our research and we will fill you in.

A few days from now you will receive in the mail a request to fill out a questionnaire for an important research project being conducted by researchers from the *School of Information Studies at Syracuse University*, the *School of Information Sciences and Technology at the Pennsylvania State University* and the *Department of Information Science at the University of Arkansas at Little Rock*, with support from both the *National Science Foundation* and the *National Association of REALTORS®*.

We write now to both alert you to the arrival of the survey in the mail and to ask for your help in completing it! The survey will ask about your experiences as a real estate professional and your use of information technology. It is only with generous help of people like you that our research can be successful.

The survey is designed for residential real estate agents who sell real estate. If you are a not a residential real estate agent who actually sells real estate please take a minute or two and visit the following WWW site. The site will allow you to indicate that the survey is not applicable to you so that we do not mail you the survey and follow up letter.

Sincerely,

Marcel Allbritton, (mmallbri@syr.edu) Rolf Wigand, (rtwigand@ualr.edu)
Kevin Crowston, (crowston@syr.edu) Steve Sawyer, (sawyer@ist.psu.edu)
Contact Information: Telephone: (877) 485-8098 FAX: (315) 443-5806
For more information about this research project, visit us on the web at http://crowston.syr.edu/real-estate/

Appendix E2: Follow-up postcard for survey

LOGOS GO HERE

About two weeks ago a questionnaire was mailed to you asking about your experiences as a real estate professional and your use of information technology.

Your name was selected randomly from the membership list of the *National Association of REALTORS®*. If you have already completed and returned the questionnaire to us, please accept our sincere thanks. If not, please do so today. We are especially grateful for your help because it is only by asking people like you to share experiences that we can understand the work processes and information technology use of residential real estate agents.

If you did not receive a questionnaire, or if it was misplaced, you can download a printable version at http://crowston.syr.edu/real-estate/survey2002.pdf. You may also call us at the phone number below and we will get another survey in the mail to you today.

Sincerely,

Marcel Allbritton, (mmallbri@syr.edu) Rolf Wigand, (rtwigand@ualr.edu)
Kevin Crowston, (crowston@syr.edu) Steve Sawyer, (sawyer@ist.psu.edu)
Contact Information: Telephone: (877) 485-8098 FAX: (315) 443-5806
For more information about this research project, visit us on the web at http://crowston.syr.edu/real-estate/

Appendix E3: Survey

THE 2003 SURVEY OF WORK ENVIRONMENT AND
INFORMATION AND COMMUNICATION TECHNOLOGY USE
OF RESIDENTIAL REAL ESTATE AGENTS

PLEASE START HERE.

1. What kind of real estate work do you do? Please check all the O's that apply.

O Business sales
O Corporate sales
O Broker-owner (no selling)
O Development/Relocation (no selling)
O Manager (no selling)
O Personal Assistant (no selling)
O Other (no selling)
This survey is designed for residential real estate agents who are actively selling real estate at the current time. If you are NOT currently active in selling residential real estate **please go no further**. Instead, please return this survey or visit the following WWW site: http://crowston.syr.edu/real-estate/nosurvey.php to indicate your job classification. It is important that you return the survey or visit the web site so that we know the survey is not applicable in your case!

O Residential real estate (full time)	PLEASE CONTINUE
O Residential real estate (part time)	PLEASE CONTINUE

2. What is your job title? If you have multiple job titles, please check the O in front of the ONE title that best describes your work.

O Broker-Owner (with some selling)	O Personal Assistant (with some selling)
O Associate Broker (with selling)	O Sales Agent (with some selling)
O Manager (with some selling)	O Other (with some selling)

These questions ask about your use of information and communications technologies in your real estate work.

3. **How often do you use each of these kinds of information or communication technologies in a typical WORK WEEK? For each technology, please circle the number that best represents your answer. Please circle "DK" if you do not know the answer and "NA" if the answer is not applicable to you.**

Technology	Never						Many times a day		
Email	1	2	3	4	5	6	7	DK	NA
Cell phone	1	2	3	4	5	6	7	DK	NA
Your own website	1	2	3	4	5	6	7	DK	NA
Internet	1	2	3	4	5	6	7	DK	NA

4. **How much do you depend on the following in your day-to-day real estate activities?**

Technology	Not at all						Totally		
Email	1	2	3	4	5	6	7	DK	NA
Cell phone	1	2	3	4	5	6	7	DK	NA
Your own website	1	2	3	4	5	6	7	DK	NA
Internet	1	2	3	4	5	6	7	DK	NA

5. **Please circle the number which best indicates your level of agreement with the following statements.**

Using my cell phone …	Strongly Disagree						Strongly Agree		
Saves me money.	1	2	3	4	5	6	7	DK	NA
Saves me time.	1	2	3	4	5	6	7	DK	NA
Reduces surprises.	1	2	3	4	5	6	7	DK	NA
Enables me to do more business.	1	2	3	4	5	6	7	DK	NA
Makes me more successful.	1	2	3	4	5	6	7	DK	NA

6. Which of the following features of the Internet do you personally use regularly for your professional real estate work?

Search engines (e.g.,Google™,Altavista™)	O Use	O Don't use	Chat rooms or bulletin boards	O Use	O Don't use
Internet site with community data	O Use	O Don't use	Registration for licensing on a Internet site	O Use	O Don't use
Portals (web links you start from, e.g., Yahoo)	O Use	O Don't use	Internet site with real estate coursework	O Use	O Don't use
On–line real estate calculators	O Use	O Don't use	REALTOR.com™	O Use	O Don't use
Internet site with sales information	O Use	O Don't use	Internet site with state or local government information	O Use	O Don't use
Internet site to file closing paperwork	O Use	O Don't use	Web access to MLS listings	O Use	O Don't use

7. Please circle the number which best indicates your level of agreement with the following statements.

Using the Internet …	Strongly Disagree						Strongly Agree		
Saves me money.	1	2	3	4	5	6	7	DK	NA
Saves me time.	1	2	3	4	5	6	7	DK	NA
Reduces surprises.	1	2	3	4	5	6	7	DK	NA
Enables me to do more business.	1	2	3	4	5	6	7	DK	NA
Makes me more successful.	1	2	3	4	5	6	7	DK	NA
Helps me stay in touch with other professionals.	1	2	3	4	5	6	7	DK	NA

8. How many work related email messages (i.e., not counting spam or personal emails) do you receive in a typical work day?

O Don't use email. Please skip to question 9.

O No messages	O 21–30 messages	O 51-79 messages
O 1–10 messages	O 31–40 messages	O 80 or more messages
O 11–20 messages	O 41–50 messages	O DK

9. **This question concerns your personal Web presence (i.e., your own Web page or information about you as a real estate agent posted on other Web pages). On which Web sites do your listings appear? Please check all that apply.**

○ Don't have my own Web presence. Please skip to question 11.

Your own personal site	○ Yes	○ No	Homeadvisor™	○ Yes	○ No
REALTOR.com™	○ Yes	○ No	Your franchise's site	○ Yes	○ No
Your company's site	○ Yes	○ No	Local real estate magazine site	○ Yes	○ No
Local newspaper site	○ Yes	○ No	Local community site	○ Yes	○ No
Local REALTOR™ Association Site	○ Yes	○ No	Other 3rd party site	○ Yes	○ No

○ Others: (please write in the URLs)

_____

10. **Which of the following features are included in your Web presence? Please check all that apply.**

Have own page on company Internet site	○ Yes	○ No	Provide virtual tours or walk-throughs on my Internet site	○ Yes	○ No
Provide list of links on my Internet site	○ Yes	○ No	Have own domain name	○ Yes	○ No
Have own Internet site with listings information	○ Yes	○ No			

11. **How much EFFORT do you EXPEND on the following tasks?**

Task	No effort					A great deal of effort			
Prospecting for sellers	1	2	3	4	5	6	7	DK	NA
Prospecting for buyers	1	2	3	4	5	6	7	DK	NA
Getting a new listing	1	2	3	4	5	6	7	DK	NA
Marketing a listing	1	2	3	4	5	6	7	DK	NA
Finding a house for a buyer	1	2	3	4	5	6	7	DK	NA
Helping a buyer select a house	1	2	3	4	5	6	7	DK	NA
Negotiating a contract to purchase	1	2	3	4	5	6	7	DK	NA
Removing contract contingencies	1	2	3	4	5	6	7	DK	NA
Closing on sale of a house	1	2	3	4	5	6	7	DK	NA

12. On which of the following tasks do you FOCUS your EFFORTS?

Task	Not focused					Main Focus			
Prospecting for sellers	1	2	3	4	5	6	7	DK	NA
Prospecting for buyers	1	2	3	4	5	6	7	DK	NA
Getting a new listing	1	2	3	4	5	6	7	DK	NA
Marketing a listing	1	2	3	4	5	6	7	DK	NA
Finding a house for a buyer	1	2	3	4	5	6	7	DK	NA
Helping a buyer select a house	1	2	3	4	5	6	7	DK	NA
Negotiating a contract to purchase	1	2	3	4	5	6	7	DK	NA
Removing contract contingencies	1	2	3	4	5	6	7	DK	NA
Closing on sale of a house	1	2	3	4	5	6	7	DK	NA

13. On which of the following tasks do you SPEND the most TIME?

Task	No time					All time			
Prospecting for sellers	1	2	3	4	5	6	7	DK	NA
Prospecting for buyers	1	2	3	4	5	6	7	DK	NA
Getting a new listing	1	2	3	4	5	6	7	DK	NA
Marketing a listing	1	2	3	4	5	6	7	DK	NA
Finding a house for a buyer	1	2	3	4	5	6	7	DK	NA
Helping a buyer select a house	1	2	3	4	5	6	7	DK	NA
Negotiating a contract to purchase	1	2	3	4	5	6	7	DK	NA
Removing contract contingencies	1	2	3	4	5	6	7	DK	NA
Closing on sale of a house	1	2	3	4	5	6	7	DK	NA

14. Please circle the number that best indicates your level of agreement with each of the statements below.

	Strongly Disagree					Strongly Agree			
My biggest limitation is a lack of time.	1	2	3	4	5	6	7	DK	NA
It's most important to me to save time when working on a sale.	1	2	3	4	5	6	7	DK	NA
Saving time is my greatest concern.	1	2	3	4	5	6	7	DK	NA
I worry about how much time I spend on a client.	1	2	3	4	5	6	7	DK	NA
Saving effort is my greatest concern.	1	2	3	4	5	6	7	DK	NA
It's most important to me to save effort when working on a sale.	1	2	3	4	5	6	7	DK	NA

The questions in this section are about the market in which you work.

15. What is the median price for an existing single-family home in your area (i.e., the price of a home in the middle of the range of prices)?

$_____ for a single-family home in the middle of the price range

16. How many offers in total (for a typical listing) do buyers receive for a typical listing?

_____ offers

17. What is the typical commission paid on a residential home sale to the agents involved in the transaction? Please give the percentage commission paid to each of the agents involved in the transaction and the percentage of the total sales price on which commissions are calculated.

Example:

If the two agents split a 7% commission calculated on 100% of the selling price, you would answer as follows:

3.5	% of	100	% of the selling price to the seller's agent
3.5	% of	100	% of the selling price to the buyer's agent
7	% total commission

Your answers:

_____	% of	_____	% of the selling price to the seller's agent
_____	% of	_____	% of the selling price to the buyer's agent
_____	% total commission

○ **NA (sellers do not pay commission, e.g., flat fee for handling a sale) Please skip to question 18.**

18. Please circle the number that best indicates your level of agreement with each of the statements below.

	Strongly Disagree					Strongly Agree			
Sellers always get the asking price.	1	2	3	4	5	6	7	DK	NA
The market is a seller's market.	1	2	3	4	5	6	7	DK	NA
Buyers often offer more than the asking price.	1	2	3	4	5	6	7	DK	NA
An overpriced house will get no offers.	1	2	3	4	5	6	7	DK	NA
It is common for a seller to receive multiple bids.	1	2	3	4	5	6	7	DK	NA

The questions in the following section are about your income and the compensation arrangements made with your company. Be assured that your responses are treated in strict confidence. No one outside the research team will see this data. All reporting of data will be only at a summary, aggregate level.

19. What was your TOTAL income earned from commissions in 2002 (Jan 1 to Dec 31)?

○ $5,000 or less	○ $35,001–75,000	○ $500,001–$1 million
○ $5,001–10,000	○ $75,001–150,000	○ More than $1 million
○ $10,001–35,000	○ $150,001–500,000	○ Don't know

20. What was your NET PERSONAL income from all real estate activities in 2002 (Jan 1 to Dec 31)?

○ $5,000 or less	○ $35,001–75,000	○ $500,001–$1 million
○ $5,001–10,000	○ $75,001–150,000	○ More than $1 million
○ $10,001–35,000	○ $150,001–500,000	○ Don't know

21. How much were your real estate–related expenses in 2002 (Jan 1 to Dec 31)?

○ $2,500 or less	○ $15,001–35,500	○ $250,001–500,000
○ $2,501–5,000	○ $35,501–75,000	○ More than $500,000
○ $5,001–15,000	○ $75,001-250,000	○ Don't know

22. Please tell us the kind of sales compensation arrangement you have with your company at present.

○ Share of agency profits	○ Commission on 100% of property selling price	○ Commission on less than 100% of property selling price

○ Others: (please describe) _____

23. How many existing single-family homes did you sell in 2002 (please count only sales with a closing date of Jan 1 to Dec 31, 2002)?

_____ existing single-family homes sold in 2002

24. What is the current agency/agent split for the half of the commission received for handling on a purchase or sale?

○ NA (not on commission) Please skip to question 25.

split _____% to agency /_____% to agent for residential home purchases

split _____% to agency /_____% to agent for residential home sales

25. How much do you pay as a desk fee?

O No Desk Fee

_____% of total commissions received

$ _____ flat desk fee per month

26. Please indicate who pays for the following. If the cost is shared, please check both.

Cell phone	O Agent	O Agency	Internet connection	O Agent	O Agency
Web Page	O Agent	O Agency	Advertisement for homes	O Agent	O Agency
Land phone (office phone)	O Agent	O Agency	Advertisement for open houses	O Agent	O Agency
Technology fees	O Agent	O Agency	Personal promotion	O Agent	O Agency

The questions in this section are about your interactions with others.

27. Please circle the number that best indicates your level of agreement with each of the statements below.

	Strongly Disagree					Strongly Agree			
Wherever I go, I meet somebody I know.	1	2	3	4	5	6	7	DK	NA
I seek opportunities to meet people.	1	2	3	4	5	6	7	DK	NA
I am always looking to add names to my contact list.	1	2	3	4	5	6	7	DK	NA
I am in frequent contact with people on my contact list.	1	2	3	4	5	6	7	DK	NA
I have lots of friends.	1	2	3	4	5	6	7	DK	NA
I have many opportunities to meet new people.	1	2	3	4	5	6	7	DK	NA
I am constantly meeting new people.	1	2	3	4	5	6	7	DK	NA
Other professionals want to work with me.	1	2	3	4	5	6	7	DK	NA
Other real estate professionals (mortgage officers, lawyers, etc.) seek me out for advice.	1	2	3	4	5	6	7	DK	NA
Most of my real estate colleagues perceive me as a leader on professional topics and issues.	1	2	3	4	5	6	7	DK	NA
I've developed enough professional contacts to excel in my job.	1	2	3	4	5	6	7	DK	NA
I've developed enough professional contacts so that I usually know most of the participants at a closing (lawyers, etc.).	1	2	3	4	5	6	7	DK	NA
I have worked with the same professionals for many years now.	1	2	3	4	5	6	7	DK	NA

28. **This question is about how you see yourself in your interaction with others. Please circle the number that best indicates your level of agreement with each of the statements below.**

	Strongly Disagree					Strongly Agree			
I would probably make a good actor.	1	2	3	4	5	6	7	DK	NA
I find it hard to imitate the behavior of other people.	1	2	3	4	5	6	7	DK	NA
At parties and social gatherings, I do not attempt to do or say things that others will like.	1	2	3	4	5	6	7	DK	NA
I can only argue for ideas that I already believe.	1	2	3	4	5	6	7	DK	NA
I can make impromptu speeches even on topics about which I have almost no information.	1	2	3	4	5	6	7	DK	NA
I guess I put on a show to impress or entertain people.	1	2	3	4	5	6	7	DK	NA
In a group of people I am rarely the center of attention.	1	2	3	4	5	6	7	DK	NA
In different situations and with different people, I often act like very different people.	1	2	3	4	5	6	7	DK	NA
I am not particularly good at making other people like me.	1	2	3	4	5	6	7	DK	NA
I'm not always the person I appear to be.	1	2	3	4	5	6	7	DK	NA
I would not change my opinions (or the way I do things) in order to please someone else or win their favor.	1	2	3	4	5	6	7	DK	NA
I have considered being an entertainer.	1	2	3	4	5	6	7	DK	NA
I have never been good at charades or improvisational acting.	1	2	3	4	5	6	7	DK	NA
	Strongly Disagree					Strongly Agree			
I have trouble changing my behavior to suit different people and different situations.	1	2	3	4	5	6	7	DK	NA
At a party I let others keep the jokes and stories going.	1	2	3	4	5	6	7	DK	NA
I feel a bit awkward in company and do not show up quite so well as I should.	1	2	3	4	5	6	7	DK	NA
I can look anyone in the eye and tell a lie with a straight face (if for a good end).	1	2	3	4	5	6	7	DK	NA
I may deceive people by being friendly when I really dislike them.	1	2	3	4	5	6	7	DK	NA

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29. This question is about your perceptions of working with others. Please circle the number that best indicates your level of agreement with each of the statements below. In these questions, "group" refers to the group of professionals you work with to complete a sale.

	Strongly Disagree					Strongly Agree			
I prefer to work with others in a group rather than working alone.	1	2	3	4	5	6	7	DK	NA
Given the choice, I would rather do a job where I can work alone.	1	2	3	4	5	6	7	DK	NA
Working with a group is better than working alone.	1	2	3	4	5	6	7	DK	NA
People should be made aware that if they are going to be a part of a group then they are sometimes going to have to do things they don't want to do.	1	2	3	4	5	6	7	DK	NA
People who belong to a group should realize that they're not always going to get what they personally want.	1	2	3	4	5	6	7	DK	NA
People in a group should realize that they sometimes are going to have to make sacrifices for the sake of the group as a whole.	1	2	3	4	5	6	7	DK	NA
People in a group should be willing to make sacrifices for the sake of the group's well-being.	1	2	3	4	5	6	7	DK	NA
A group is more productive when its members do what they want to do rather than what the group wants them to do.	1	2	3	4	5	6	7	DK	NA
A group is most efficient when its members do what they think is best rather than doing what the group wants them to do.	1	2	3	4	5	6	7	DK	NA
A group is more productive when its members follow their own interests and concerns.	1	2	3	4	5	6	7	DK	NA

This section of questions collects background information to help us better understand your responses.

30. Please answer each question below. Be assured that your responses are treated in strict confidence.

What year were you born?

_____ year born

What is your gender?

○ Male   ○ Female

How long have you worked in real estate?

_____ years in the industry

How long have you lived in your current area?   _____ years lived in the area

31. What are your current affiliations, memberships, and professional designations? Please check the ○ for all that apply.

○ ABR   ○ GRI   ○ NAR
○ CRS   ○ CBR   ○ RMM

○ Others: (please specify) _____

32. What is the highest level of education you have completed (please check only one)?

○ Some High School	○ Associate's Degree	○ Master's Degree
○ High School	○ Bachelor's Degree	○ MBA or Law Degree
○ Some college	○ Some graduate school	○ Doctorate

33. If there is anything else you would like to tell us about this survey, or our research efforts, please do so in the space provided below.

PLEASE RETURN YOUR COMPLETED QUESTIONNAIRE IN THE
PRE-ADDRESSED, POSTAGE-PAID ENVELOPE.

If you have questions, comments, or concerns about this study, please feel free to contact us.

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For more information about this research project, please visit us on the web at
http://crowston.syr.edu/real-estate/

THANK YOU!

Appendix F1: An overview of structural equation modeling

In this section, I provide an overview of structural equation modeling, the major type of statistical analysis used in this research. A unique characteristic of structural equation modeling is that the analysis provides explicit estimates of error variance including possible error in independent variables. Structural equation modeling also allows for modeling multivariate relations and for estimating indirect effects.

In simple terms, structural equation modeling allows for estimating the probability that a hypothesized model is representative of a model inferred from data of a population. In statistical terms, structural equation modeling determines the fit between restricted covariance matrix implied by the hypothesized model and the sample covariance matrix from the data.

Structural equation is a statistical methodology that takes a confirmatory (i.e. hypotheses testing) approach to the analysis of a structural theory bearing on some phenomenon. In structural equation modeling (1) causal processes are represented by a series of structural (i.e. regression) equations. The structural equation maps to a hypothesized theoretical model (Byrne 2001). The pattern of intervariate relations should be specified a priori. To test a model for its fitness to the collected data, there must be theoretical support and empirical evidence to suggest the structure of the model or the correlation among the components of the model.

There are several assumptions that are critical for structural equation modeling: (1) large sample size, (2) multivariate normal distribution, (3) valid hypothesized model, and (4) continuous scale. Different sections in this chapter discuss addressing these assumptions. The purpose of this section was to provide a cursory description of structural equation modeling and present the some of the criteria and assumptions of this type of analysis.

Interpretation of structural equation modeling analysis.

In this section, I review the statistics used in structural equation modeling when determining the fit of a model and diagnosing possible changes to a given model to improve fit. There are many different statistics for model fit used in SEM. In this research I use the fit indices or statistics that are used when reporting findings in journals that publish in the field of organizational behavior and management of information systems. In the next several paragraphs, I will provide descriptions of the indices of fit statistics used in this research. This will aid the reader in understanding the structural equation results presented in chapter 4.

A minimal set of indices reported in structural equation modeling analysis would include: the X^2 statistic and its degrees of freedom, and significance level, an index that explains the overall proportion of explained variance such as the CFI, an index that adjusts the proportion of explained variance for model complexity, such as the GFI, and an index based on the standardized residuals such as the RMSEA.

Three limitations of all fit indices should be kept in mind: (1) fit indices indicate only the overall or average fit of a model, (2) fit indices do not indicate whether the results are theoretically meaningful, and (3) good values of fit indices do not indicate that the predictive power of the models is also high (Byrne, 2001; Kline, 2004).

With a large sample and under the assumption of multivariate normality, the X^2 statistic for a model is interpreted as a test of significance in the fit between that model and the data. The lower the X^2 value, the better the fit of the model.

The X^2 divided by the degrees of freedom serves as a check against achieving a significant value for the X^2 due to a large sample size even though differences between observed and model-implied covariances are slight. To reduce the sensitivity of the X^2 statistic to sample size, some researchers divide its value by the degrees of freedom resulting in a lower value.

The GFI is analogous to a squared multiple correlation in that it indicates the proportion of the observed covariances explained by the model-implied covariances. The AGFI is a squared multiple correlations corrected for model complexity.

The NFI indicates the proportion in the improvement of overall fit of the researcher's model relative to the null model. The typical null model is an independent model in which the observed variables are assumed to be uncorrelated. The CFI is interpreted in the same way as the NFI but is less affected by sample size.

The standardized root mean squared residual (SRMR) is a standardized summary of the average covariance. Covariance residuals are the differences between the observed and model implied covariances.

The RMR, root mean square residual, represents the average residual value derived from the fitting of the variance-covariance matrix for the hypothesized model to the variance-covariance matrix of the sample data. The standardized RMR represents the average value across all standardized residuals and ranges from zero to 1.00. In a well fitting model the value is smaller. The standardized RMR represents the average discrepancy between the sample observed and the hypothesized correlation matrices. It can be interpreted as the degree to which the value explains the correlations to within an average error of whatever the given value is. When the fit of a model is perfect, the SRMR equals zero.

Model generation.

This section describes the process of structural equation modeling. A description is provided here so that the reader is able to clearly interpret the results presented in chapter 4, findings. The model generating scenario is the most common of the different approaches to using structural equation modeling. The model generating scenario represents the case where the researcher, having postulated and rejected a theoretically derived model on the basis of poor fit to the sample data, proceeds in an exploratory rather than a confirmatory fashion to modify and reestimate the model. Respecification is both theory and data driven. The ultimate objective is to find a model that is both substantively meaningful and statistically well fitting.

The findings of well-fitting hypothesized models, where the X^2 value approximates the degrees of freedom, have proven to be unrealistic in most structural equation modeling empirical research (Byrne, 2001). More common is a large X^2 relative to degrees of freedom, indicating a need to modify the model in order to better fit the data (Byrne, 2001). At this point the SEM analysis ceases to be confirmatory and becomes exploratory. As long as the researcher is fully cognizant of the exploratory nature of his or her analysis, the process of post hoc model fitting can be substantively meaningful because practical as well as statistical significance can be taken into account (Byrne, pg. 248). In the interest of future research, the researcher should probe into why the model is rejected.

The M.I. index is a statistic used in fitting the structural equation model. The structural equation modeling program provides a statistic referred to as a modification index which is a X^2 statistic with one degree of freedom. An MI value is provided for each fixed parameter specified, the value of which represents the expected drop in overall x2 value if the parameter were to be freely estimated in a subsequent run. The MI index allows the researcher to identify those observed measures that could allow for better model fit. Large MIs argue for the presence of factor cross-loadings. High measurement error covariances represent systematic error.

Steps for conducting the structural equation model generation are as follows: (1) Fit of the proposed structural model is determined. (2) The hypothesized model is evaluated with adjustments made to the measurement models for each of the constructs. (3) The source of misfit is identified and explained relative to the hypothesized model. (4) The structural model is evaluated and corrections are performed that are necessary to obtain a model with acceptable fit which may include allowing error variances to covary and, in some cases, omitting items. (5) A substantively meaningful and statistically meaningful model is determined that better fits the data. (6) Explanations are provided for distinctions between the hypothesized model and the accepted model. Decisions to allow variables to covary or to delete variables must meet the following criteria: (1) theoretical justification, (2) degrees of freedom, (3) model fit, and (4) statistical soundness.

Structural equation modeling analysis.

The statistical procedure of structural equation modeling was thoroughly reviewed in chapter 3 so an in depth description of structural equation modeling analysis is not provided here. Also discussed in chapter 3 were the meaning and application of different fit statistics used in structural equation modeling analysis.

In the following sections, limitations of structural equation modeling analysis are described, and findings from analysis of the initial and revised structural equation models are presented. Acceptance and rejection of models is discussed based on fit indices that provide statistical values reflective of the fit of the proposed models with the data. The initial structural equation model discussed includes all of the constructs and items that were produced from factor analysis and individual SEM analysis of each measurement.

The revised model is a revision of the initial model created by making certain changes in parameters suggested by statistical fit indices of the initial model. In addition to the support of statistical findings, theoretical and valid reasons must be provided to support changes in the revised model. These justifications with respect to validity and theory are presented in support of suggested changes.

The process of structural equation modeling has limitations with respects to the interpretation and application of findings. The limitations refer to the interpretation of statistics and the ability of the model to explain relationships among variables.

The proposed model is a model that has some explanatory power and is predictive in nature. The predictors chosen for the model are not purported to be the sole predictors for the variables indicated. There are other variables that explain the phenomenon of study, but the focus of my research is on strong and weak tie personal social network connectivity as predictors of performance and individual characteristics relative to strong and weak tie personal social network connectivity.

Relationships are more likely to be significant when using a large sample size for analysis. Statistics in structural equation modeling such as X^2/df make adjustments to account for the tendency of large sample sizes to be significant. In this research, particular attention was paid to this bias towards statistical significance given that the study made use of a large sample size. The x2/df is generally used as a determinant of model fit given that the statistic controls for sample size. Another measure of statistical significance for an SEM model is the "p value" this value suggests that a model is significant when a p value of .05 or above is obtained. It is much more difficult to achieve a desired probability level for SEM as it reflects the significance of the entire model, not just the relationship among multiple variables. SEM results are often published without including the probability level and regardless of whether significance is achieved. Published research on SEM often ignores the statistic of p value and uses the x2/df value to represent the fit of the model.

Another limitation of results from structural equation modeling analysis is that SEM results do not have inherent meaning. The meaning of the statistical results must be supported by concept, theory, and previous research. The application of theory with respects to findings is discussed. The conceptual development of the constructs in the study was also examined with respects to findings.

Cross-sectional data were used to assess relationships meaning the phenomenon was studied taking a cross section of it at one time. Thus data is reflective of observations made at one time. Given that the study was cross sectional in design, findings reflect association rather than causal links between constructs.

Structural equation models only imply preconceived causal ordering. Thus relationships are not causal but associative in nature. Despite its advantages, structural equation modeling does not provide evidence of causality, and it does not "prove" the superiority of one model over all possible alternative models. Any argument for causality is conceptually and theoretically based. Further limitations include biases from omitted variables and the possibility of mutual influence among constructs. Having discussed some of the limitations of structural equation modeling analysis, I now report results from the analysis firstly describing results from the initial SEM model and then results from the adjusted model.

Confirmatory analysis of measurements.

The purpose of the research focused on measurement development as well as descriptives and hypotheses testing. The earlier scale development derived from factor analysis of the pre-test and a pilot test is discussed in chapter 3. Findings discussed here are confirmatory analysis of final measurement models in the form of confirmatory factor analysis and SEM measurement models. Conceptual, theoretical, and statistical soundness is assessed for each final index or scale used to measure a construct. Explanations are provided in support of the choices made in confirmatory analysis of the measurement scales of constructs used in the study. Results of survey analysis are presented here for each final measurement model.

In deciding upon further adjustments to scales there were several concerns: (1) the regression coefficient for the measure item as a predictor of the construct. (2) reliability of the items, (3) face validity, (4) factor analysis results, (5) variance accounted for, (6) theoretical justification, and (7) conceptual justification. All scales were developed from literature, a pre-test, and a pilot test.

For each scale, a conceptual description is presented and items used to measure the construct are presented. Then results from SEM analysis of items are presented and discussed

indicating the factor loading of each item, as well as the significance, variance accounted for, and effect size. A discussion is also provided describing the final measurement derived.

Appendix F2: Survey questions

id	Respondent identification number
q1r1	Business sales
q1r2	Corporate sales
q1r3	Broker-owner (no selling)
q1r4	Development/Relocation (no selling)
q1r5	Manager (no selling)
q1r6	Personal Assistant (no selling)
q1r7	Other (no selling)
q1r8	Residential real estate (full time)
q1r9	Residential real estate (part time)
q2r1	Job Title
q3r1	Frequency of email
q3r2	Frequency of cell
q3r3	Frequency of your own website
q3r4	Frequency of Internet
q4r1	Dependence on email
q4r2	Dependence on cell phone
q4r3	Dependence on own website
q4r4	Dependence on Internet
q5r1	Cell phone saves me money.
q5r2	Cell phone saves me time.
q5r3	Cell phone reduces surprises.
q5r4	Cell phone enables me to do more business.
q5r5	Cell phone makes me more successful.
q6r1	Search engines
q6r2	(e.g.,Google,Altavista)
q6r3	Internet site with community data
q6r4	Portals (web links you start from, e.g., Yahoo)
q6r5	OnÐline real estate calculators
q6r6	Internet site with sales information
q6r7	Chat rooms or bulletin boards
q6r8	Registration for licensing on a Internet site
q6r9	Internet site with real estate coursework
q6r10	REALTOR.com
q6r11	Internet site with state or local government information
q6r12	Web access to MLS listings
q7r1	Internet saves me money.
q7r2	Interent saves me time.
q7r3	Internet reduces surprises.
q7r4	Internet enables me to do more business.
q7r5	Internet makes me more successful.
q7r6	Interenet helps me stay in touch with other professionals.
q8r1	Don't use email
q8r2	Email messages received in a day
q9r1	Don't have my own Web presence
q9r2	Your own personal site
q9r3	REALTOR.com
q9r4	Your company's site
q9r5	Local newspaper site
q9r6	Local REALTOR Association Site
q9r7	Homeadvisorä

q9r8	Your franchise's site
q9r9	Local real estate magazine site
q9r10	Local community site
q9r11	Other 3rd party site
q9r12	Others
q10r1	Have own page on company Internet site
q10r2	Provide list of links on my Internet site
q10r3	Have own Internet site with listings information
q10r4	Provide virtual tours or
q10r5	walk-throughs on my Internet site
q11r1	Effort expended prospecting for sellers
q11r2	Effort expended prospecting for buyers
q11r3	Effort expended getting a new listing
q11r4	Effort expended marketing a listing
q11r5	Effort expended finding a house for a buyer
q11r6	Effort expended helping a buyer select a house
q11r7	Effort expended negotiating a contract to purchase
q11r8	Effort expended removing contract contingencies
q11r9	Effort expended closing on sale of a house
q12r1	Focus effort on prospecting for sellers
q12r2	Focus effort on prospecting for buyers
q12r3	Focus effort on getting a new listing
q12r4	Focus effort on marketing a listing
q12r5	Focus effort on finding a house for a buyer
q12r6	Focus effort on helping a buyer select a house
q12r7	Focus effort on negotiating a contract to purchase
q12r8	Focus effort on removing contract contingencies
q12r9	Focus effort on closing on sale of a house
q13r1	Spend time on prospecting for sellers
q13r2	Spend time on prospecting for buyers
q13r3	Spend time on getting a new listing
q13r4	Spend time on marketing a listing
q13r5	Spend time on finding a house for a buyer
q13r6	Spend time on helping a buyer select a house
q13r7	Spend time on negotiating a contract to purchase
q13r8	Spend time on removing contract contingencies
q13r9	Spend time on closing on sale of a house
q14r1	My biggest limitation is a lack of time.
q14r2	It's most important to me to save time when working on a sale.
q14r3	Saving time is my greatest concern.
q14r4	I worry about how much time I spend on a client.
q14r5	Saving effort is my greatest concern.
q14r6	It's most important to me to save effort when working on a sale.
q15r1	Median price for home
q16r1	Offers received bu buyers for listing
q17r1	Commission to seller's agent
q17r2	Percent of selling price to seller's agent
q17r3	Commission to buyer's agent
q17r4	Percent of selling price to buyer's agent
q17r5	Total commission
q17r6	Sellers do not pay commission
q18r1	Sellers always get the asking price.
q18r2	The market is a seller's market.
q18r3	Buyers often offer more than the asking price.
q18r4r	An overpriced house will get no offers.
q18r5	It is common for a seller to receive multiple bids.

q19r1	Total income earned from commissions
q20r1	Net personal income from all real estate activities
q21r1	Real estateÐrelated expenses
q22r1	Share of agency profits
q22r2	Commission on 100% of property selling price
q22r3	Commission on less than 100% of property selling price
q23r1	Number of homes sold
q24r1	Not on commission
q24r2	Percent to agency for home purchases
q24r3	Percent to agent for home purchases
q24r4	Percent to agency for home sales
q24r5	Percent to agent for home sales
q25r1	No desk fee
q25r2	Percent of total commissions received
q25r3	Flat desk fee per month
q26r1	Cell phone
q26r2	Web Page
q26r3	Land phone
q26r4	(office phone)
q26r5	Internet connection
q26r6	Advertisement for homes
q26r7	Advertisement for open houses
q26r8	Personal promotion
q27r1	Wherever I go, I meet somebody I know.
q27r2	I seek opportunities to meet people.
q27r3	I am always looking to add names to my contact list.
q27r4	I am in frequent contact with people on my contact list.
q27r5	I have lots of friends.
q27r6	I have many opportunities to meet new people.
q27r7	I am constantly meeting new people.
q27r8	Other professionals want to work with me.
q27r9	Other real estate professionals (mortgage officers, lawyers, etc.) seek me out for advice.
q27r10	Most of my real estate colleagues perceive me as a leader on professional topics and issues.
q27r11	I've developed enough professional contacts to excel in my job.
q27r12	I've developed enough professional contacts so that I usually know most of the participants at a closing (lawyers, etc.).
q27r13	I have worked with the same professionals for many years now.
q28r1	I would probably make a good actor.
q28r2r	I find it hard to imitate the behavior of other people.
q28r3r	At parties and social gatherings, I do not attempt to do or say things that others will like.
q28r4r	I can only argue for ideas that I already believe.
q28r5	I can make impromptu speeches even on topics about which I have almost no information.
q28r6	I guess I put on a show to impress or entertain people.
q28r7r	In a group of people I am rarely the center of attention.
q28r8	In different situations and with different people, I often act like very different people.
q28r9r	I am not particularly good at making other people like me.
q28r10	I'm not always the person I appear to be.
q28r11r	I would not change my opinions (or the way I do things) in order to please someone else or win their favor.
q28r12	I have considered being an entertainer.
q28r13r	I have never been good at charades or improvisational acting.
q28r14r	I have trouble changing my behavior to suit different people and different situations.
q28r15r	At a party I let others keep the jokes and stories going.
q28r16r	I feel a bit awkward in company and do not show up quite so well as I should.

q28r17	I can look anyone in the eye and tell a lie with a straight face (if for a good end).
q28r18	I may deceive people by being friendly when I really dislike them.
q29r1	I prefer to work with others in a group rather than working alone.
q29r2r	Given the choice, I would rather do a job where I can work alone
q29r3	Working with a group is better than working alone.
q29r4	People should be made aware that if they are going to be a part of a group then they are sometimes going to have to do things they don't want to do.
q29r5	People who belong to a group should realize that they're not always going to get what they personally want.
q29r6	People in a group should realize that they sometimes are going to have to make sacrifices for the sake of the group as a whole.
q29r7	People in a group should be willing to make sacrifices for the sake of the group's well-being.
q29r8r	A group is more productive when its members do what they want to do rather than what the group wants them to do.
q29r9r	A group is most efficient when its members do what they think is best rather than doing what the group wants them to do.
q29r10r	A group is more productive when its members follow their own interests and concerns.
q30r2	What is your gender?
q30r3	How long have you worked in real estate?
q30r4	How long have you lived in your current area?
q31r1	ABR
q31r2	CRS
q31r3	GRI
q31r4	CBR
q31r5	NAR
q31r6	RMM
q32r1	Highest level of education completed
q30r1	Age

Appendix G: Analysis tables

Table 1: Descriptive Statistics for STPSND scale items.

	Mean	Std. Dev.	Q27R8	Q27R9	Q27R10	Q27R11	Q27R12	Q27R13
Q27R8	2.25	0.47	1.00					
Q27R9	6.22	1.48	0.63	1.00				
Q27R10	3.37	1.93	0.59	0.79	1.00			
Q27R11	5.72	1.77	0.51	0.62	0.62	1.00		
Q27R12	2.17	0.46	0.49	0.58	0.54	0.70	1.00	
Q27R13	6.08	1.52	0.38	0.48	0.49	0.59	0.70	1.00

 * All correlation are significant at the 0.01 level (2-tailed).

Table 2: Descriptive Statistics for WTPSND scale items.

	Mean	Std. Deviation	Q27R1	Q27R2	Q27R3	Q27R4	Q27R5	Q27R6	Q27R7
Q27R1	1.92	0.49	1.00						
Q27R2	2.00	0.45	0.40	1.00					
Q27R3	2.09	0.42	0.34	0.64	1.00				
Q27R4	1.84	0.45	0.32	0.50	0.68	1.00			
Q27R5	1.81	0.50	0.50	0.43	0.33	0.39	1.00		
Q27R6	1.64	0.47	0.52	0.55	0.42	0.42	0.61	1.00	
Q27R7	1.93	0.42	0.51	0.57	0.46	0.44	0.56	0.87	1.00

 ** Correlation is significant at the 0.01 level (2-tailed).

Table 3: Correlations for Self-monitoring.

	Mean	Std. Deviation	Q28R1	Q28R2R	Q28R3R	Q28R4R	Q28R5	Q28R6	Q28R7R	Q28R8	Q28R9R
Q28R1	1.92	0.49	1								
Q28R2R	2	0.45	0.07	1							
Q28R3R	2.09	0.42	0.02	0.1	1						
Q28R4R	1.84	0.45	0.08	0.18	0.2	1					
Q28R5	1.81	0.5	0.42	0.14	0.01	0.15	1				
Q28R6	1.64	0.47	0.35	0.11	0.04	0.11	0.52	1			
Q28R7R	1.93	0.42	0.18	0.14	0.09	0.1	0.11	0.2	1		
Q28R8	1.79	0.5	0.26	0.08	0.02	0.03	0.23	0.39	0.04	1	
Q28R9R	2.24	0.41	0.04	0.04	0.13	0.05	0.03	-0.01	0.07	-0.03	1

Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Table 4: Correlations for Self-monitoring (continued).

	Mean	Std. Dev	Q28R10	Q28R11R	Q28R12	Q28R13R	Q28R14R	Q28R15R	Q28R16R	Q28R17	Q28R18
Q28R10	1.62	0.52	1.00								
Q28R11R	1.71	0.52	-0.02	1.00							
Q28R12	1.52	0.55	0.27	-0.01	1.00						
Q28R13R	1.98	0.51	0.06	0.07	0.08	1.00					
Q28R14R	2.08	0.45	0.05	0.20	0.05	0.27	1.00				
Q28R15R	1.87	0.43	-0.03	0.14	0.19	0.22	0.27	1.00			
Q28R16R	2.21	0.39	-0.17	0.02	0.06	0.17	0.25	0.31	1.00		
Q28R17	1.47	0.51	0.23	0.04	0.16	0.07	0.12	0.07	-0.01	1.00	
Q28R18	1.66	0.51	0.26	0.08	0.07	0.04	0.11	-0.01	-0.13	0.40	1.00

Table 5: Correlations of control variables

	Mean	Std. Deviation	Age	market	Tenure	Education
Age	53.303	11.13790	1			
Market	4.243	1.9496	-.009	1		
Tenure	3.690	1.35580	.463	.012	1	
Education	4.210	1.5288	.050	-.018	.027	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 6: Correlations for Q27.

	Mean	Std. Deviation	Q27R1	Q27R2	Q27R3	Q27R4	Q27R5	Q27R6	Q27R7
Q27R1	4.99	1.4167	1						
Q27R2	5.172	1.3534	0.4	1					
Q27R3	5.33	1.4742	0.34	0.64	1				
Q27R4	4.742	1.4837	0.32	0.5	0.68	1			
Q27R5	5.229	1.4024	0.5	0.43	0.33	0.39	1		
Q27R6	5.264	1.3103	0.52	0.55	0.42	0.42	0.61	1	
Q27R7	5.18	1.3622	0.51	0.57	0.46	0.44	0.56	0.87	1

Put new data into tables.

Table 7: Correlation for Q27 (continued).

	Mean	Std. Deviation	Q27R8	Q27R9	Q27R10	Q27R11	Q27R12	Q27R13
Q27R8	5.672	1.1597	1					
Q27R9	5.137	1.5307	0.63	1				
Q27R10	5.142	1.5056	0.59	0.79	1			
Q27R11	5.223	1.4403	0.51	0.62	0.61	1		

| Q27R12 | 5.371 | 1.409 | 0.49 | 0.58 | 0.54 | 0.70 | 1 | |
| Q27R13 | 5.298 | 1.6546 | 0.39 | 0.48 | 0.49 | -.59 | 0.70 | 1 |

Table 8: Correlations for ICT use.

	Q3R2	Q3R3	Q3R4	Q4R2	Q4R3	Q4R4	Q3R1	Q4R1
Q3R2	1.000							
Q3R3	.174	1.000						
Q3R4	.262	.374	1.000					
Q4R2	.776	.157	.218	1.000				
Q4R3	.155	.794	.322	.193	1.000			
Q4R4	.224	.306	.667	.293	.377	1.000		
Q3R1	.253	.377	.608	.185	.313	.427	1.000	
Q4R1	.231	.375	.508	.305	.460	.588	.683	1.000

Table 9: Unstandardized and standardized estimates for hypothesized relationships in the model.

Regression	Est.	Std. Est.	S.E.	C.R.
WTPSNC <------------- WEBSITE	0.032	0.060	0.025	1.290
STPSNC <------------- WEBSITE	0.092	0.136	0.033	2.825
WTPSNC <-------------- SM	0.343	0.113	0.121	2.830
STPSNC <-------------- SM	0.396	0.103	0.158	2.512
SOT3 <--------------- WEBSITE	0.087	0.144	0.029	3.028
SOT3 <---------------- SM	0.558	0.162	0.142	3.935
WTPSNC <-------- Internet	-0.025	-0.041	0.049	-0.505
STPSNC <-------- Internet	0.001	0.001	0.064	0.010
SOT3 <---------- Internet	0.123	0.178	0.057	2.145
WTPSNC <----------- Email	0.470	0.199	0.201	2.339
STPSNC <----------- Email	0.461	0.154	0.262	1.761
SOT3 <------------- Email	0.211	0.078	0.231	0.915
q28r5 <--------------- SM	1.000	0.594		
q28r6 <--------------- SM	1.406	0.876	0.155	9.046
q4r3 <--------------- WEBSITE	1.000	0.911		
q3r3 <--------------- WEBSITE	1.003	0.872	0.048	20.693
q27r5 <----------- WTPSNC	1.000	0.639		
q27r6 <----------- WTPSNC	1.379	0.943	0.064	21.644
q27r7 <----------- WTPSNC	1.398	0.920	0.065	21.503
q27r9 <----------- STPSNC	1.000	0.742		
q27r11 <---------- STPSNC	22.643	0.855	1.084	0.048
q27r12 <---------- STPSNC	0.991	0.799	0.046	21.661
q27r2 <------------- SOT3	1.000	0.753		
q27r3 <------------- SOT3	1.225	0.847	0.055	22.249
q27r4 <------------- SOT3	1.107	0.760	0.054	20.665
q3r4 <---------- Internet	1.000	0.835		
q4r4 <---------- Internet	0.974	0.799	0.046	21.127
q3r1 <------------- Email	1.000	0.798		
q4r1 <------------- Email	1.047	0.857	0.047	22.296
q19r1 <----------- WTPSNC	-0.649	-0.057	0.564	-1.151
q19r1 <----------- STPSNC	5.004	0.553	0.424	11.798
q19r1 <------------- SOT3	-0.857	-0.085	0.483	-1.775
q28r8 <--------------- SM	0.732	0.435	0.072	10.216

Table 10: Confidence intervals for hypothesized relationships in the model.

Regression	Lower	Upper	p
WTPSNC <------------- WEBSITE	-0.015	0.080	0.201
STPSNC <------------- WEBSITE	0.021	0.155	0.006
WTPSNC <-------------- SM	0.080	0.645	0.010
STPSNC <-------------- SM	0.027	0.764	0.037
SOT3 <--------------- WEBSITE	0.030	0.147	0.006
SOT3 <---------------- SM	0.251	0.914	0.003
WTPSNC <-------- Internet	-0.122	0.084	0.633
STPSNC <-------- Internet	-0.158	0.146	0.965
SOT3 <---------- Internet	0.017	0.265	0.022
WTPSNC <----------- Email	0.008	0.901	0.046
STPSNC <----------- Email	-0.073	1.107	0.082
SOT3 <------------- Email	-0.308	0.710	0.358
q28r5 <--------------- SM	1.000	1.000	...
q28r6 <--------------- SM	1.101	1.870	0.004
q4r3 <--------------- WEBSITE	1.000	1.000	...
q3r3 <--------------- WEBSITE	0.893	1.121	0.004
q27r5 <----------- WTPSNC	1.000	1.000	...
q27r6 <----------- WTPSNC	1.253	1.522	0.004
q27r7 <----------- WTPSNC	1.265	1.571	0.003
q27r9 <----------- STPSNC	1.000	1.000	...
q27r11 <---------- STPSNC	0.962	1.203	0.005
q27r12 <---------- STPSNC	0.897	1.121	0.003
q27r2 <------------- SOT3	1.000	1.000	...
q27r3 <------------- SOT3	1.092	1.398	0.004
q27r4 <------------- SOT3	0.947	1.291	0.005
q3r4 <---------- Internet	1.000	1.000	...
q4r4 <---------- Internet	0.852	1.139	0.002
q3r1 <------------- Email	1.000	1.000	...
q4r1 <------------- Email	0.904	1.233	0.003
q19r1 <----------- WTPSNC	-1.845	0.562	0.356
q19r1 <----------- STPSNC	4.082	5.775	0.009
q19r1 <------------- SOT3	-1.913	0.080	0.079
q28r8 <--------------- SM	0.563	0.889	0.004
Q19r1<--------------- Internet	-2.575	-0.507	0.003
Q19r1<--------------- Email	-0.358	7.736	0.068
Q19r1<--------------- WEBSITE	0.816	1.789	0.006
Q19r1<--------------- SM	0.025	5.100	0.047

95.0% confidence intervals (bias corrected percentile method)

Table 11: Standardized confidence intervals for hypothesized relationships in the model.

Regression Weights	Lower	Upper	p
WTPSNC <------------- WEBSITE	-0.033	0.145	0.216
STPSNC <------------- WEBSITE	0.030	0.234	0.007
WTPSNC <-------------- SM	0.018	0.218	0.013
STPSNC <-------------- SM	0.004	0.203	0.040
SOT3 <--------------- WEBSITE	0.043	0.240	0.008
SOT3 <---------------- SM	0.061	0.265	0.005
WTPSNC <-------- Internet	-0.209	0.134	0.633
STPSNC <-------- Internet	-0.202	0.189	0.965
SOT3 <---------- Internet	0.025	0.406	0.023
WTPSNC <----------- Email	0.002	0.382	0.049
STPSNC <----------- Email	-0.029	0.354	0.085
SOT3 <------------- Email	-0.110	0.272	0.343
q28r5 <--------------- SM	0.500	0.687	0.004
q28r6 <--------------- SM	0.784	1.032	0.002
q4r3 <--------------- WEBSITE	0.857	0.960	0.005
q3r3 <--------------- WEBSITE	0.820	0.919	0.005
q27r5 <----------- WTPSNC	0.574	0.695	0.005
q27r6 <----------- WTPSNC	0.919	0.967	0.004
q27r7 <----------- WTPSNC	0.896	0.942	0.003
q27r9 <----------- STPSNC	0.692	0.788	0.005
q27r11 <---------- STPSNC	0.806	0.897	0.006
q27r12 <---------- STPSNC	0.758	0.838	0.004
q27r2 <------------- SOT3	0.695	0.811	0.003
q27r3 <------------- SOT3	0.802	0.886	0.003
q27r4 <------------- SOT3	0.707	0.805	0.004
q3r4 <---------- Internet	0.761	0.890	0.006
q4r4 <---------- Internet	0.730	0.869	0.003
q3r1 <------------- Email	0.728	0.852	0.005
q4r1 <------------- Email	0.800	0.928	0.002
q19r1 <----------- WTPSNC	-0.166	0.050	0.372
q19r1 <----------- STPSNC	0.452	0.644	0.006
q19r1 <------------- SOT3	-0.183	0.007	0.077
q28r8 <--------------- SM	0.358	0.506	0.003
Q19r1<--------------- Internet	-0.369	-0.065	0.004
Q19r1<--------------- Email	-0.010	0.291	0.064
Q19r1<--------------- WEBSITE	0.134	0.290	0.008
Q19r1<--------------- SM	0.008	0.154	0.039

95.0% confidence intervals (bias corrected percentile method)

Appendix H: Initial SEM model results
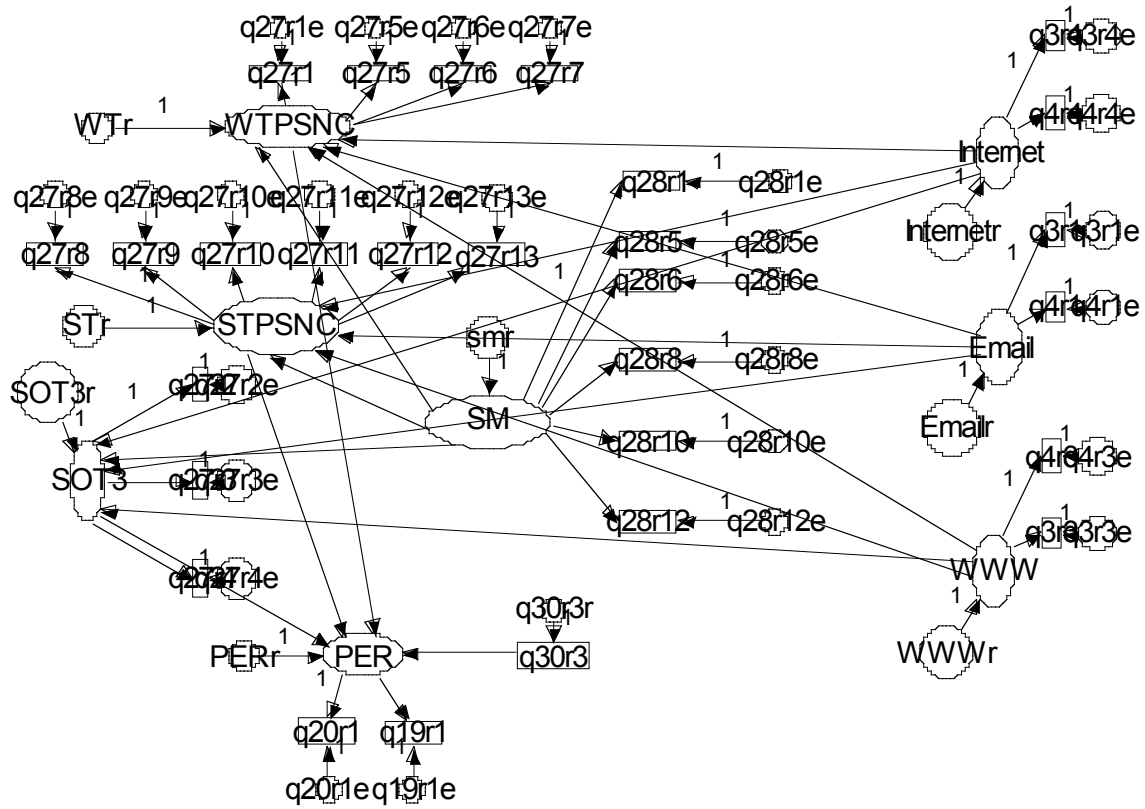
```
                              Amos

                        by James L. Arbuckle


                          Version 4.01




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                         Chicago, IL 60615 USA
                             773-667-8635
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          *********************************************
```

Title

    initialaug: Thursday, August 03, 2006   06:32 PM

Your model contains the following variables

              q28r1   observed   endogenous
              q28r5   observed   endogenous
              q28r6   observed   endogenous
              q28r8   observed   endogenous
              q28r10   observed   endogenous

```
q28r12                              observed    endogenous
q4r3                                observed    endogenous
q3r3                                observed    endogenous
q27r1                               observed    endogenous
q27r5                               observed    endogenous
q27r6                               observed    endogenous
q27r7                               observed    endogenous
q27r8                               observed    endogenous
q27r9                               observed    endogenous
q27r10                              observed    endogenous
q27r11                              observed    endogenous
q27r12                              observed    endogenous
q20r1                               observed    endogenous
q27r2                               observed    endogenous
q27r3                               observed    endogenous
q27r4                               observed    endogenous
q3r4                                observed    endogenous
q4r4                                observed    endogenous
q3r1                                observed    endogenous
q4r1                                observed    endogenous
q27r13                              observed    endogenous
q19r1                               observed    endogenous
q30r3                               observed    endogenous

SM                                  unobserved endogenous
WWW                                 unobserved endogenous
WTPSNC                              unobserved endogenous
STPSNC                              unobserved endogenous
SOT3                                unobserved endogenous
Internet                            unobserved endogenous
Email                               unobserved endogenous
PER                                 unobserved endogenous

q28r1e                              unobserved exogenous
q28r5e                              unobserved exogenous
q28r6e                              unobserved exogenous
q28r8e                              unobserved exogenous
q28r10e                             unobserved exogenous
q28r12e                             unobserved exogenous
smr                                 unobserved exogenous
q4r3e                               unobserved exogenous
q3r3e                               unobserved exogenous
q27r1e                              unobserved exogenous
q27r5e                              unobserved exogenous
q27r6e                              unobserved exogenous
q27r7e                              unobserved exogenous
q27r8e                              unobserved exogenous
q27r9e                              unobserved exogenous
q27r10e                             unobserved exogenous
q27r11e                             unobserved exogenous
q27r12e                             unobserved exogenous
q20r1e                              unobserved exogenous
WWWr                                unobserved exogenous
WTr                                 unobserved exogenous


STr                                 unobserved exogenous
```

```
         q27r2e                         unobserved  exogenous
         q27r3e                         unobserved  exogenous
         q27r4e                         unobserved  exogenous
         SOT3r                          unobserved  exogenous
         q3r4e                          unobserved  exogenous
         q4r4e                          unobserved  exogenous
         q3r1e                          unobserved  exogenous
         q4r1e                          unobserved  exogenous
         Emailr                         unobserved  exogenous
         Internetr                      unobserved  exogenous
         q27r13e                        unobserved  exogenous
         q19r1e                         unobserved  exogenous
         PERr                           unobserved  exogenous
         q30r3r                         unobserved  exogenous


              Number of variables in your model:    72
              Number of observed variables:         28
              Number of unobserved variables:       44
              Number of exogenous variables:        36
              Number of endogenous variables:       36
```

Summary of Parameters

```
             Weights  Covariances Variances    Means   Intercepts   Total
             -------  ----------- ---------    -----   ----------   -----
      Fixed:    44          0         0          0          0         44
    Labeled:     0          0         0          0          0          0
  Unlabeled:    35          0        36          0          0         71
             -------  ----------- ---------    -----   ----------   -----
      Total:    79          0        36          0          0        115
```

NOTE:
    The model is recursive.

Sample size: 830

Model: Default model

Computation of degrees of freedom

```
                Number of distinct sample moments:   406
      Number of distinct parameters to be estimated:   71
                                -------------------------
                                Degrees of freedom:  335
```


Minimum was achieved

```
Chi-square = 3078.423
Degrees of freedom = 335
Probability level = 0.000


Maximum Likelihood Estimates
----------------------------



Regression Weights:                    Estimate    S.E.     C.R.     Label
-------------------                    --------   -------  -------  -------

        WTPSNC <------------- WWW        0.039     0.017    2.297
        STPSNC <------------- WWW        0.063     0.018    3.552
        WTPSNC <-------------- SM        0.575     0.111    5.175
        STPSNC <-------------- SM        0.504     0.108    4.655
          SOT3 <------------- WWW        0.085     0.022    3.936
          SOT3 <-------------- SM        0.785     0.134    5.842
        WTPSNC <-------- Internet       -0.004     0.018   -0.196
        STPSNC <-------- Internet        0.016     0.019    0.871
          SOT3 <---------- Internet      0.075     0.028    2.697
        WTPSNC <----------- Email        0.398     0.084    4.728
        STPSNC <----------- Email        0.378     0.083    4.560
          SOT3 <------------ Email       0.376     0.098    3.841
           PER <------------- WTPSNC    -0.390     0.352   -1.107
           PER <------------- STPSNC     5.742     0.442   12.998
           PER <------------- q30r3      1.050     0.197    5.317
           PER <-------------- SOT3     -0.685     0.314   -2.181
         q28r1 <--------------- SM       1.000
         q28r5 <--------------- SM       1.023     0.077   13.271
         q28r6 <--------------- SM       1.094     0.077   14.162
         q28r8 <--------------- SM       0.810     0.072   11.194
        q28r10 <-------------- SM        0.727     0.073    9.943
        q28r12 <-------------- SM        1.001     0.082   12.176
          q4r3 <-------------- WWW       1.000
          q3r3 <-------------- WWW       0.949     0.112    8.500
         q27r5 <---------- WTPSNC        1.125     0.077   14.529
         q27r6 <---------- WTPSNC        1.558     0.087   17.933
         q27r7 <---------- WTPSNC        1.564     0.088   17.855
         q27r8 <---------- STPSNC        1.000
         q27r9 <---------- STPSNC        1.625     0.076   21.284
        q27r10 <---------- STPSNC        1.563     0.075   20.883
        q27r11 <---------- STPSNC        1.437     0.071   20.178
        q27r12 <---------- STPSNC        1.347     0.069   19.443
         q27r2 <------------- SOT3       1.000
         q27r3 <------------- SOT3       1.390     0.072   19.266
         q27r4 <------------- SOT3       1.171     0.062   18.896
          q3r4 <---------- Internet      1.000
          q4r4 <---------- Internet      0.826     0.228    3.625
          q3r1 <------------- Email      1.000
          q4r1 <------------- Email      0.975     0.112    8.692
         q27r1 <---------- WTPSNC        1.000
        q27r13 <---------- STPSNC        1.387     0.080   17.249
         q20r1 <------------- PER        1.000
         q19r1 <------------- PER        1.057     0.053   19.808
```

```
Standardized Regression Weights:          Estimate
-------------------------------           --------

        WTPSNC <------------- WWW           0.086
        STPSNC <------------- WWW           0.139
        WTPSNC <------------- SM            0.221
        STPSNC <------------- SM            0.196
        SOT3 <-------------- WWW            0.159
        SOT3 <-------------- SM             0.257
        WTPSNC <-------- Internet          -0.007
        STPSNC <-------- Internet           0.034
        SOT3 <--------- Internet            0.130
        WTPSNC <----------- Email           0.196
        STPSNC <----------- Email           0.189
        SOT3 <------------ Email            0.158
        PER <------------- WTPSNC          -0.037
        PER <------------- STPSNC           0.543
        PER <------------- q30r3            0.172
        PER <-------------- SOT3           -0.077
        q28r1 <-------------- SM            0.617
        q28r5 <-------------- SM            0.625
        q28r6 <-------------- SM            0.701
        q28r8 <-------------- SM            0.495
        q28r10 <------------- SM            0.428
        q28r12 <------------- SM            0.552
        q4r3 <-------------- WWW            0.936
        q3r3 <-------------- WWW            0.848
        q27r5 <----------- WTPSNC           0.636
        q27r6 <----------- WTPSNC           0.947
        q27r7 <----------- WTPSNC           0.914
        q27r8 <----------- STPSNC           0.679
        q27r9 <----------- STPSNC           0.839
        q27r10 <---------- STPSNC           0.820
        q27r11 <---------- STPSNC           0.787
        q27r12 <---------- STPSNC           0.754
        q27r2 <------------ SOT3            0.695
        q27r3 <------------ SOT3            0.896
        q27r4 <------------ SOT3            0.744
        q3r4 <---------- Internet           0.907
        q4r4 <---------- Internet           0.736
        q3r1 <------------ Email            0.823
        q4r1 <------------ Email            0.823
        q27r1 <----------- WTPSNC           0.560
        q27r13 <---------- STPSNC           0.659
        q20r1 <------------- PER            0.893
        q19r1 <------------- PER            0.859


Variances:                       Estimate    S.E.     C.R.    Label
----------                       --------   -------  -------  -------

                    smr            0.092     0.011    8.590
                    WWWr           2.967     0.380    7.818
                  Emailr           0.152     0.020    7.652
                Internetr          2.575     0.721    3.570
```

80

```
        WTr       0.566      0.067       8.470
        STr       0.551      0.052      10.567
       SOT3r      0.745      0.072      10.370
      q30r3r      1.836      0.090      20.359
        PERr     46.423      3.776      12.293
      q28r1e      0.150      0.009      16.531
      q28r5e      0.151      0.009      16.375
      q28r6e      0.114      0.008      14.341
      q28r8e      0.187      0.010      18.368
     q28r10e      0.218      0.011      18.988
     q28r12e      0.211      0.012      17.652
       q4r3e      0.420      0.342       1.228
       q3r3e      1.047      0.312       3.351
      q27r1e      1.370      0.070      19.715
      q27r5e      1.162      0.060      19.380
      q27r6e      0.176      0.029       6.069
      q27r7e      0.301      0.032       9.493
      q27r8e      0.713      0.039      18.496
      q27r9e      0.676      0.045      15.094
     q27r10e      0.726      0.046      15.829
     q27r11e      0.772      0.046      16.772
     q27r12e      0.839      0.048      17.466
      q20r1e     17.399      3.109       5.596
      q27r2e      0.918      0.056      16.454
      q27r3e      0.410      0.065       6.334
      q27r4e      0.949      0.064      14.747
       q3r4e      0.558      0.706       0.791
       q4r4e      1.491      0.487       3.059
       q3r1e      0.073      0.017       4.207
       q4r1e      0.069      0.016       4.199
     q27r13e      1.523      0.082      18.682
      q19r1e     27.146      3.596       7.548


Squared Multiple Correlations:        Estimate
------------------------------        --------

          Email      0.000
       Internet      0.000
            WWW      0.000
             SM      0.000
          q30r3      0.000
           SOT3      0.133
          STPSNC      0.095
          WTPSNC      0.095
            PER      0.319
          q19r1      0.737
         q27r13      0.435
           q4r1      0.677
           q3r1      0.677
           q4r4      0.541
           q3r4      0.822
          q27r4      0.554
          q27r3      0.802
          q27r2      0.484
          q20r1      0.797
         q27r12      0.569
```

```
                    q27r11      0.619
                    q27r10      0.672
                     q27r9      0.704
                     q27r8      0.461
                     q27r7      0.836
                     q27r6      0.896
                     q27r5      0.405
                     q27r1      0.313
                      q3r3      0.719
                      q4r3      0.876
                    q28r12      0.305
                    q28r10      0.183
                     q28r8      0.245
                     q28r6      0.491
                     q28r5      0.390
                     q28r1      0.381


Residual Covariances

               q30r3     q19r1     q27r13    q4r1      q3r1      q4r4      q3r4
             _____  _____  _____  _____  _____  _____  _____
 q30r3         0.000
 q19r1         1.568     2.075
 q27r13        0.927     1.510     0.040
 q4r1         -0.099     0.379    -0.024     0.000
 q3r1         -0.092     0.294    -0.022     0.001    -0.000
 q4r4         -0.286     0.515     0.044     0.490     0.365     0.000
 q3r4         -0.243     0.804     0.147     0.416     0.510     0.000    -0.000
 q27r4        -0.211     1.988     0.413     0.120     0.111     0.426     0.427
 q27r3        -0.140     1.390     0.302     0.047     0.047     0.263     0.283
 q27r2        -0.017     1.916     0.384     0.050     0.061     0.210     0.270
 q20r1         2.004     1.963     1.205     0.179     0.160     0.285     0.422
 q27r12        0.472     0.255     0.501     0.011     0.016     0.161     0.308
 q27r11        0.536     0.830     0.180     0.012     0.018     0.230     0.255
 q27r10        0.515     0.306    -0.108     0.036     0.039     0.311     0.371
 q27r9         0.463     0.323    -0.153     0.044     0.039     0.313     0.411
 q27r8         0.161    -0.397    -0.108     0.039     0.049     0.254     0.272
 q27r7        -0.048     2.281     0.559     0.008     0.019     0.265     0.371
 q27r6         0.045     2.517     0.616     0.003     0.000     0.228     0.273
 q27r5         0.043     2.078     0.642     0.014    -0.021     0.221     0.122
 q27r1         0.303     3.156     0.887     0.025     0.003     0.105     0.139
 q3r3         -0.113     3.220     0.146     0.334     0.345     1.065     1.278
 q4r3         -0.023     3.533     0.154     0.391     0.273     1.251     1.050
 q28r12       -0.033    -0.102    -0.060     0.003     0.011    -0.016     0.014
 q28r10        0.002    -0.216    -0.091    -0.018    -0.008    -0.050    -0.014
 q28r8        -0.041    -0.024    -0.090     0.009     0.006     0.012     0.016
 q28r6        -0.008     0.205    -0.050     0.003     0.019    -0.003     0.031
 q28r5         0.038     0.337     0.002     0.019     0.031     0.016     0.058
 q28r1         0.001     0.265     0.038     0.017     0.019     0.026     0.056


               q27r4     q27r3     q27r2     q20r1     q27r12    q27r11    q27r10
             _____  _____  _____  _____  _____  _____  _____
 q27r4         0.072
 q27r3         0.093     0.101
 q27r2        -0.001     0.085     0.052
```

```
q20r1         1.314      1.047      1.424      1.857
q27r12        0.498      0.435      0.466      0.019      0.038
q27r11        0.503      0.420      0.512      0.518      0.241      0.043
q27r10        0.559      0.524      0.637      0.041     -0.135     -0.029      0.051
q27r9         0.559      0.464      0.630      0.057     -0.083     -0.049      0.262
q27r8         0.471      0.465      0.527     -0.399     -0.016     -0.018      0.074
q27r7         0.762      0.757      0.935      1.675      0.615      0.658      0.610
q27r6         0.680      0.660      0.864      1.762      0.636      0.714      0.609
q27r5         0.717      0.574      0.727      1.405      0.639      0.701      0.563
q27r1         0.588      0.598      0.683      2.856      0.882      0.796      0.754
q3r3          0.370      0.248      0.220      1.167      0.105      0.111      0.176
q4r3          0.334      0.149      0.130      1.495      0.116      0.118      0.175
q28r12       -0.023     -0.066     -0.029     -0.083     -0.052     -0.031     -0.042
q28r10       -0.083     -0.048     -0.058      0.021     -0.079     -0.108     -0.065
q28r8        -0.043     -0.004     -0.001      0.024     -0.074     -0.083     -0.055
q28r6        -0.031     -0.042      0.006      0.231     -0.048     -0.027      0.005
q28r5        -0.017      0.012      0.065      0.452      0.011      0.047      0.102
q28r1         0.017      0.029      0.067      0.106      0.014      0.037      0.054


              q27r9      q27r8      q27r7      q27r6      q27r5      q27r1      q3r3
            --------   --------   --------   --------   --------   --------   --------
q27r9         0.055
q27r8         0.125      0.021
q27r7         0.695      0.647      0.023
q27r6         0.649      0.602      0.028      0.023
q27r5         0.648      0.603     -0.023      0.018      0.012
q27r1         0.851      0.526      0.000     -0.010      0.281      0.010
q3r3          0.123      0.016      0.155      0.110      0.153      0.217      0.000
q4r3          0.172      0.079      0.105      0.120      0.191      0.236      0.003
q28r12       -0.074     -0.083     -0.035     -0.049     -0.036     -0.005      0.012
q28r10       -0.090     -0.066     -0.083     -0.086     -0.114     -0.071      0.006
q28r8        -0.056     -0.045     -0.047     -0.047     -0.069     -0.023      0.047
q28r6        -0.021     -0.036     -0.023     -0.050     -0.056     -0.013      0.036
q28r5         0.064      0.018      0.039      0.033      0.004      0.051      0.082
q28r1         0.002      0.008      0.028      0.030      0.022      0.048      0.044


              q4r3      q28r12     q28r10     q28r8      q28r6      q28r5      q28r1
            --------   --------   --------   --------   --------   --------   --------
q4r3          0.000
q28r12       -0.042      0.000
q28r10       -0.095      0.010      0.000
q28r8        -0.017     -0.010      0.071      0.000
q28r6        -0.029     -0.005      0.012      0.010      0.000
q28r5         0.017     -0.019     -0.032     -0.019      0.019     -0.000
q28r1         0.003      0.042     -0.022     -0.011     -0.019      0.010      0.000


Standardized Residual Covariances

              q30r3      q19r1      q27r13     q4r1       q3r1       q4r4       q3r4
            --------   --------   --------   --------   --------   --------   --------
q30r3         0.000
q19r1         3.243      0.409
q27r13       11.997      2.495      0.301
q4r1         -4.558      2.320     -0.923      0.000
q3r1         -4.105      1.756     -0.795      0.152     -0.000
q4r4         -3.370      0.809      0.429     16.931     12.287      0.000
```

```
q3r4       -2.923     1.286     1.455    14.641    17.514     0.002    -0.000
q27r4      -3.074     3.860     4.957     5.111     4.590     4.657     4.746
q27r3      -2.067     2.735     3.677     2.036     1.988     2.912     3.186
q27r2      -0.265     4.069     5.043     2.336     2.785     2.507     3.286
q20r1       4.548     0.477     2.180     1.203     1.052     0.491     0.741
q27r12      7.187     0.490     5.636     0.503     0.680     1.840     3.586
q27r11      7.996     1.553     1.969     0.513     0.770     2.580     2.914
q27r10      7.356     0.546    -1.124     1.512     1.562     3.342     4.053
q27r9       6.510     0.565    -1.551     1.810     1.538     3.302     4.425
q27r8       2.966    -0.934    -1.498     2.122     2.556     3.532     3.852
q27r7      -0.755     4.775     7.243     0.383     0.842     3.130     4.456
q27r6       0.739     5.480     8.289     0.145     0.013     2.804     3.420
q27r5       0.660     4.213     8.054     0.603    -0.921     2.531     1.425
q27r1       4.551     6.328    11.005     1.111     0.141     1.185     1.602
q3r3       -1.245     4.722     1.326    10.804    10.856     8.817    10.777
q4r3       -0.266     5.430     1.464    13.250     9.017    10.854     9.279
q28r12     -1.286    -0.523    -1.911     0.358     1.227    -0.470     0.416
q28r10      0.085    -1.184    -3.079    -2.146    -0.949    -1.550    -0.443
q28r8      -1.759    -0.135    -3.171     1.081     0.688     0.387     0.521
q28r6      -0.373     1.223    -1.837     0.349     2.479    -0.105     1.076
q28r5       1.609     1.914     0.059     2.332     3.769     0.516     1.912
q28r1       0.024     1.521     1.343     2.127     2.387     0.856     1.850


            q27r4     q27r3     q27r2     q20r1    q27r12    q27r11    q27r10
           --------  --------  --------  --------  --------  --------  --------
q27r4       0.685
q27r3       1.062     0.993
q27r2      -0.018     1.082     0.599
q20r1       2.804     2.265     3.323     0.442
q27r12      7.035     6.229     7.200     0.040     0.393
q27r11      6.963     5.889     7.750     1.060     2.999     0.428
q27r10      7.404     7.024     9.225     0.080    -1.597    -0.333     0.465
q27r9       7.290     6.129     8.986     0.110    -0.954    -0.550     2.765
q27r8       8.071     8.069     9.892    -1.027    -0.256    -0.274     1.092
q27r7      11.095    11.155    14.891     3.853     9.364     9.804     8.710
q27r6      10.289    10.112    14.316     4.217    10.072    11.071     9.032
q27r5      10.125     8.213    11.228     3.129     9.426    10.123     7.785
q27r1       8.217     8.468    10.442     6.291    12.888    11.387    10.315
q3r3        3.766     2.555     2.455     1.881     1.115     1.155     1.755
q4r3        3.561     1.608     1.520     2.524     1.293     1.286     1.831
q28r12     -0.807    -2.361    -1.124    -0.471    -1.948    -1.124    -1.486
q28r10     -3.178    -1.864    -2.415     0.125    -3.137    -4.226    -2.433
q28r8      -1.716    -0.155    -0.031     0.151    -3.042    -3.345    -2.136
q28r6      -1.293    -1.753     0.285     1.515    -2.085    -1.164     0.183
q28r5      -0.667     0.497     2.795     2.823     0.468     1.884     3.954
q28r1       0.659     1.162     2.905     0.671     0.598     1.521     2.115


            q27r9     q27r8     q27r7     q27r6     q27r5     q27r1      q3r3
           --------  --------  --------  --------  --------  --------  --------
q27r9       0.487
q27r8       1.796     0.318
q27r7       9.757    11.956     0.260
q27r6       9.476    11.561     0.345     0.279
q27r5       8.819    10.790    -0.298     0.249     0.126
q27r1      11.466     9.310     0.003    -0.143     3.865     0.097
q3r3        1.209     0.207     1.701     1.257     1.628     2.288     0.000
```

```
q4r3      1.772   1.074   1.216   1.443   2.132   2.612   0.019
q28r12   -2.551  -3.760  -1.363  -1.971  -1.357  -0.200   0.334
q28r10   -3.318  -3.180  -3.418  -3.665  -4.555  -2.801   0.183
q28r8    -2.130  -2.274  -1.981  -2.081  -2.866  -0.949   1.419
q28r6    -0.836  -1.888  -1.024  -2.323  -2.410  -0.565   1.138
q28r5     2.435   0.880   1.656   1.463   0.178   2.100   2.449
q28r1     0.092   0.405   1.212   1.338   0.904   1.986   1.343

           q4r3    q28r12   q28r10   q28r8    q28r6    q28r5    q28r1
         --------  -------- -------- -------- -------- -------- --------
q4r3      0.000
q28r12   -1.206    0.000
q28r10   -2.876    0.989    0.000
q28r8    -0.541   -1.023    7.831    0.000
q28r6    -0.959   -0.502    1.384    1.133    0.000
q28r5     0.523   -1.930   -3.413   -2.159    2.176   -0.000
q28r1     0.104    4.237   -2.387   -1.249   -2.124    1.053    0.000
```

Modification Indices

```
Covariances:                                    M.I.     Par Change
                                              ---------  ----------
          Internetr <------> Emailr           333.247      0.477
          WWWr <----------> Emailr            157.347      0.341
          WWWr <--------> Internetr           120.165      1.197
          smr <------------> Emailr             4.436      0.011
          q30r3r <---------> Emailr            18.582     -0.088
          q30r3r <------> Internetr            10.283     -0.262
          STr <-----------> q30r3r            102.636      0.378
          STr <------------> SOT3r             83.892      0.239
          WTr <------------> SOT3r            198.049      0.366
          WTr <--------------> STr            184.794      0.294
          PERr <----------> Emailr              4.421      0.242
          PERr <------------> WWWr             14.386      1.825
          q19r1e <---------> Emailr             4.982      0.216
          q19r1e <----------> WWWr             31.932      2.286
          q27r13e <--------> Emailr             8.220     -0.055
          q27r13e <-----> Internetr             5.960     -0.189
          q27r13e <--------> q30r3r            83.110      0.550
          q4r1e <-------> Internetr            36.200      0.123
          q4r1e <-----------> WWWr             73.635      0.182
          q4r1e <----------> q30r3r             9.557     -0.049
          q4r1e <------------> STr              4.080     -0.019
          q3r1e <-------> Internetr            74.014      0.180
          q3r1e <------------> smr              6.735      0.011
          q3r1e <----------> q30r3r             4.262     -0.034
          q3r1e <----------> SOT3r              4.329     -0.024
          q3r1e <------------> WTr              4.874     -0.021
          q4r4e <----------> Emailr            31.723      0.114
          q4r4e <-----------> WWWr             28.191      0.448
          q4r4e <-----------> q4r1e           153.328      0.195
          q4r4e <-----------> q3r1e            56.934     -0.122
          q3r4e <----------> Emailr            85.772      0.183
```

```
q3r4e   <------------> WWWr       16.008      0.331
q3r4e   <------------> smr         4.139      0.032
q3r4e   <-----------> q4r1e       27.339     -0.081
q3r4e   <-----------> q3r1e      165.631      0.204
q27r4e  <---------> Emailr        18.761      0.070
q27r4e  <------> Internetr         7.711      0.179
q27r4e  <-----------> WWWr         7.891      0.189
q27r4e  <---------> q30r3r         5.759     -0.121
q27r4e  <------------> STr         7.944      0.083
q27r4e  <-----------> WTr          8.768      0.087
q27r4e  <-----------> q4r1e        4.941      0.028
q27r3e  <---------> Emailr        13.893     -0.054
q27r3e  <------> Internetr         5.267     -0.132
q27r2e  <------------> smr         9.951      0.039
q27r2e  <------------> STr        31.399      0.158
q27r2e  <------------> WTr        95.755      0.274
q27r2e  <---------> q27r4e         4.976     -0.084
q20r1e  <-----------> WWWr         6.277     -0.912
q27r12e <-----------> WTr         10.682      0.088
q27r12e <-------> q27r13e        169.035      0.564
q27r12e <---------> q4r4e          4.080     -0.092
q27r11e <--------> q30r3r          7.479      0.123
q27r11e <-----------> WTr         14.596      0.100
q27r11e <-------> q27r13e         17.157      0.175


q27r11e <-------> q27r12e         67.966      0.265
q27r10e <-----------> smr          7.956      0.032
q27r10e <-------> q27r13e         23.194     -0.202
q27r10e <-------> q27r12e         59.868     -0.246
q27r10e <-------> q27r11e         11.927     -0.107
q27r9e  <-------> q27r13e         43.749     -0.272
q27r9e  <---------> q27r2e         5.443      0.078
q27r9e  <--------> q27r12e        34.012     -0.182
q27r9e  <--------> q27r11e        22.020     -0.142
q27r9e  <--------> q27r10e       111.577      0.315
q27r8e  <---------> Emailr         5.382      0.031
q27r8e  <---------> q30r3r        13.573     -0.153
q27r8e  <----------> SOT3r        26.419      0.150
q27r8e  <------------> WTr        39.262      0.151
q27r8e  <--------> q27r13e        16.562     -0.159
q27r8e  <---------> q27r2e         6.640      0.081
q27r8e  <---------> q27r11e        4.291     -0.060
q27r8e  <---------> q27r9e        19.631      0.125
q27r7e  <------> Internetr         5.028      0.090
q27r7e  <---------> q30r3r        10.952     -0.104
q27r7e  <----------> SOT3r        17.156      0.091
q27r7e  <--------> q27r13e         5.141     -0.067
q27r7e  <----------> q3r4e         5.666      0.072
q27r7e  <---------> q27r2e         4.007      0.047
q27r7e  <--------> q27r11e         5.977     -0.054
q27r7e  <---------> q27r9e         5.928      0.053
q27r7e  <---------> q27r8e        12.072      0.071
q27r6e  <------------> STr         4.420      0.036
q27r6e  <---------> q27r2e         5.572      0.052
q27r6e  <--------> q27r11e        10.934      0.068
q27r6e  <---------> q27r9e         6.188     -0.050
```

```
q27r5e  <----------> SOT3r       10.433      0.117
q27r5e  <-----------> STr        19.721      0.135
q27r5e  <----------> q3r1e        8.714     -0.039
q27r5e  <----------> q4r4e        4.486      0.109
q27r5e  <----------> q3r4e        8.262     -0.145
q27r5e  <----------> q27r4e      14.619      0.156
q27r5e  <----------> q27r8e       4.839      0.074
q27r5e  <----------> q27r7e       5.554     -0.059
q27r1e  <----------> WWWr         4.744      0.163
q27r1e  <----------> q30r3r      28.171      0.297
q27r1e  <----------> SOT3r        7.232      0.105
q27r1e  <-----------> STr        61.940      0.257
q27r1e  <--------> q27r13e       13.333      0.193
q27r1e  <--------> q27r12e       21.746      0.189
q27r1e  <----------> q27r8e       8.851     -0.108
q27r1e  <----------> q27r6e       4.735     -0.055
q27r1e  <----------> q27r5e      40.929      0.291
q3r3e   <----------> Emailr      12.188      0.062
q3r3e   <-------> Internetr      21.469      0.328
q3r3e   <------------> smr       16.980      0.058
q3r3e   <----------> q4r1e       21.643     -0.064
q3r3e   <----------> q3r1e       64.440      0.113
q3r3e   <----------> q4r4e       20.522     -0.248
q3r3e   <----------> q3r4e       52.127      0.387
q4r3e   <----------> Emailr      20.975      0.077
q4r3e   <-------> Internetr       6.627      0.173
q4r3e   <------------> smr       14.853     -0.052
q4r3e   <----------> q19r1e       4.732      0.542
q4r3e   <----------> q4r1e       99.327      0.131
q4r3e   <----------> q3r1e       34.414     -0.079
q4r3e   <----------> q4r4e       56.271      0.390


q4r3e   <----------> q3r4e       15.743     -0.202
q4r3e   <----------> q27r7e       5.273     -0.059
q28r12e <---------> SOT3r         7.511     -0.044
q28r12e <-----------> STr        10.565     -0.043
q28r12e <----------> WTr          5.893     -0.032
q28r12e <--------> q27r3e         5.645     -0.038
q28r12e <--------> q27r8e        10.169     -0.047
q28r10e <--------> Emailr        10.344     -0.023
q28r10e <----------> WWWr         5.786     -0.072
q28r10e <---------> SOT3r         5.318     -0.036
q28r10e <-----------> STr        14.907     -0.051
q28r10e <-----------> WTr        16.514     -0.053
q28r10e <--------> q27r4e         4.135     -0.036
q28r10e <--------> q27r2e         6.640     -0.044
q28r10e <--------> q20r1e         4.554      0.206
q28r10e <-------> q27r11e         6.887     -0.042
q28r10e <--------> q27r5e         7.264     -0.049
q28r10e <---------> q3r3e         9.326      0.060
q28r10e <---------> q4r3e        11.814     -0.064
q28r8e  <--------> q30r3r         4.986     -0.047
q28r8e  <-----------> STr        16.087     -0.050
q28r8e  <-----------> WTr         8.699     -0.036
q28r8e  <---------> q27r4e        4.090     -0.034
q28r8e  <--------> q27r11e        5.197     -0.034
```

```
q28r8e  <-------->  q28r10e     117.710      0.081
q28r6e  <---------->  SOT3r       8.358     -0.037
q28r6e  <------------>  STr       5.181     -0.024
q28r6e  <------------>  WTr      13.156     -0.038
q28r6e  <---------->  q3r1e       8.090      0.013
q28r6e  <-------->  q27r3e        4.476     -0.027
q28r6e  <-------->  q27r7e        4.043      0.018
q28r6e  <-------->  q27r6e        8.395     -0.024
q28r6e  <--------->  q28r10e      6.702      0.016
q28r6e  <--------->  q28r8e       5.078      0.013
q28r5e  <--------->  Emailr       9.996      0.020
q28r5e  <-------->  q30r3r        4.170      0.040
q28r5e  <------------->  STr      6.456      0.029
q28r5e  <-------->  q27r2e        5.188      0.034
q28r5e  <-------->  q27r10e      10.329      0.045
q28r5e  <-------->  q28r12e      12.564     -0.025
q28r5e  <-------->  q28r10e      30.655     -0.039
q28r5e  <--------->  q28r8e      13.841     -0.024
q28r5e  <--------->  q28r6e      26.124      0.028
q28r1e  <-------->  q27r13e       4.089      0.038
q28r1e  <--------->  q20r1e       4.174     -0.172
q28r1e  <--------->  q27r9e       6.176     -0.034
q28r1e  <-------->  q28r12e      59.165      0.054
q28r1e  <-------->  q28r10e      14.659     -0.027
q28r1e  <--------->  q28r8e       4.528     -0.014
q28r1e  <--------->  q28r6e      24.299     -0.027
q28r1e  <--------->  q28r5e       4.475      0.013


Variances:                               M.I.   Par Change
                                     ---------  ----------


Regression Weights:                      M.I.   Par Change
                                     ---------  ----------

    Email  <---------  Internet     333.247      0.185
    Email  <-------------  WWW       157.347      0.115
    Email  <--------------  SM         4.436      0.119
    Internet  <---------  Email     333.247      3.137
    Internet  <----------  WWW       120.165      0.403
    WWW  <-------------  Email       157.347      2.245
    WWW  <-----------  Internet      120.165      0.465
    SM  <--------------  Email         4.436      0.072
    q30r3  <------------  Email      18.582     -0.578
    q30r3  <---------  Internet      10.283     -0.102
    q30r3  <-------------  SOT3        5.436     -0.127
    q30r3  <----------  STPSNC        74.188      0.546
    SOT3  <------------  STPSNC       73.897      0.382
    SOT3  <------------  WTPSNC      174.708      0.570
    STPSNC  <-----------  q30r3      102.636      0.206
    STPSNC  <------------  SOT3       69.385      0.266
    STPSNC  <---------  WTPSNC       163.004      0.459
    WTPSNC  <------------  SOT3      163.799      0.406
    WTPSNC  <---------  STPSNC       162.765      0.470
    PER  <--------------  Email        4.421      1.592
    PER  <----------------  WWW       14.386      0.615
    q19r1  <------------  Email        4.982      1.422
```

```
q19r1  <-------------- WWW        31.932      0.771
q19r1  <------------ q4r1          5.816      1.167
q19r1  <------------ q3r3         27.325      0.606
q19r1  <------------ q4r3         30.031      0.666
q27r13 <----------- Email          8.220     -0.364
q27r13 <-------- Internet          5.960     -0.073
q27r13 <----------- q30r3         83.110      0.300
q27r13 <------------- PER          8.794      0.017
q27r13 <----------- q19r1          6.846      0.011
q27r13 <----------- q4r1           7.735     -0.268
q27r13 <----------- q3r1           6.988     -0.248
q27r13 <------------ q4r4          6.880     -0.065
q27r13 <------------ q3r4          4.708     -0.055
q27r13 <------------ q20r1         7.184      0.013
q27r13 <---------- q27r12         64.456      0.256
q27r13 <---------- q27r11          5.592      0.074
q27r13 <---------- q27r10          6.234     -0.075
q27r13 <----------- q27r9         10.227     -0.094
q27r13 <----------- q27r8          8.261     -0.111
q27r13 <----------- q27r1         12.056      0.109
q27r13 <----------- q28r5          4.535     -0.191
q4r1   <---------- Internet       36.200      0.048
q4r1   <-------------- WWW        73.635      0.061
q4r1   <------------ q30r3         9.557     -0.027
q4r1   <------------ q4r4        137.223      0.076
q4r1   <------------ q3r4         14.324      0.025
q4r1   <------------ q3r3         22.793      0.029
q4r1   <------------ q4r3         93.823      0.062
q3r1   <---------- Internet       74.014      0.070
q3r1   <--------------- SM         6.735      0.117
q3r1   <------------ q30r3         4.262     -0.018
q3r1   <------------ q3r4        105.869      0.070
q3r1   <------------ q27r5         9.916     -0.027
q3r1   <------------ q27r1         4.812     -0.019
q3r1   <------------ q3r3         23.943      0.031
q3r1   <------------ q28r6        11.468      0.086
q3r1   <------------ q28r5         7.672      0.067
q4r4   <------------ Email        31.723      0.748


q4r4   <-------------- WWW        28.191      0.151
q4r4   <------------ q4r1         92.901      0.973
q4r4   <------------ q3r3          4.797      0.053
q4r4   <------------ q4r3         39.270      0.159
q3r4   <------------ Email        85.772      1.205
q3r4   <-------------- WWW        16.008      0.111
q3r4   <--------------- SM         4.139      0.349
q3r4   <------------ SOT3          5.628      0.126
q3r4   <----------- STPSNC         6.707      0.159
q3r4   <------------ q4r1         20.734      0.450
q3r4   <------------ q3r1        157.445      1.209
q3r4   <------------ q27r4         4.704      0.068
q3r4   <------------ q27r2         4.451      0.072
q3r4   <------------ q27r12        7.200      0.088
q3r4   <------------ q27r9         6.329      0.076
q3r4   <------------ q27r7         4.137      0.069
q3r4   <------------ q3r3         43.136      0.156
```

```
q3r4  <-------------- q4r3        7.574      0.068
q3r4  <------------ q28r5         4.307      0.191
q27r4 <----------- Email         18.761      0.458
q27r4 <--------- Internet         7.711      0.070
q27r4 <------------- WWW          7.891      0.064
q27r4 <----------- q30r3          5.759     -0.066
q27r4 <---------- STPSNC         13.522      0.184
q27r4 <---------- WTPSNC         12.530      0.172
q27r4 <----------- q27r13         8.269      0.065
q27r4 <------------ q4r1         17.559      0.337
q27r4 <------------ q3r1         11.569      0.266
q27r4 <------------ q4r4          8.320      0.059
q27r4 <------------ q3r4          6.416      0.053
q27r4 <----------- q27r12        10.277      0.085
q27r4 <----------- q27r11        10.385      0.084
q27r4 <----------- q27r10         6.231      0.062
q27r4 <------------ q27r9         9.817      0.077
q27r4 <------------ q27r8         6.613      0.083
q27r4 <----------- q27r7         10.565      0.089
q27r4 <----------- q27r6          9.766      0.089
q27r4 <----------- q27r5         25.667      0.135
q27r4 <----------- q27r1          5.385      0.061
q27r4 <------------ q3r3          4.385      0.040
q27r4 <------------ q4r3          8.224      0.058
q27r4 <----------- q28r10         5.096     -0.162
q27r4 <----------- q28r8          4.979     -0.166
q27r4 <----------- q28r5          4.268     -0.154
q27r3 <------------ Email        13.893     -0.352
q27r3 <--------- Internet         5.267     -0.051
q27r3 <------------- q4r1        12.598     -0.255
q27r3 <------------ q3r1         12.515     -0.247
q27r3 <------------ q3r4          5.092     -0.042
q27r3 <----------- q28r12         5.722     -0.144
q27r2 <--------------- SM         9.951      0.421
q27r2 <----------- STPSNC        35.944      0.288
q27r2 <----------- WTPSNC        99.609      0.465
q27r2 <-------------- PER         7.684      0.013
q27r2 <----------- q19r1          5.668      0.008
q27r2 <----------- q27r13         9.298      0.066
q27r2 <----------- q20r1          4.210      0.008
q27r2 <----------- q27r12        13.318      0.093
q27r2 <----------- q27r11        21.015      0.115
q27r2 <------------ q27r10       30.863      0.133
q27r2 <------------ q27r9        34.794      0.139
q27r2 <------------ q27r8        32.290      0.176


q27r2 <------------ q27r7        90.285      0.250
q27r2 <------------ q27r6        93.341      0.265
q27r2 <------------ q27r5        47.971      0.177
q27r2 <------------ q27r1        37.034      0.153
q27r2 <------------ q28r5        11.374      0.241
q27r2 <------------ q28r1         7.859      0.203
q20r1 <-------------- WWW         6.277     -0.308
q20r1 <------------ q27r5         4.234     -0.296
q20r1 <------------- q3r3         5.740     -0.250
q20r1 <------------- q4r3         5.506     -0.257
```

```
q20r1  <----------- q28r10          5.387       0.905
q27r12 <---------- WTPSNC           6.395       0.112
q27r12 <---------- q27r13          89.489       0.196
q27r12 <---------- q27r11          22.414       0.113
q27r12 <---------- q27r10          16.342      -0.092
q27r12 <---------- q27r9            8.099      -0.064
q27r12 <---------- q27r6            6.035       0.064
q27r12 <---------- q27r5            6.921       0.064
q27r12 <---------- q27r1           26.822       0.125
q27r12 <---------- q28r6            4.320      -0.149
q27r12 <---------- q28r5            4.905      -0.152
q27r11 <---------- q30r3            7.479       0.067
q27r11 <---------- WTPSNC          11.057       0.144
q27r11 <---------- q27r13           9.112       0.061
q27r11 <---------- q27r12          26.306       0.122
q27r11 <---------- q27r9            5.304      -0.051
q27r11 <---------- q27r7            4.516       0.052
q27r11 <---------- q27r6           14.208       0.096
q27r11 <---------- q27r5           12.100       0.083
q27r11 <---------- q27r1            4.891       0.052
q27r11 <---------- q28r10           5.464      -0.150
q27r10 <------------ SM             7.956       0.349
q27r10 <----------- SOT3            5.518       0.090
q27r10 <---------- q27r13          12.375      -0.071
q27r10 <---------- q27r3            4.453       0.048
q27r10 <---------- q27r2            7.140       0.066
q27r10 <---------- q27r12          23.365      -0.114
q27r10 <---------- q27r11           4.004      -0.046
q27r10 <---------- q27r9           27.321       0.114
q27r10 <---------- q28r6            4.388       0.146
q27r10 <---------- q28r5           14.936       0.256
q27r10 <---------- q28r1            4.410       0.141
q27r9  <---------- q27r13          23.436      -0.096
q27r9  <---------- q27r12          13.369      -0.085
q27r9  <---------- q27r11           7.459      -0.062
q27r9  <---------- q27r10          31.542       0.123
q27r9  <----------- q27r8           9.979       0.089
q27r9  <----------- q28r1           4.205      -0.135
q27r8  <----------- Email           5.382       0.202
q27r8  <----------- q30r3          13.573      -0.083
q27r8  <------------ SOT3          22.777       0.170
q27r8  <----------- WTPSNC         35.753       0.239
q27r8  <------------- PER           5.898      -0.010
q27r8  <------------ q19r1          5.910      -0.007
q27r8  <----------- q27r13          8.730      -0.055
q27r8  <------------- q3r1          4.098       0.131
q27r8  <----------- q27r4          12.061       0.073
q27r8  <----------- q27r3          20.031       0.095
q27r8  <----------- q27r2          23.183       0.111
q27r8  <----------- q20r1           4.149      -0.007
q27r8  <----------- q27r9           4.601       0.043
q27r8  <----------- q27r7          41.649       0.146


q27r8  <----------- q27r6          29.991       0.129
q27r8  <----------- q27r5          28.557       0.117
q27r8  <----------- q28r12          9.834      -0.174
```

```
q27r7 <--------- Internet          5.028      0.035
q27r7 <------------ q30r3         10.952     -0.056
q27r7 <------------ SOT3          19.920      0.120
q27r7 <------------ q3r4           5.994      0.032
q27r7 <----------- q27r4          10.902      0.052
q27r7 <----------- q27r3          17.039      0.066
q27r7 <----------- q27r2          17.884      0.073
q27r7 <----------- q27r8           8.543      0.059
q27r7 <----------- q28r6           4.251      0.100
q27r6 <---------- q27r11           8.447      0.044
q27r6 <----------- q28r6           6.655     -0.117
q27r5 <------------ SOT3           7.254      0.120
q27r5 <----------- STPSNC         16.425      0.209
q27r5 <----------- q27r13         13.138      0.084
q27r5 <----------- q27r4          17.573      0.110
q27r5 <----------- q27r2           5.917      0.070
q27r5 <----------- q27r12         14.277      0.104
q27r5 <----------- q27r11         16.866      0.110
q27r5 <----------- q27r10          6.053      0.063
q27r5 <----------- q27r9          10.357      0.081
q27r5 <----------- q27r8          17.334      0.139
q27r5 <----------- q27r1          27.344      0.142
q27r5 <----------- q28r10          8.136     -0.211
q27r5 <----------- q28r8           4.051     -0.155
q27r1 <------------- WWW           4.744      0.055
q27r1 <----------- q30r3          28.171      0.162
q27r1 <------------ SOT3          10.687      0.156
q27r1 <---------- STPSNC          66.339      0.453
q27r1 <------------- PER          28.519      0.028
q27r1 <----------- q19r1          15.934      0.016
q27r1 <----------- q27r13         60.052      0.195
q27r1 <----------- q27r4           6.562      0.072
q27r1 <----------- q27r3           9.163      0.087
q27r1 <----------- q27r2           7.135      0.083
q27r1 <----------- q20r1          22.365      0.021
q27r1 <----------- q27r12         75.741      0.257
q27r1 <----------- q27r11         40.706      0.185
q27r1 <----------- q27r10         39.036      0.173
q27r1 <----------- q27r9          51.257      0.195
q27r1 <----------- q27r8          10.001      0.113
q27r1 <----------- q27r5          23.342      0.143
q27r1 <------------ q4r3           4.290      0.046
q3r3 <------------- Email         12.188      0.405
q3r3 <---------- Internet         21.469      0.127
q3r3 <--------------- SM          16.980      0.630
q3r3 <------------- SOT3           4.453      0.100
q3r3 <------------- q3r1          37.623      0.527
q3r3 <------------- q3r4          31.480      0.129
q3r3 <----------- q28r12           5.139      0.168
q3r3 <----------- q28r10          17.940      0.334
q3r3 <------------ q28r8          10.054      0.260
q3r3 <------------ q28r6          10.463      0.278
q3r3 <------------ q28r5          10.788      0.269
q3r3 <------------ q28r1           4.037      0.166
q4r3 <------------- Email         20.975      0.505
q4r3 <---------- Internet          6.627      0.067
q4r3 <--------------- SM          14.853     -0.560
```

```
q4r3   <-------------- q19r1        6.047        0.009
q4r3   <-------------- q4r1        60.723        0.653


q4r3   <-------------- q4r4        40.563        0.137
q4r3   <------------ q28r12         4.154       -0.143
q4r3   <------------ q28r10        20.007       -0.336
q4r3   <------------ q28r8          5.693       -0.186
q4r3   <------------ q28r6          7.589       -0.225
q4r3   <------------ q28r5          6.064       -0.192
q28r12 <------------ SOT3           7.873       -0.055
q28r12 <---------- STPSNC          10.892       -0.075
q28r12 <---------- WTPSNC           6.029       -0.054
q28r12 <---------- q27r3            9.269       -0.036
q28r12 <---------- q27r2            8.430       -0.037
q28r12 <---------- q27r12           4.141       -0.025
q28r12 <---------- q27r10           8.753       -0.033
q28r12 <---------- q27r9           10.884       -0.037
q28r12 <---------- q27r8           19.132       -0.064
q28r12 <---------- q27r7            4.809       -0.027
q28r12 <---------- q27r6            6.474       -0.033
q28r12 <---------- q28r5            6.663       -0.087
q28r12 <---------- q28r1           32.036        0.193
q28r10 <---------- Email           10.344       -0.152
q28r10 <------------ WWW            5.786       -0.024
q28r10 <---------- SOT3            10.043       -0.061
q28r10 <--------- STPSNC           20.996       -0.103
q28r10 <--------- WTPSNC           21.133       -0.100
q28r10 <---------- q27r13          10.003       -0.032
q28r10 <------------ q4r1           8.598       -0.106
q28r10 <------------ q3r1           4.984       -0.078
q28r10 <---------- q27r4           11.769       -0.039
q28r10 <---------- q27r3            4.630       -0.025
q28r10 <---------- q27r2           14.277       -0.047
q28r10 <---------- q27r12          10.669       -0.039
q28r10 <---------- q27r11          24.172       -0.057
q28r10 <---------- q27r10          12.363       -0.039
q28r10 <---------- q27r9           14.596       -0.042
q28r10 <---------- q27r8           11.180       -0.048
q28r10 <---------- q27r7           17.783       -0.052
q28r10 <---------- q27r6           17.682       -0.054
q28r10 <---------- q27r5           23.681       -0.058
q28r10 <---------- q27r1           14.960       -0.046
q28r10 <------------ q4r3           8.105       -0.026
q28r10 <---------- q28r8           82.668        0.304
q28r10 <---------- q28r5           16.099       -0.134
q28r10 <---------- q28r1            7.863       -0.095
q28r8  <------------ q30r3          4.986       -0.026
q28r8  <----------- STPSNC         14.488       -0.080
q28r8  <----------- WTPSNC          7.914       -0.057
q28r8  <---------- q27r13          11.473       -0.032
q28r8  <---------- q27r12          10.743       -0.037
q28r8  <---------- q27r11          17.145       -0.045
q28r8  <---------- q27r10          12.050       -0.036
q28r8  <------------ q27r9          6.796       -0.027
q28r8  <------------ q27r8          5.721       -0.032
q28r8  <------------ q27r7          7.674       -0.032
```

```
         q28r8 <----------- q27r6                6.410         -0.030
         q28r8 <----------- q27r5                9.298         -0.034
         q28r8 <---------- q28r10               91.625          0.289
         q28r8 <----------- q28r5                7.301         -0.085
         q28r6 <------------ SOT3                7.282         -0.042
         q28r6 <---------- STPSNC                4.823         -0.039
         q28r6 <---------- WTPSNC               11.864         -0.060
         q28r6 <----------- q27r13               4.637         -0.017
         q28r6 <----------- q27r3                8.282         -0.027


         q28r6 <----------- q27r12               6.938         -0.025
         q28r6 <----------- q27r11               4.429         -0.020
         q28r6 <----------- q27r8                5.689         -0.028
         q28r6 <----------- q27r7                5.644         -0.023
         q28r6 <----------- q27r6               14.359         -0.039
         q28r6 <----------- q27r5                9.741         -0.030
         q28r6 <----------- q27r1                6.069         -0.023
         q28r6 <----------- q28r10               5.274          0.059
         q28r6 <----------- q28r5               14.259          0.101
         q28r6 <----------- q28r1               13.525         -0.099
         q28r5 <----------- Email                9.996          0.132
         q28r5 <----------- q30r3                4.170          0.022
         q28r5 <---------- STPSNC               10.520          0.064
         q28r5 <---------- WTPSNC                4.013          0.038
         q28r5 <------------- PER                6.023          0.005
         q28r5 <------------ q4r1                5.532          0.074
         q28r5 <------------ q3r1               10.030          0.098
         q28r5 <----------- q27r2                4.280          0.023
         q28r5 <----------- q20r1                6.412          0.004
         q28r5 <----------- q27r11               5.930          0.025
         q28r5 <----------- q27r10              17.460          0.041
         q28r5 <----------- q27r9               11.017          0.032
         q28r5 <----------- q27r6                4.002          0.022
         q28r5 <------------ q3r3                4.335          0.016
         q28r5 <----------- q28r12               8.008         -0.075
         q28r5 <----------- q28r10              23.980         -0.139
         q28r5 <----------- q28r8                9.812         -0.092
         q28r5 <----------- q28r6               10.849          0.102
         q28r1 <----------- q27r13               5.946          0.022
         q28r1 <------------ q4r1                4.225          0.065
         q28r1 <----------- q27r2                4.925          0.024
         q28r1 <----------- q28r12              37.681          0.162
         q28r1 <----------- q28r10              11.462         -0.095
         q28r1 <----------- q28r6               10.070         -0.097


Summary of models
-----------------


            Model  NPAR      CMIN   DF         P    CMIN/DF
    ---------------  ----  --------   --  ---------  ---------
     Default model    71  3078.423  335     0.000      9.189
   Saturated model   406     0.000    0
  Independence model   28 12456.394  378     0.000     32.953
```

Model	RMR	GFI	AGFI	PGFI
Default model	0.592	0.781	0.734	0.644
Saturated model	0.000	1.000		
Independence model	3.863	0.334	0.284	0.311

	DELTA1	RHO1	DELTA2	RHO2	
Model	NFI	RFI	IFI	TLI	CFI
Default model	0.753	0.721	0.774	0.744	0.773
Saturated model	1.000		1.000		1.000
Independence model	0.000	0.000	0.000	0.000	0.000

Model	PRATIO	PNFI	PCFI
Default model	0.886	0.667	0.685
Saturated model	0.000	0.000	0.000
Independence model	1.000	0.000	0.000

Model	NCP	LO 90	HI 90
Default model	2743.423	2569.558	2924.659
Saturated model	0.000	0.000	0.000
Independence model	12078.394	11717.211	12445.920

Model	FMIN	F0	LO 90	HI 90
Default model	3.713	3.309	3.100	3.528
Saturated model	0.000	0.000	0.000	0.000
Independence model	15.026	14.570	14.134	15.013

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0.099	0.096	0.103	0.000
Independence model	0.196	0.193	0.199	0.000

Model	AIC	BCC	BIC	CAIC
Default model	3220.423	3225.571	3792.231	3626.645
Saturated model	812.000	841.435	4081.774	3134.899
Independence model	12512.394	12514.424	12737.895	12672.594

Model	ECVI	LO 90	HI 90	MECVI
Default model	3.885	3.675	4.103	3.891
Saturated model	0.979	0.979	0.979	1.015
Independence model	15.093	14.658	15.537	15.096

Model	HOELTER .05	HOELTER .01
Default model	102	108
Independence model	29	30

Execution time summary:

```
    Minimization: 0.341
   Miscellaneous: 3.444
       Bootstrap: 0.000
           Total: 3.785
```

Appendix I: Revised SEM model results

Amos

by James L. Arbuckle

Version 4.01

****

Title

      revisedaug: Wednesday, August 02, 2006   10:48 PM

Your model contains the following variables

              q28r5   observed   endogenous
              q28r6   observed   endogenous
              q4r3   observed   endogenous
              q3r3   observed   endogenous
              q27r5   observed   endogenous

```
q27r6                                observed    endogenous
q27r7                                observed    endogenous
q27r9                                observed    endogenous
q27r11                               observed    endogenous
q27r12                               observed    endogenous
q19r1                                observed    endogenous
q27r2                                observed    endogenous
q27r3                                observed    endogenous
q27r4                                observed    endogenous
q3r4                                 observed    endogenous
q4r4                                 observed    endogenous
q3r1                                 observed    endogenous
q4r1                                 observed    endogenous
q28r8                                observed    endogenous

SM                                   unobserved  endogenous
WWW                                  unobserved  endogenous
WTPSNC                               unobserved  endogenous
STPSNC                               unobserved  endogenous
SOT3                                 unobserved  endogenous
Internet                             unobserved  endogenous
Email                                unobserved  endogenous

q28r5e                               unobserved  exogenous
q28r6e                               unobserved  exogenous
smr                                  unobserved  exogenous
q4r3e                                unobserved  exogenous
q3r3e                                unobserved  exogenous
q27r5e                               unobserved  exogenous
q27r6e                               unobserved  exogenous
q27r7e                               unobserved  exogenous
q27r9e                               unobserved  exogenous
q27r11e                              unobserved  exogenous
q27r12e                              unobserved  exogenous
q19r1e                               unobserved  exogenous
WWWr                                 unobserved  exogenous
WTr                                  unobserved  exogenous
STr                                  unobserved  exogenous
q27r2e                               unobserved  exogenous
q27r3e                               unobserved  exogenous
q27r4e                               unobserved  exogenous
SOT3r                                unobserved  exogenous
q3r4e                                unobserved  exogenous
q4r4e                                unobserved  exogenous
q3r1e                                unobserved  exogenous
q4r1e                                unobserved  exogenous
Emailr                               unobserved  exogenous
Internetr                            unobserved  exogenous
q28r8e                               unobserved  exogenous


        Number of variables in your model:   52
        Number of observed variables:        19
        Number of unobserved variables:      33
        Number of exogenous variables:       26
        Number of endogenous variables:      26
```

```
Summary of Parameters

                Weights  Covariances Variances    Means    Intercepts    Total
                -------  ----------- ---------    -----    ----------    -----
       Fixed:      33          0          0          0          0          33
     Labeled:       0          0          0          0          0           0
   Unlabeled:      26          6         26          0          0          58
                -------  ----------- ---------    -----    ----------    -----
       Total:      59          6         26          0          0          91


NOTE:
    The model is recursive.


Sample size:   830


Model: Default model



Computation of degrees of freedom

                  Number of distinct sample moments:  190
       Number of distinct parameters to be estimated:   58
                                         -------------------------
                                         Degrees of freedom:  132



Minimum was achieved



Chi-square = 655.436
Degrees of freedom = 132
Probability level = 0.000


Maximum Likelihood Estimates
----------------------------



Regression Weights:                        Estimate    S.E.      C.R.      Label
-------------------                        --------   -------   -------    -------


        WTPSNC <------------- WWW            0.032     0.025     1.290
        STPSNC <------------- WWW            0.092     0.033     2.825
        WTPSNC <------------- SM             0.343     0.121     2.830
        STPSNC <------------- SM             0.396     0.158     2.512
        SOT3   <------------- WWW            0.087     0.029     3.028
        SOT3   <------------- SM             0.558     0.142     3.935
        WTPSNC <-------- Internet           -0.025     0.049    -0.505
        STPSNC <-------- Internet            0.001     0.064     0.010
```

```
SOT3   <---------- Internet      0.123   0.057    2.145
WTPSNC <----------- Email        0.470   0.201    2.339
STPSNC <----------- Email        0.461   0.262    1.761
SOT3   <------------ Email       0.211   0.231    0.915
q28r5  <--------------- SM       1.000
q28r6  <--------------- SM       1.406   0.155    9.046
q4r3   <-------------- WWW        1.000
q3r3   <-------------- WWW        1.003   0.048   20.693
q27r5  <---------- WTPSNC        1.000
q27r6  <---------- WTPSNC        1.379   0.064   21.644
q27r7  <---------- WTPSNC        1.398   0.065   21.503
q27r9  <---------- STPSNC        1.000
q27r11 <---------- STPSNC        1.084   0.048   22.643
q27r12 <---------- STPSNC        0.991   0.046   21.661
q27r2  <------------ SOT3        1.000
q27r3  <------------ SOT3        1.225   0.055   22.249
q27r4  <------------ SOT3        1.107   0.054   20.665
q3r4   <---------- Internet      1.000
q4r4   <---------- Internet      0.974   0.046   21.127
q3r1   <------------ Email       1.000
q4r1   <------------ Email       1.047   0.047   22.296
q19r1  <---------- WTPSNC       -0.649   0.564   -1.151
q19r1  <---------- STPSNC        5.004   0.424   11.798
q19r1  <------------ SOT3       -0.857   0.483   -1.775
q28r8  <--------------- SM       0.732   0.072   10.216


Standardized Regression Weights:        Estimate
--------------------------------        --------


WTPSNC <------------- WWW        0.060
STPSNC <------------- WWW        0.136
WTPSNC <------------- SM         0.113
STPSNC <------------- SM         0.103
SOT3   <------------- WWW        0.144
SOT3   <--------------- SM       0.162
WTPSNC <-------- Internet       -0.041
STPSNC <-------- Internet        0.001
SOT3   <--------- Internet       0.178
WTPSNC <----------- Email        0.199
STPSNC <----------- Email        0.154
SOT3   <------------ Email       0.078
q28r5  <--------------- SM       0.594
q28r6  <--------------- SM       0.876
q4r3   <-------------- WWW        0.911
q3r3   <-------------- WWW        0.872
q27r5  <---------- WTPSNC        0.639
q27r6  <---------- WTPSNC        0.943
q27r7  <---------- WTPSNC        0.920
q27r9  <---------- STPSNC        0.742
q27r11 <---------- STPSNC        0.855
q27r12 <---------- STPSNC        0.799
q27r2  <------------ SOT3        0.753
q27r3  <------------ SOT3        0.847
q27r4  <------------ SOT3        0.760
q3r4   <---------- Internet      0.835
q4r4   <---------- Internet      0.799
```

```
        q3r1  <------------- Email      0.798
        q4r1  <------------- Email      0.857
        q19r1 <----------- WTPSNC       -0.057
        q19r1 <----------- STPSNC        0.553
        q19r1 <------------ SOT3        -0.085
        q28r8 <-------------- SM         0.435


Covariances:                          Estimate    S.E.     C.R.     Label
------------                          --------   -------  -------  -------

        Emailr <------> Internetr       0.440     0.032    13.688
        WWWr  <-----------> Emailr      0.332     0.030    10.941
        WWWr  <--------> Internetr      1.169     0.114    10.210
        WTr   <--------------> STr      0.497     0.049    10.098
        WTr   <------------> SOT3r      0.503     0.046    10.952
        STr   <------------> SOT3r      0.411     0.049     8.306


Correlations:                         Estimate
-------------                         --------

        Emailr <------> Internetr       0.788
        WWWr  <-----------> Emailr      0.524
        WWWr  <--------> Internetr      0.471
        WTr   <--------------> STr      0.524
        WTr   <------------> SOT3r      0.613
        STr   <------------> SOT3r      0.400


Variances:                            Estimate    S.E.     C.R.     Label
----------                            --------   -------  -------  -------

                            smr         0.087     0.013     6.800
                           WWWr         2.812     0.202    13.886
                         Emailr         0.143     0.011    12.592
                      Internetr         2.186     0.167    13.094
                            WTr         0.757     0.076     9.986
                            STr         1.190     0.102    11.636
                          SOT3r         0.887     0.076    11.623
                         q28r5e         0.160     0.012    13.502
                         q28r6e         0.052     0.018     2.947
                          q4r3e         0.576     0.122     4.714
                          q3r3e         0.893     0.127     7.013
                         q27r5e         1.162     0.060    19.390
                         q27r6e         0.190     0.027     7.011
                         q27r7e         0.286     0.030     9.602
                         q27r9e         1.051     0.064    16.330
                        q27r11e         0.558     0.049    11.386
                        q27r12e         0.716     0.050    14.358
                         q19r1e        79.591     4.201    18.945
                         q27r2e         0.790     0.051    15.581
                         q27r3e         0.612     0.054    11.239
                         q27r4e         0.926     0.060    15.344
                          q3r4e         0.947     0.092    10.263
                          q4r4e         1.177     0.095    12.370
                          q3r1e         0.082     0.006    13.042
```

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```
                           q4r1e       0.057      0.006      9.524
                           q28r8e      0.201      0.011     18.259


  Squared Multiple Correlations:                Estimate
  ------------------------------                --------

                               Email            0.000
                            Internet            0.000
                                 WWW            0.000
                                  SM            0.000
                                SOT3            0.143
                              STPSNC            0.075
                              WTPSNC            0.055
                               q28r8            0.189
                                q4r1            0.734
                                q3r1            0.636
                                q4r4            0.638
                                q3r4            0.698
                               q27r4            0.578
                               q27r3            0.717
                               q27r2            0.567
                               q19r1            0.245
                              q27r12            0.638
                              q27r11            0.730
                               q27r9            0.550
                               q27r7            0.846
                               q27r6            0.889
                               q27r5            0.408
                                q3r3            0.760
                                q4r3            0.830
                               q28r6            0.768
                               q28r5            0.353


  Residual Covariances

              q28r8      q4r1      q3r1      q4r4      q3r4     q27r4     q27r3
            --------  --------  --------  --------  --------  --------  --------
  q28r8        0.000
  q4r1         0.009     0.000
  q3r1         0.006     0.000     0.000
  q4r4         0.012     0.041    -0.064     0.000
  q3r4         0.016    -0.045     0.070     0.000    -0.000
  q27r4       -0.014     0.054     0.052     0.114     0.141     0.004
  q27r3        0.034    -0.020    -0.012    -0.067    -0.015     0.088     0.005
  q27r2        0.022    -0.013     0.005    -0.082     0.000    -0.141     0.011
  q19r1        0.063     0.295     0.233    -0.398    -0.115     0.263    -0.537
  q27r12      -0.048    -0.014    -0.003    -0.093     0.055     0.044    -0.057
  q27r11      -0.056    -0.017    -0.004    -0.049    -0.022     0.004    -0.122
  q27r9       -0.020     0.034     0.035     0.066     0.168     0.126    -0.004
  q27r7       -0.010     0.003     0.020    -0.005     0.090     0.006    -0.069
  q27r6       -0.010    -0.002     0.002    -0.039    -0.003    -0.064    -0.153
  q27r5       -0.043     0.010    -0.020     0.028    -0.078     0.177    -0.015
  q3r3         0.047    -0.014     0.012    -0.076     0.106     0.142     0.019
  q4r3        -0.017     0.044    -0.059     0.113    -0.119     0.123    -0.061
  q28r6        0.002     0.003     0.019    -0.003     0.031    -0.014    -0.016
```

q28r5   -0.007   0.019   0.031   0.016   0.058   0.016   0.056

	q27r2	q19r1	q27r12	q27r11	q27r9	q27r7	q27r6
q27r2	0.004						
q19r1	0.367	0.026					
q27r12	0.050	-0.446	0.002				
q27r11	0.054	-0.069	0.037	0.003			
q27r9	0.231	0.579	-0.024	-0.021	0.002		
q27r7	0.245	-0.168	-0.042	-0.063	0.056	0.003	
q27r6	0.185	0.102	-0.010	0.004	0.020	0.007	0.003
q27r5	0.234	0.327	0.169	0.185	0.192	-0.042	0.009
q3r3	0.001	2.544	-0.066	-0.082	-0.002	0.024	-0.017
q4r3	-0.075	2.908	-0.041	-0.060	0.064	-0.015	0.003
q28r6	0.017	0.275	-0.028	-0.007	0.013	0.009	-0.018
q28r5	0.090	0.437	0.041	0.077	0.107	0.082	0.076

	q27r5	q3r3	q4r3	q28r6	q28r5
q27r5	0.002				
q3r3	0.060	0.000			
q4r3	0.105	0.000	-0.000		
q28r6	-0.033	0.036	-0.029	-0.000	
q28r5	0.035	0.082	0.017	-0.000	0.000

Standardized Residual Covariances

	q28r8	q4r1	q3r1	q4r4	q3r4	q27r4	q27r3
q28r8	0.000						
q4r1	1.081	0.000					
q3r1	0.688	0.000	0.000				
q4r4	0.387	1.245	-1.932	0.000			
q3r4	0.521	-1.384	2.127	0.000	-0.000		
q27r4	-0.557	2.243	2.115	1.210	1.517	0.042	
q27r3	1.332	-0.842	-0.476	-0.714	-0.166	0.977	0.052
q27r2	0.951	-0.569	0.237	-0.949	0.003	-1.762	0.139
q19r1	0.353	1.783	1.376	-0.619	-0.182	0.496	-1.017
q27r12	-1.968	-0.595	-0.119	-1.051	0.636	0.586	-0.760
q27r11	-2.249	-0.747	-0.172	-0.536	-0.245	0.051	-1.575
q27r9	-0.755	1.374	1.387	0.683	1.780	1.549	-0.045
q27r7	-0.423	0.131	0.892	-0.064	1.076	0.084	-0.887
q27r6	-0.455	-0.072	0.108	-0.468	-0.035	-0.872	-2.042
q27r5	-1.773	0.442	-0.866	0.317	-0.903	2.353	-0.204
q3r3	1.419	-0.433	0.342	-0.600	0.846	1.410	0.187
q4r3	-0.541	1.365	-1.820	0.928	-0.986	1.275	-0.632
q28r6	0.189	0.349	2.479	-0.105	1.076	-0.589	-0.652
q28r5	-0.778	2.332	3.769	0.516	1.912	0.618	2.186

	q27r2	q19r1	q27r12	q27r11	q27r9	q27r7	q27r6
q27r2	0.041						
q19r1	0.759	0.005					
q27r12	0.724	-0.829	0.023				
q27r11	0.772	-0.124	0.438	0.027			
q27r9	3.122	0.999	-0.276	-0.237	0.020		

```
q27r7        3.519   -0.341   -0.580   -0.854    0.729    0.034
q27r6        2.750    0.216   -0.150    0.060    0.275    0.087    0.036
q27r5        3.411    0.650    2.382    2.535    2.491   -0.551    0.124
q3r3         0.007    3.688   -0.691   -0.843   -0.016    0.263   -0.195
q4r3        -0.857    4.416   -0.448   -0.647    0.650   -0.170    0.040
q28r6        0.759    1.627   -1.198   -0.300    0.518    0.398   -0.828
q28r5        3.850    2.465    1.689    3.111    4.033    3.486    3.374


             q27r5    q3r3     q4r3     q28r6    q28r5
            -------- -------- -------- -------- --------
q27r5        0.017
q3r3         0.636    0.000
q4r3         1.172    0.000   -0.000
q28r6       -1.406    1.138   -0.959   -0.000
q28r5        1.463    2.449    0.523   -0.004    0.000
```

Total Effects

```
             Email    Internet WWW      SM       SOT3     STPSNC   WTPSNC
            -------- -------- -------- -------- -------- -------- --------
SOT3         0.211    0.123    0.087    0.558    0.000    0.000    0.000
STPSNC       0.461    0.001    0.092    0.396    0.000    0.000    0.000
WTPSNC       0.470   -0.025    0.032    0.343    0.000    0.000    0.000
q28r8        0.000    0.000    0.000    0.732    0.000    0.000    0.000
q4r1         1.047    0.000    0.000    0.000    0.000    0.000    0.000
q3r1         1.000    0.000    0.000    0.000    0.000    0.000    0.000
q4r4         0.000    0.974    0.000    0.000    0.000    0.000    0.000
q3r4         0.000    1.000    0.000    0.000    0.000    0.000    0.000
q27r4        0.234    0.136    0.096    0.618    1.107    0.000    0.000
q27r3        0.259    0.150    0.107    0.684    1.225    0.000    0.000
q27r2        0.211    0.123    0.087    0.558    1.000    0.000    0.000
q19r1        1.822   -0.086    0.365    1.282   -0.857    5.004   -0.649
q27r12       0.457    0.001    0.091    0.393    0.000    0.991    0.000
q27r11       0.500    0.001    0.100    0.429    0.000    1.084    0.000
q27r9        0.461    0.001    0.092    0.396    0.000    1.000    0.000
q27r7        0.657   -0.035    0.045    0.479    0.000    0.000    1.398
q27r6        0.648   -0.034    0.044    0.472    0.000    0.000    1.379
q27r5        0.470   -0.025    0.032    0.343    0.000    0.000    1.000
q3r3         0.000    0.000    1.003    0.000    0.000    0.000    0.000
q4r3         0.000    0.000    1.000    0.000    0.000    0.000    0.000
q28r6        0.000    0.000    0.000    1.406    0.000    0.000    0.000
q28r5        0.000    0.000    0.000    1.000    0.000    0.000    0.000
```

Standardized Total Effects

```
             Email    Internet WWW      SM       SOT3     STPSNC   WTPSNC
            -------- -------- -------- -------- -------- -------- --------
SOT3         0.0785   0.1785   0.1437   0.1621   0.0000   0.0000   0.0000
STPSNC       0.1537   0.0008   0.1360   0.1032   0.0000   0.0000   0.0000
WTPSNC       0.1987  -0.0411   0.0597   0.1131   0.0000   0.0000   0.0000
q28r8        0.0000   0.0000   0.0000   0.4350   0.0000   0.0000   0.0000
q4r1         0.8566   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000
q3r1         0.7976   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000
q4r4         0.0000   0.7986   0.0000   0.0000   0.0000   0.0000   0.0000
```

```
q3r4      0.0000    0.8353    0.0000    0.0000    0.0000    0.0000    0.0000
q27r4     0.0597    0.1357    0.1092    0.1232    0.7602    0.0000    0.0000
q27r3     0.0665    0.1511    0.1217    0.1373    0.8469    0.0000    0.0000
q27r2     0.0591    0.1344    0.1082    0.1220    0.7530    0.0000    0.0000
q19r1     0.0671   -0.0124    0.0596    0.0369   -0.0849    0.5528   -0.0566
q27r12    0.1228    0.0006    0.1087    0.0824    0.0000    0.7990    0.0000
q27r11    0.1314    0.0007    0.1162    0.0882    0.0000    0.8546    0.0000
q27r9     0.1140    0.0006    0.1009    0.0765    0.0000    0.7418    0.0000
q27r7     0.1827   -0.0378    0.0549    0.1040    0.0000    0.0000    0.9196
q27r6     0.1873   -0.0388    0.0563    0.1066    0.0000    0.0000    0.9429
q27r5     0.1269   -0.0263    0.0381    0.0722    0.0000    0.0000    0.6387
q3r3      0.0000    0.0000    0.8718    0.0000    0.0000    0.0000    0.0000
q4r3      0.0000    0.0000    0.9111    0.0000    0.0000    0.0000    0.0000
q28r6     0.0000    0.0000    0.0000    0.8765    0.0000    0.0000    0.0000
q28r5     0.0000    0.0000    0.0000    0.5938    0.0000    0.0000    0.0000
```

Direct Effects

```
          Email    Internet  WWW       SM        SOT3      STPSNC    WTPSNC
          --------  --------  --------  --------  --------  --------  --------
SOT3      0.211     0.123     0.087     0.558     0.000     0.000     0.000
STPSNC    0.461     0.001     0.092     0.396     0.000     0.000     0.000
WTPSNC    0.470    -0.025     0.032     0.343     0.000     0.000     0.000
q28r8     0.000     0.000     0.000     0.732     0.000     0.000     0.000
q4r1      1.047     0.000     0.000     0.000     0.000     0.000     0.000
q3r1      1.000     0.000     0.000     0.000     0.000     0.000     0.000
q4r4      0.000     0.974     0.000     0.000     0.000     0.000     0.000
q3r4      0.000     1.000     0.000     0.000     0.000     0.000     0.000
q27r4     0.000     0.000     0.000     0.000     1.107     0.000     0.000
q27r3     0.000     0.000     0.000     0.000     1.225     0.000     0.000
q27r2     0.000     0.000     0.000     0.000     1.000     0.000     0.000
q19r1     0.000     0.000     0.000     0.000    -0.857     5.004    -0.649
q27r12    0.000     0.000     0.000     0.000     0.000     0.991     0.000
q27r11    0.000     0.000     0.000     0.000     0.000     1.084     0.000
q27r9     0.000     0.000     0.000     0.000     0.000     1.000     0.000
q27r7     0.000     0.000     0.000     0.000     0.000     0.000     1.398
q27r6     0.000     0.000     0.000     0.000     0.000     0.000     1.379
q27r5     0.000     0.000     0.000     0.000     0.000     0.000     1.000
q3r3      0.000     0.000     1.003     0.000     0.000     0.000     0.000
q4r3      0.000     0.000     1.000     0.000     0.000     0.000     0.000
q28r6     0.000     0.000     0.000     1.406     0.000     0.000     0.000
q28r5     0.000     0.000     0.000     1.000     0.000     0.000     0.000
```

Standardized Direct Effects

```
          Email    Internet  WWW       SM        SOT3      STPSNC    WTPSNC
          --------  --------  --------  --------  --------  --------  --------
SOT3      0.0785    0.1785    0.1437    0.1621    0.0000    0.0000    0.0000
STPSNC    0.1537    0.0008    0.1360    0.1032    0.0000    0.0000    0.0000
WTPSNC    0.1987   -0.0411    0.0597    0.1131    0.0000    0.0000    0.0000
q28r8     0.0000    0.0000    0.0000    0.4350    0.0000    0.0000    0.0000
q4r1      0.8566    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
q3r1      0.7976    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
q4r4      0.0000    0.7986    0.0000    0.0000    0.0000    0.0000    0.0000
```

q3r4	0.0000	0.8353	0.0000	0.0000	0.0000	0.0000	0.0000
q27r4	0.0000	0.0000	0.0000	0.0000	0.7602	0.0000	0.0000
q27r3	0.0000	0.0000	0.0000	0.0000	0.8469	0.0000	0.0000
q27r2	0.0000	0.0000	0.0000	0.0000	0.7530	0.0000	0.0000
q19r1	0.0000	0.0000	0.0000	0.0000	-0.0849	0.5528	-0.0566
q27r12	0.0000	0.0000	0.0000	0.0000	0.0000	0.7990	0.0000
q27r11	0.0000	0.0000	0.0000	0.0000	0.0000	0.8546	0.0000
q27r9	0.0000	0.0000	0.0000	0.0000	0.0000	0.7418	0.0000
q27r7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9196
q27r6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9429
q27r5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6387
q3r3	0.0000	0.0000	0.8718	0.0000	0.0000	0.0000	0.0000
q4r3	0.0000	0.0000	0.9111	0.0000	0.0000	0.0000	0.0000
q28r6	0.0000	0.0000	0.0000	0.8765	0.0000	0.0000	0.0000
q28r5	0.0000	0.0000	0.0000	0.5938	0.0000	0.0000	0.0000

Indirect Effects

	Email	Internet	WWW	SM	SOT3	STPSNC	WTPSNC
SOT3	0.000	0.000	0.000	0.000	0.000	0.000	0.000
STPSNC	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WTPSNC	0.000	0.000	0.000	0.000	0.000	0.000	0.000
q28r8	0.000	0.000	0.000	0.000	0.000	0.000	0.000
q4r1	0.000	0.000	0.000	0.000	0.000	0.000	0.000
q3r1	0.000	0.000	0.000	0.000	0.000	0.000	0.000
q4r4	0.000	0.000	0.000	0.000	0.000	0.000	0.000
q3r4	0.000	0.000	0.000	0.000	0.000	0.000	0.000
q27r4	0.234	0.136	0.096	0.618	0.000	0.000	0.000
q27r3	0.259	0.150	0.107	0.684	0.000	0.000	0.000
q27r2	0.211	0.123	0.087	0.558	0.000	0.000	0.000
q19r1	1.822	-0.086	0.365	1.282	0.000	0.000	0.000
q27r12	0.457	0.001	0.091	0.393	0.000	0.000	0.000
q27r11	0.500	0.001	0.100	0.429	0.000	0.000	0.000
q27r9	0.461	0.001	0.092	0.396	0.000	0.000	0.000
q27r7	0.657	-0.035	0.045	0.479	0.000	0.000	0.000
q27r6	0.648	-0.034	0.044	0.472	0.000	0.000	0.000
q27r5	0.470	-0.025	0.032	0.343	0.000	0.000	0.000
q3r3	0.000	0.000	0.000	0.000	0.000	0.000	0.000
q4r3	0.000	0.000	0.000	0.000	0.000	0.000	0.000
q28r6	0.000	0.000	0.000	0.000	0.000	0.000	0.000
q28r5	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Standardized Indirect Effects

	Email	Internet	WWW	SM	SOT3	STPSNC	WTPSNC
SOT3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STPSNC	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WTPSNC	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
q28r8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
q4r1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
q3r1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
q4r4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

```
q3r4      0.0000   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000
q27r4     0.0597   0.1357   0.1092   0.1232   0.0000   0.0000   0.0000
q27r3     0.0665   0.1511   0.1217   0.1373   0.0000   0.0000   0.0000
q27r2     0.0591   0.1344   0.1082   0.1220   0.0000   0.0000   0.0000
q19r1     0.0671  -0.0124   0.0596   0.0369   0.0000   0.0000   0.0000
q27r12    0.1228   0.0006   0.1087   0.0824   0.0000   0.0000   0.0000
q27r11    0.1314   0.0007   0.1162   0.0882   0.0000   0.0000   0.0000
q27r9     0.1140   0.0006   0.1009   0.0765   0.0000   0.0000   0.0000
q27r7     0.1827  -0.0378   0.0549   0.1040   0.0000   0.0000   0.0000
q27r6     0.1873  -0.0388   0.0563   0.1066   0.0000   0.0000   0.0000
q27r5     0.1269  -0.0263   0.0381   0.0722   0.0000   0.0000   0.0000
q3r3      0.0000   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000
q4r3      0.0000   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000
q28r6     0.0000   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000
q28r5     0.0000   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000
```

Modification Indices

```
Covariances:                                      M.I.      Par Change
                                                --------   ----------
         q28r8e <------------> STr                5.987      -0.041
         q4r1e  <------------> WWWr               4.819       0.037
         q3r1e  <------------> WWWr               6.150      -0.045
         q3r1e  <------------> smr               10.238       0.012
         q4r4e  <-----------> q4r1e              58.110       0.104
         q4r4e  <-----------> q3r1e              77.829      -0.130
         q3r4e  <-----------> q4r1e              68.226      -0.107
         q3r4e  <-----------> q3r1e              91.194       0.134
         q27r4e <---------> Emailr                6.350       0.029
         q27r4e <----------> q4r1e                4.381       0.024
         q27r3e <---------> Emailr                5.753      -0.025
         q27r3e <----------> SOT3r               16.754       0.112
         q27r3e <------------> WTr               21.498      -0.110
         q27r3e <---------> q28r8e                6.735       0.040
         q27r3e <---------> q27r4e               17.222       0.142
         q27r2e <-----------> smr                 4.574       0.024
         q27r2e <----------> SOT3r               23.685      -0.141
         q27r2e <------------> WTr               49.763       0.171
         q27r2e <---------> q27r4e               34.534      -0.210
         q19r1e <------> Internetr               10.158      -1.268
         q19r1e <-----------> WWWr               26.922       2.593
         q19r1e <------------> smr                4.181       0.215
         q27r12e <----------> smr                 4.352      -0.023
         q27r12e <---------> q3r4e                4.238       0.085
         q27r12e <--------> q19r1e                4.238      -0.629
         q27r11e <--------> q28r8e                4.545      -0.032
         q27r11e <-------> q27r12e                4.371       0.060
         q27r9e <---------> q27r2e                8.047       0.109
         q27r9e <---------> q19r1e                5.238       0.812
         q27r7e <-----------> smr                 5.217       0.017
         q27r7e <----------> SOT3r                4.691       0.043
         q27r7e <------------> STr                5.789      -0.057
         q27r7e <----------> q3r4e                5.748       0.067
```

```
          q27r7e <---------> q27r2e              4.416        0.047
          q27r7e <--------> q27r11e              9.292       -0.065
          q27r7e <--------> q27r9e               6.041        0.063
          q27r6e <---------> SOT3r               9.885       -0.059
          q27r6e <--------> q27r3e               8.592       -0.061
          q27r6e <--------> q27r2e               4.599        0.045
          q27r6e <-------> q27r11e               4.762        0.044
          q27r6e <--------> q27r9e               5.937       -0.059
          q27r5e <--------> SOT3r                7.080        0.090
          q27r5e <-----------> STr              16.992        0.164
          q27r5e <-----------> WTr              10.179       -0.087
          q27r5e <---------> q3r1e               6.699       -0.033
          q27r5e <---------> q3r4e               8.365       -0.136
          q27r5e <--------> q27r4e              12.522        0.145
          q27r5e <-------> q27r11e               4.114        0.072
          q27r5e <--------> q27r7e               7.697       -0.069
          q3r3e <------------> smr              11.250        0.045
          q3r3e <----------> q4r1e              38.053       -0.077
          q3r3e <----------> q3r1e              36.006        0.080
          q3r3e <----------> q4r4e              25.138       -0.259
          q3r3e <----------> q3r4e              31.311        0.276
          q4r3e <------------> smr              13.014       -0.045


          q4r3e <----------> q4r1e              55.126        0.087
          q4r3e <----------> q3r1e              55.755       -0.094
          q4r3e <----------> q4r4e              29.275        0.263
          q4r3e <----------> q3r4e              34.982       -0.275
          q4r3e <---------> q19r1e               7.936        0.981
          q4r3e <---------> q27r7e               4.637       -0.054
          q28r6e <---------> q3r1e               4.723        0.010
          q28r6e <--------> q27r7e               5.434        0.021
          q28r6e <--------> q27r6e               6.098       -0.020
          q28r5e <--------> Emailr               7.056        0.012
          q28r5e <-----------> STr               4.811        0.034
          q28r5e <-----------> WTr               4.272        0.022
          q28r5e <--------> q27r4e               5.589       -0.037
          q28r5e <--------> q27r2e               6.544        0.037
          q28r5e <--------> q27r9e               4.788        0.036


Variances:                                      M.I.    Par Change
                                             ---------  ----------


Regression Weights:                             M.I.    Par Change
                                             ---------  ----------
          q28r8 <----------- STPSNC              4.650       -0.032
          q28r8 <----------- q27r11              6.779       -0.029
          q4r1 <------------- q4r4              12.861        0.021
          q4r1 <------------- q3r4              16.174       -0.024
          q4r1 <------------- q4r3              13.097        0.021
          q3r1 <-------------- SM               10.238        0.139
          q3r1 <------------- q4r4              17.125       -0.026
          q3r1 <------------- q3r4              21.202        0.030
          q3r1 <------------- q4r3              14.530       -0.024
          q3r1 <------------ q28r6               9.841        0.076
```

```
q3r1  <------------ q28r5        8.345      0.067
q4r4  <------------ q4r1         9.242      0.293
q4r4  <------------ q3r1        21.453     -0.435
q4r4  <------------ q4r3         4.366      0.050
q3r4  <------------ q4r1        10.990     -0.306
q3r4  <------------ q3r1        25.239      0.451
q3r4  <------------ q4r3         4.828     -0.051
q27r4 <----------- Email        14.247      0.403
q27r4 <--------- Internet        9.142      0.083
q27r4 <------------- WWW         6.668      0.061
q27r4 <------------ q4r1        14.572      0.308
q27r4 <------------ q3r1         9.247      0.239
q27r4 <------------ q4r4         6.067      0.051
q27r4 <------------ q3r4         4.445      0.044
q27r4 <----------- q27r2        12.837     -0.099
q27r4 <----------- q27r5         5.234      0.061
q27r4 <------------ q4r3         6.455      0.051
q27r4 <----------- q28r5         6.016     -0.184
q27r3 <----------- Email         5.487     -0.228
q27r3 <---------- STPSNC        10.019     -0.102
q27r3 <---------- WTPSNC        16.810     -0.161
q27r3 <----------- q28r8         4.248      0.141
q27r3 <------------ q4r1         4.758     -0.161
q27r3 <------------ q3r1         4.525     -0.153
q27r3 <----------- q27r4         6.653      0.059
q27r3 <----------- q19r1         6.061     -0.008
q27r3 <---------- q27r11         7.959     -0.067
q27r3 <----------- q27r9         7.847     -0.062
q27r3 <----------- q27r7        12.306     -0.088


q27r3 <----------- q27r6        19.658     -0.115
q27r3 <----------- q27r5        12.001     -0.084
q27r2 <-------------- SM         4.574      0.276
q27r2 <---------- STPSNC         8.143      0.092
q27r2 <---------- WTPSNC        32.190      0.224
q27r2 <----------- q27r4        12.384     -0.081
q27r2 <----------- q27r11        4.178      0.049
q27r2 <----------- q27r9        13.793      0.083
q27r2 <----------- q27r7        32.730      0.144
q27r2 <----------- q27r6        32.309      0.149
q27r2 <----------- q27r5        17.006      0.101
q27r2 <----------- q28r5         9.518      0.212
q19r1 <-------------- WWW       25.073      1.006
q19r1 <-------------- SM         4.181      2.458
q19r1 <------------ q4r1         4.506      1.463
q19r1 <------------ q3r3        20.608      0.750
q19r1 <------------ q4r3        26.203      0.886
q19r1 <----------- q28r6         4.105      1.361
q27r12 <------------- SM         4.352     -0.264
q27r11 <----------- q28r8        4.015     -0.130
q27r9 <----------- Email         5.566      0.263
q27r9 <--------- Internet        5.850      0.069
q27r9 <------------ SOT3         5.199      0.094
q27r9 <------------ q4r1         5.082      0.190
q27r9 <------------ q3r4         5.323      0.051
q27r9 <----------- q27r2        10.716      0.094
```

```
q27r9  <------------ q28r5          6.269         0.196
q27r7  <--------------- SM          5.217         0.197
q27r7  <------------ q3r4           5.437         0.030
q27r7  <------------ q27r2          6.163         0.042
q27r7  <----------- q27r11          6.107        -0.039
q27r7  <------------ q27r5          4.463        -0.035
q27r7  <------------ q28r6          6.063         0.119
q27r6  <------------- SOT3          6.335        -0.057
q27r6  <------------ q27r4          8.591        -0.042
q27r6  <------------ q27r3         10.395        -0.047
q27r5  <------------ SOT3           4.239         0.084
q27r5  <----------- STPSNC         12.428         0.128
q27r5  <------------ q27r4         12.335         0.091
q27r5  <----------- q27r12         11.632         0.093
q27r5  <----------- q27r11         13.327         0.097
q27r5  <------------ q27r9          8.064         0.071
q3r3   <---------------- SM        11.250         0.510
q3r3   <------------ q28r8          8.524         0.236
q3r3   <------------- q4r1          6.689        -0.225
q3r3   <------------- q3r1          8.985         0.255
q3r3   <------------- q4r4          5.034        -0.050
q3r3   <------------- q3r4          7.674         0.063
q3r3   <------------ q28r6          8.581         0.249
q3r3   <------------ q28r5          8.288         0.233
q4r3   <---------------- SM        13.014        -0.517
q4r3   <------------ q28r8          7.942        -0.215
q4r3   <------------- q4r1          9.499         0.253
q4r3   <------------- q3r1         14.203        -0.302
q4r3   <------------- q4r4          6.070         0.052
q4r3   <------------- q3r4          8.367        -0.062
q4r3   <------------ q19r1          7.365         0.010
q4r3   <------------ q28r6         10.496        -0.259
q4r3   <------------ q28r5          8.544        -0.223
q28r6  <------------- SOT3          4.846        -0.031
q28r6  <----------- WTPSNC          5.361        -0.036
q28r6  <------------ q27r3          5.987        -0.022


q28r6  <------------ q27r6          7.256        -0.027
q28r6  <------------ q27r5          4.780        -0.021
q28r5  <------------ Email          8.256         0.121
q28r5  <------------- SOT3         12.685         0.056
q28r5  <----------- STPSNC         20.666         0.063
q28r5  <----------- WTPSNC         20.194         0.076
q28r5  <------------- q4r1          6.010         0.078
q28r5  <------------- q3r1          8.557         0.091
q28r5  <----------- q27r3           8.091         0.028
q28r5  <----------- q27r2          16.013         0.044
q28r5  <----------- q27r12          8.040         0.030
q28r5  <----------- q27r11         16.191         0.041
q28r5  <------------ q27r9         20.115         0.043
q28r5  <----------- q27r7          15.211         0.042
q28r5  <----------- q27r6          20.242         0.051
q28r5  <------------ q27r5          6.881         0.028
q28r5  <------------ q3r3           4.397         0.016
```

```
Summary of models
-----------------

                  Model    NPAR        CMIN    DF           P    CMIN/DF
        ---------------    ----   ---------    --   ---------   ---------
          Default model      58     655.436   132       0.000       4.965
        Saturated model     190       0.000     0
     Independence model      19    7912.272   171       0.000      46.271


                  Model     RMR         GFI        AGFI        PGFI
        ---------------  ----------  ----------  ----------  ----------
          Default model      0.303       0.921       0.886       0.640
        Saturated model      0.000       1.000
     Independence model      1.078       0.394       0.327       0.355


                           DELTA1        RHO1      DELTA2        RHO2
                  Model       NFI         RFI         IFI         TLI         CFI
        ---------------  ----------  ----------  ----------  ----------  ----------
          Default model      0.917       0.893       0.933       0.912       0.932
        Saturated model      1.000                   1.000                   1.000
     Independence model      0.000       0.000       0.000       0.000       0.000


                  Model    PRATIO        PNFI        PCFI
        ---------------  ----------  ----------  ----------
          Default model      0.772       0.708       0.720
        Saturated model      0.000       0.000       0.000
     Independence model      1.000       0.000       0.000


                  Model       NCP       LO 90       HI 90
        ---------------  ----------  ----------  ----------
          Default model     523.436     447.292     607.104
        Saturated model       0.000       0.000       0.000
     Independence model    7741.272    7453.406    8035.461


                  Model      FMIN          F0       LO 90       HI 90
        ---------------  ----------  ----------  ----------  ----------
          Default model      0.791       0.631       0.540       0.732
        Saturated model      0.000       0.000       0.000       0.000
     Independence model      9.544       9.338       8.991       9.693


                  Model     RMSEA       LO 90       HI 90      PCLOSE
        ---------------  ----------  ----------  ----------  ----------
          Default model      0.069       0.064       0.074       0.000
     Independence model      0.234       0.229       0.238       0.000
```

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Model	AIC	BCC	BIC	CAIC
Default model	771.436	774.304	1216.056	1103.279
Saturated model	380.000	389.394	1836.514	1467.071
Independence model	7950.272	7951.211	8095.923	8058.979

Model	ECVI	LO 90	HI 90	MECVI
Default model	0.931	0.839	1.031	0.934
Saturated model	0.458	0.458	0.458	0.470
Independence model	9.590	9.243	9.945	9.591

Model	HOELTER .05	HOELTER .01
Default model	203	219
Independence model	22	23

Execution time summary:

Minimization: 0.150
Miscellaneous: 2.113
Bootstrap: 0.000
Total: 2.263

Appendix J: Variables transformations

Transformation	Variable
Square root	q3r1 Frequency of email
None	q3r2 Frequency of cell
Cube	q3r3 Frequency of your own website
None	q3r4 Frequency of Internet
Square root	q4r1 Dependence on email
None	q4r2 Dependence on cell phone
Square root	q4r3 Dependence on own website
None	q4r4 Dependence on Internet
Reciprocal	q8r2 Email messages received in a day
Square root	q9 WWW marketing
Log	q18r1 Sellers always get the asking price.
Log	q18r2 The market is a seller's market.
None	q18r3 Buyers often offer more than the asking price.
Raw	q18r4r An overpriced house will get no offers.
Log	q18r5 It is common for a seller to receive multiple bids.
Square	q19r1 Total income earned from commissions
Square	q20r1 Net personal income from all real estate activities
Square root	q23r1 Number of homes sold
Raw	q27r1 Wherever I go, I meet somebody I know.
Raw	q27r2 I seek opportunities to meet people.
Raw	q27r3 I am always looking to add names to my contact list.
Square root	q27r4 I am in frequent contact with people on my contact list.
Raw	q27r5 I have lots of friends.
Raw	q27r6 I have many opportunities to meet new people.
Raw	q27r7 I am constantly meeting new people.
Square root	q27r8 Other professionals want to work with me.
Raw	q27r9 Other real estate professionals (mortgage officers, lawyers, etc.) seek me out

	for
	advice.
Raw	q27r10 Most of my real estate colleagues perceive me as a leader on professional topics and issues.
Raw	q27r11 I've developed enough professional contacts to excel in my job.
Raw	q27r12 I've developed enough professional contacts so that I usually know most of the participants at a closing (lawyers, etc.).
Raw	q27r13 I have worked with the same professionals for many years now.
Square root	q28r1 I would probably make a good actor.
Square root	q28r2r I find it hard to imitate the behavior of other people.
Square root	q28r3r At parties and social gatherings, I do not attempt to do or say things that others will like.
Square root	q28r4r I can only argue for ideas that I already believe.
Square root	q28r5 I can make impromptu speeches even on topics about which I have almost no information.
Square root	q28r6 I guess I put on a show to impress or entertain people.
Square root	q28r7r In a group of people I am rarely the center of attention.
Square root	q28r8 In different situations and with different people, I often act like very different people.
Square root	q28r9r I am not particularly good at making other people like me.
Square root	q28r10 I'm not always the person I appear to be.
Square root	q28r11r I would not change my opinions (or the way I do things) in order to please someone else or win their favor.
Square root	q28r12 I have considered being an entertainer.
Square root	q28r13r I have never been good at charades or improvisational acting.
Square root	q28r14r I have trouble changing my behavior to suit different people and different situations.
Square root	q28r15r At a party I let others keep the jokes and stories going.
Square root	q28r16r I feel a bit awkward in company and do not show up quite so well as I should.

Square root	q28r17 I can look anyone in the eye and tell a lie with a straight face (if for a good end).
Square root	q28r18 I may deceive people by being friendly when I really dislike them.
Square	q29r1 I prefer to work with others in a group rather than working alone.
Square	q29r2r Given the choice, I would rather do a job where I can work alone
Square	q29r3 Working with a group is better than working alone.
Square	q29r4 People should be made aware that if they are going to be a part of a group then they are sometimes going to have to do things they don't want to do.
Square	q29r5 People who belong to a group should realize that they're not always going to get what they personally want.
Square	q29r6 People in a group should realize that they sometimes are going to have to make sacrifices for the sake of the group as a whole.
Square	q29r7 People in a group should be willing to make sacrifices for the sake of the group's well-being.
Square	q29r8r A group is more productive when its members do what they want to do rather than what the group wants them to do.
Square	q29r9r A group is most efficient when its members do what they think is best rather than doing what the group wants them to do.
Square	q29r10r A group is more productive when its members follow their own interests and concerns.
	q30r3 How long have you worked in real estate?
	q30r4 How long have you lived in your current area?
	q32r1 Highest level of education completed

Appendix K : Data preparation

In preparing the data for analysis, certain assumptions about the properties of the data analyzed must be met. I addressed several concerns with regards to data preparation: (1) errors upon data entry, (2) systematic errors with respect to mistakes in directions, questions, or formatting, (3) respondent error, (4) ensuring that the assumption of properties and distributions of the data are suitable for the type of data analysis used, and (5) assessing missing data to determine the effect this has on the generalizability of results.

The data entry for my survey was outsourced. The data was double entered, to reduce the likelihood of operator error. The data cleaning involved examining raw data to assess systematic errors. Individual values of data were examined to determine if extreme values existed as a result of respondent error, or if there was some other systematic explanation for unexplainable high or low values. The range of values for each question was also examined. It was also required that several survey items be reversed-coded. The order of these reversed items was reordered, from highest to lowest, to reflect meaning in the same direction with other items on the scale.

In addition to choosing a value on a continuous scale, respondents could indicate that they did not know the answer to the question, or that the question was not applicable in their case. Values of eight and nine were presented as "Don't know" or "Not Applicable," respectively. These values were coded so that the values of 8 and 9 did not bias analysis of the Likert scale items. Statistics were plotted for each item to identify outliers, coding errors, and skewed data. Most questions were continuous scales with defined lower and upper limits, suggesting that outliers would not be possible. For those questions where data values were unconstrained, box blots were examined to assess outliers.

Another important concern in data preparation is ensuring that the data have certain properties. The inferential statistics used for analysis require that the data be normally distributed. Normally distributed data ensures the validity of normal theory estimators such as maximum likelihood and generalized least squares. Normal theory does not hold under excessive kurtosis and skewness. This means that an analysis of data may not be valid if data are not normally distributed. The assumption of structural equation modeling, the analysis method used in this research, is that data are normally distributed. However, from a pragmatic perspective, researchers generally do perform analysis on non-normal data as long as the distributions do not deviate greatly from a normal distribution.

Two measures are often used to assess the degree to which data is normally distributed: skewness and kurtosis. Skewness measures the symmetry of the sample distribution. Kurtosis measures the peakedness of the sample distribution. I used the ratio of each statistic to its standard error to test for normality. Normality is rejected if the value is less than -2 or greater than +2. Skewness and kurtosis statistics are sensitive to anomalies in the distribution, so data were also studied in conjunction with a histogram, boxplot, or stem and leaf diagram.

Multivariate normality is a common assumption of the data in structural equation modeling. Multivariate normality means that (1) all the univariate distributions are normal, (2) the joint distributions of any combination of the variables are also normal, and (3) all bivariate scatterplots are linear and homoscedastic (Kline 2004). In order to assess multivariate normality, I examined bivariate scallerplots for all variables analyzed.

Statistical analysis of variable values to determine proper transformation was conducted. Intercooled Stata 7.0 software was used to determine the proper transformation to perform on the data. Items for several questions were highly skewed and had high levels of kurtosis, even after

transformation. Exploratory analysis of raw data confirmed the need for transformation. Transformations were performed upon data, where needed, to ensure that the data was more normally distributed. Please see Appendix J for a listing of the data that was not normally distributed and the transformations that were performed in each variable.

It is important to address the extent of missing responses and to determine if there are any systemic explanations for missing data or for a pattern in which data is incomplete, missing, or otherwise unobserved. Incomplete data can bias conclusions drawn from an empirical study. There are no clear guidelines as to what constitutes a large amount of missing data. One standard is that missing data should constitute less than 10% of the data (Kline 2004). For this study, most missing values ranged from 3% to 7% well below the acceptable level of 10%. The number of missing responses for questions averaged around 4%.

The large sample size and low percentage of missing values in my research suggested that addressing missing data was not as serious a concern as it might have been had the sample size been small and the percentage of missing values high. In addition, missing data were examined relative to the wording of specific questions and relationships between questions to assess whether or not there were systemic reasons for missing data due to question wording. Questions with higher numbers of missing values were carefully scrutinized to assess whether or not there was a systematic explanation for missing answers. There were no discernable systematic reasons for missing values.

When performing structural equation analysis, the full analysis cannot be performed on data with missing values. For this reason, missing data is often substituted with a statistic. Another option with missing data is to throw out the cases that contain missing data. Missing values are often substituted with the median or mean. The mean is the average of all values for that variable.

The median is the middle observation when the data are ordered from smallest to largest (SPSS, 1999).

Replacing the missing values with the average may affect the overall variance in the data. The median is less sensitive to outliers. The calculation of the median depends on the position of ordered sample values rather than the exact value of every of every observation in the sample. For this reason, a decision was made to use the median value for all data missing data.

Appendix L: Factor analysis

In any research there is a trade off between theory, construct, measure, and data. For example, certain decisions had to be made with respect to the selection of items to include as measures for constructs. These decisions were greatly influenced by the factor analysis. There was also the question of whether the results of the factor analysis contributed towards construct validity. In other words, were the final constructs and measurements selected consistent with the theories used in the study? In the discussions that follow, interpretation of factor analysis and measurement development process is discussed.

Appendix M: Limitations of interpretation of findings

The proposed model of this study was predictive in nature, not causal. I argue that the present model has some explanatory power. The intent of this research was not to attempt to explain all of the variance accounted for, but rather to explore theoretical propositions that suggest that personal social network connectivity is an important contributing factor to the success of contractual project-based workers, and that individual characteristics affect the shaping of social networks.

Within the confines of this study, it was only possible to address a few of the individual characteristics of the contractual project-based worker that contribute to the development of personal social networks. Findings from other studies complement this study in developing theoretical understandings of the shaping of personal social networks by contractual project-based workers.

Given the selected methodology and the phenomena of study, choices were made with respects to the specificity of the phenomena studied. Given that this study was conducted in an underdeveloped area of inquiry — perceived levels of personal social network connectivity — a decision was made to begin at a more general level. As other studies are conducted and theory is further developed, more specific aspects of the phenomena of study can be addressed. For example specific functions of personal social network connectivity might be researched. The measures of strong and weak tie personal social network connectivity and the social contact factor might be further developed. Or other measures of personal social network connectivity might be measured.

While real estate agents serve as exemplars of distributed contractual project-based workers, there are limits to the generalizability of residential real estate workers to other types of contractual project-based workers. For instance, the work of some contractual project-based workers may not

be as sales-based as that of the residential real estate agents. In addition, the degree to which the contractual project-based work is distributed may vary depending upon the specific context of the contractual project-based work.

Another limitation is that this research focused solely on social network connectivity in order to gain insight into the work of contractual project-based workers. There are many other approaches that can be taken in researching contractual project-based work. One example is a focus on the specific models of organization that contractual project-based workers use in their work, given the distinctiveness of their work context.

Appendix N : Bivariate scatterplots of weak tie personal social connectivity items as predictors of performance.
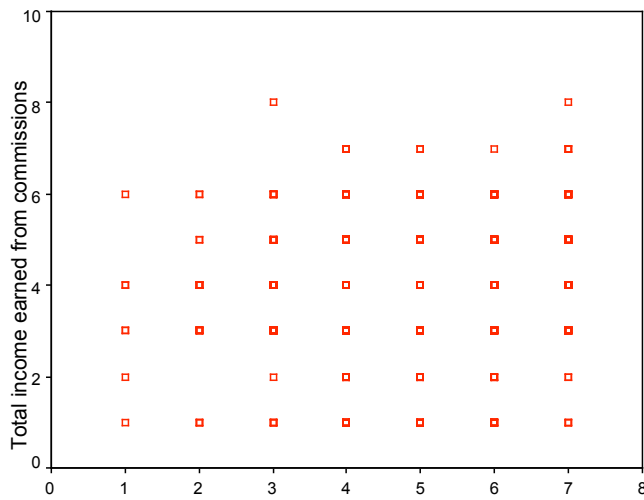
Q27r2: I seek opportunities to meet people.
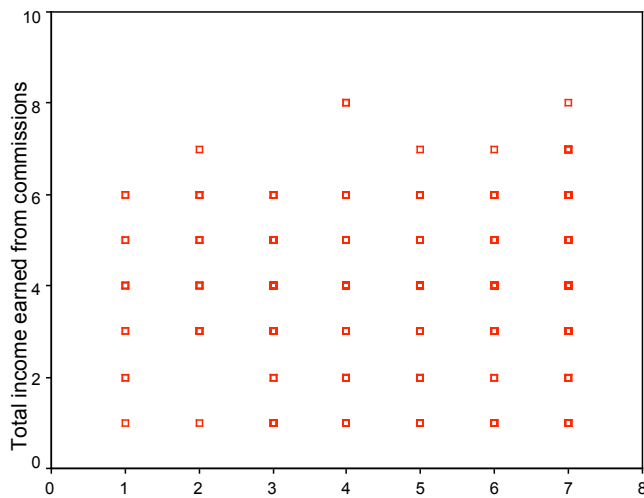
Q27r3: I am always looking to add names to my contact list.
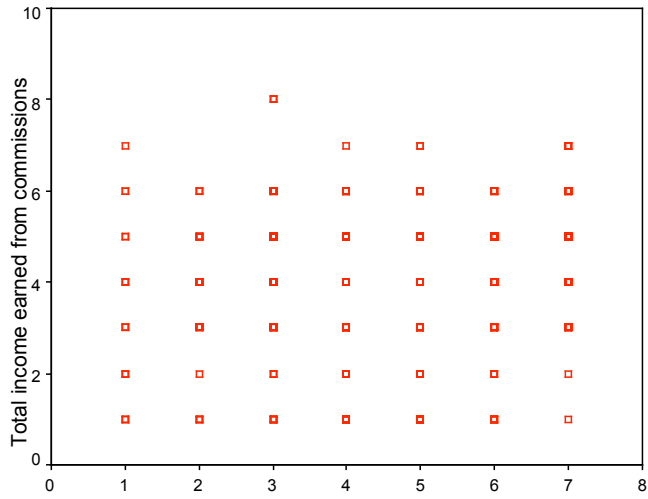
Q27r4: I am in frequent contact with people on my contact list.
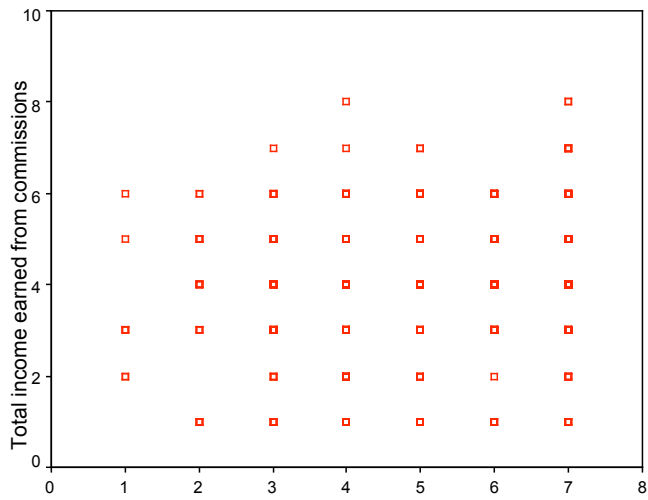
Q27r5: I have lots of friends.
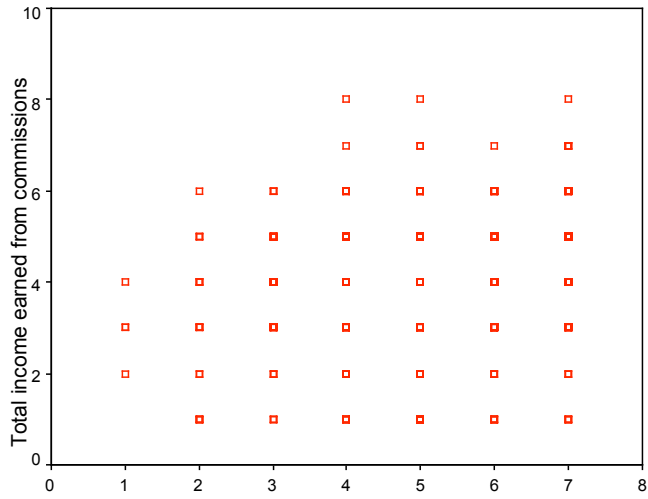
Q27r6: I have many opportunities to meet new people.
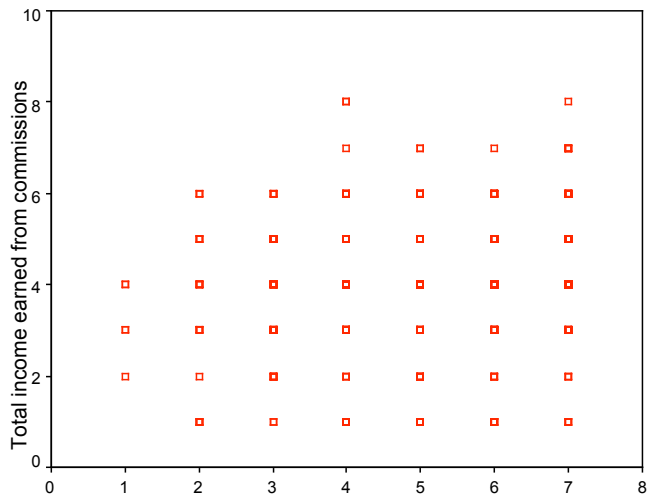
Q27r7: I am constantly meeting new people.

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